EnviroTrac
Environmental Services

Site Characterization and Investigation Work Plan

Former CAMCO Site
2125 Smithtown Avenue,
Ronkonkoma, New York

NYSDEC Index #A1-0627-12-09

Date:
August 18, 2010

Submitted To:

Mr. John Sheehan
NYSDEC, Region 1
Building 40
SUNY at Stony Brook
Stony Brook, New York 11790

Prepared By:

EnviroTrac Ltd.
5 Old Dock Road
Yaphank, NY 11980

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

Site Characterization and Investigation Work Plan

Former CAMCO Site
2125 Smithtown Avenue
Ronkonkoma, New York

Patrick Condon
Project Manager

Peter C. Breen
Technical Director

for
Jeffrey S. Romano
Quality Assurance Officer

Michael Clark / PCB
Michael A. Clark, CHMM
Health and Safety Director

August 18, 2010
Date

EnviroTrac
Environmental Services

TABLE OF CONTENTS

FIGURES

TABLES

APPENDICES

1.0 INTRODUCTION

1.1 Purpose

The Town of Islip, Suffolk County, New York (the Town) and the New York State Department of Environmental Conservation (the Department) have entered into an Order on Consent and Administrative Settlement "Order", Index #A1-0627-12-09 that specifies the development and implementation of a remedial program for property owned by the Town. The Site is currently listed in the *Register of Inactive Hazardous Waste Disposal Sites in New York State* as Site Number HS 1006 with a Classification "P" pursuant to ECL 27-1305. The objective of this *Site Characterization and Investigation Work Plan* is to identify the presence of hazardous waste disposal at the Site.

listed in the registry inactive Haz Site, site # HS1006 and Registry inactive Haz waste Site, site # 152206 as a "P" site

2.0 PHYSICAL SETTING

2.1 Site Location

The Town owns the property located at 2125 Smithtown Avenue, Ronkonkoma, New York, where Central Aviation & Marine Corporation (hereinafter "CAMCO") was formerly located (Figure 2-1). The latitude and longitude coordinates for the approximate center of the Site are 40° 47' 56.8" north and 73° 6' 31.7" west, respectively. The Site is identified as Tax Map: Section 106; Block 1: Lot 6.6.

The Site is located on the west side of the Long Island McArthur Airport complex and on the east side of Smithtown Avenue, approximately one (1) mile north of the Veterans Memorial Hwy. (NYS Rte 454): one (1) mile south of the Long Island Expressway (1-495); and three thousand five hundred (3,500) feet east of Lakeland Avenue (C.R.93), in the hamlet of Ronkonkoma, Town of Islip, County of Suffolk, New York.

2.2 Site Description

The Site consists of two parcels, measuring approximately 2.03 acres and 0.62 acres, respectively (Figure 2-2). The larger parcel is comprised of a one and two story wood frame structure and a small wood-frame shed that occupies approximately 50,000 square feet of area. The remainder of the Site consists of asphalt/gravel for parking purposes. The structures were not occupied during a site walk through conducted on April 16, 2010 and are in a general condition of disrepair. This area has been historically utilized as a repair shop for overhauling and repairing aircraft accessories and turbine engines. The smaller parcel is comprised of a steel frame building that occupies approximately 13,000 square feet of area. The remainder of the Site consists of asphalt paved and vegetated land.

2.3 Regional Geology and Hydrogeology

The Site is located in the Atlantic Coastal Plain physiographic province which is characterized by low hills of unconsolidated sands, gravel and silt. Land surface elevation at the Site is approximately 91feet above mean sea level (ft/msl). Regionally the shallow subsurface consists of Pleistocene age deposits of glacial drift that consist of southward sloping surfaces of sand, gravel and silt which overlie thick Cretaceous age strata comprising the Magothy, Raritan and Lloyd Formations. Beneath these unconsolidated deposits the crystalline-bedrock surface in the vicinity of the Site is found at an elevation of approximately -1,500 ft/msl. This bedrock foundation, formed during the Precambrian Era, has negligible permeability and functions as a hydrologic boundary or base for the Long Island groundwater flow system. Regionally, groundwater flows within the unconsolidated deposits toward the Great South Bay, which is located approximately five miles to the south of the Site.

2.4 Site Specific Geology and Hydrogeology

Based on limited data derived from previous investigations conducted at the Site the underlying geology is consistent with the reported regional characteristics associated with literature descriptions of the shallow Pleistocene age deposits found regionally.

Based on prior testing conducted at the Site the depth to groundwater is approximately 50 feet below land surface. N.D. Eryou, PhD, PE, a previous investigator at the Site, has reported the general direction of groundwater flow to be to the south southwest.

3.0 OWNERSHIP/OCCUPANCY AND USE OF THE SITE

3.1 Ownership/Occupancy

From approximately 1936 until 1996 CAMCO leased this property from the Town of Islip.

3.2 Historical Use of the Site

During its occupation at the Site CAMCO operated a repair and overhaul shop for aircraft parts and accessories. Prior to 1980 the CAMCO's facility's wastewater discharged on site to a series of leaching pools and storm drains. From the early 1980s to 1996 CAMCO treated, containerized and transferred operational wastewater to an off-site recycling or disposal facility. Sanitary wastes were discharged to cesspools located east of the main building and west of the smaller structure. During operation, electricity, natural gas and potable water were supplied to the Site by off-site providers.

3.3 Current Use of the Site

In 1996, CAMCO vacated the property and since then the main building has been vacant and the warehouse used for limited storage; the majority of the facility has been dormant.

3.4 Adjoining Properties

Land use in the immediate vicinity of the Site consists of:

- Paved roadway, Suffolk County Police, HMS Inc. and Aero Trades Corp. to the north;
- Airport runway to the east;
- Paved roadway to the south; and
- Smithtown Avenue to the west.

4.0 PREVIOUS ENVIRONMENTAL INVESTIGATIONS

Environmental studies have reportedly been conducted at the CAMCO site date to 1980 when samples collected from on-site leaching pools and storm drains revealed the presence of elevated concentrations of cadmium (4.2 ppm), 1,1,1-trichloroethane (1270 ppb), and methylene chloride (1,300 ppb).

During the last several years evaluations have been conducted to assess the presence of impacts to soil and groundwater remaining from previous on-site operations.

- N.D. Eryou PhD, PE/Kost Environmental Services, Inc. (December 2006) – Phase I Site Assessment.
- N.D. Eryou PhD, PE/Kost Environmental Services, Inc. (July 2007) – Laboratory Data for Subsurface Evaluation Report #2.
- Fenley & Nicol (April 21, 2008) – Subsurface Investigation Report.
- Fenley & Nicol (October 14, 2008) – Soil Gas Sampling Report.
- N.D. Eryou PhD, PE/Kost Environmental Services, Inc. (October 8, 2009) – Fourth Investigation Work Plan.

These evaluations included summaries of environmental database records reviews conducted pertaining to historic Site operations and summaries of soil and groundwater testing and soil vapor assessments performed to identify whether there remained any environmental impacts from former operations. Results identified locations where elevated concentrations of chemical constituents were found in soil vapor, soil and groundwater collected at locations including former drum storage areas and leaching pools. Based on these results, the impacted leaching pools were cleaned out in 2008 as described in the Fenley & Nicol (F&N) April 21, 2008 Subsurface Investigation Report. VOCs including trichloroethene (TCE), 1,1,1-trichloroethane (TCA), tetrachloroethene (PCE) and cis-1,2-dichloroethene were detected in soil vapor sampling conducted by F&N in March and September, 2008 (Tables 4-1 and 4-2) at the locations shown on Figures 4-1 and 4-2, respectively.

5.0 ENVIRONMENTAL RECORDS REVIEW

In accordance with the Order a Records Search Report was prepared and submitted to the Department on July 8, 2010.

6.0 AREAS OF ENVIRONMENTAL CONCERN

Based on previously conducted testing and remedial actions implemented at the Site, and review of information provided in reports listed in Section 4.0, 2 (two) areas of environmental concern (AECs) have been identified requiring additional investigation.

6.1 General Footprint of the Main Building

Prior testing has revealed the presence of elevated concentrations of volatile organic compounds in soil vapor samples collected from below the building foundation slab. To further evaluate the presence and general distribution of VOCs in the soil beneath the footprint of the building soil vapor testing will be conducted at locations of previous sampling events.

6.2 Former Drum Storage Area

Previous testing has identified that the highest concentrations of VOCs were found at the location of the former drum storage area located in the southwest portion of the building. Additional subsurface investigation will be conducted at this location to investigate remaining impacts resulting from potential historic releases and to determine if a source of contamination to soil and groundwater exists.

7.0 SCOPE OF WORK

Project related activities will be conducted as per applicable local, county, state (6 NYCRR Part 375) and federal regulations (40 C.F.R Part 300). Quality assurance and health and safety procedures that will be employed during the project are presented in the Quality Assurance Project Plan (QAPP) and the Health and Safety Plan (HASP) provided in Appendices A and B, respectively.

The Town has determined that all above ground structures and foundations present at the Site will be removed. This demolition will be conducted prior to the implementation of the activities specified in this work plan.

7.1 Sample Collection Locations

Environmental media samples will be collected from each of the identified AECS at the approximate locations presented on Figures 4-1 and 4-2 (soil vapor testing), and Figure 7-1 (soil and groundwater testing). During the proposed activities the actual testing locations will be field verified and placed on scaled figures that will be submitted as part of the investigation summary report.

7.1.1 Soil Vapor Assessment

Six soil vapor samples will be collected at former testing locations within the footprint of the building designated SG-1, SG-2, SG-4, SG-5, SG-7 and SG-8. These locations were tested during March and September 2008 and samples analyzed for the presence of VOCs using Method TO-15. While numerous VOCs were detected; TCE was found at the highest concentrations ranging to a maximum of 32,000 ug/m^3 for sample SG-7, corresponding to the location of a former drum storage area in the southwest portion of the building.

To assess the shallow soil vapor, implants will be installed and samples collected at the prior testing locations. Eight hour duration samples will be collected from six soil vapor implants and analyzed for TO-15 VOCs and helium. An ambient outdoor air sample will be collected during the soil vapor testing at a location upgradient of the building with respect to wind direction as noted on the date of sampling, and analyzed for TO-15 VOCs.

7.1.2 Soil Assessment

Four soil borings will be drilled in the vicinity of the former drum storage area located in the southwestern portion of the building to evaluate the presence of residual chemical impacts to soil. Two of these proposed borings (designated SB-1 and SB-2) will be drilled to a depth of 10 feet bgs, one of these will be installed at the location of a drywell that is located adjacent to the pad area. The remaining two proposed (designated MW-4 and MW-5) will be advanced approximately 10 feet into the saturated zone (the depth to water is estimated to be approximately 65 feet bgs based on information provided), and completed as monitoring wells. The borings will be advanced using a Geoprobe with continuous samples collected and screened in the field for the presence of VOCs using a portable photoionization detector (PID). Proposed monitoring well constructions details are illustrated on Figure 7-2.

A sample from the interval exhibiting the highest PID response will be collected from each of the shallow soil borings (SB-1 and SB-2) and submitted to the laboratory for analysis (in the absence of elevated PID response soil from the deepest interval of the borings will be analyzed). For the deeper soil borings (MW-4 and MW-5), a sample collected from the interval just above the water table will be submitted to the laboratory for analysis. The soil samples will be tested for the full Target Analyte List and Target Compound List (TAL/TCL) parameters.

7.1.3 Groundwater Assessment

The presence of elevated concentrations of VOCs including TCE, TCA, and PCE in soil vapor from prior testing suggests the possibility of impacts to soil and groundwater quality in the vicinity of those findings. In addition, F&N reported the detection of groundwater impacts in the vicinity of the Site based on work conducted during a subsurface investigation conducted in 2008 when PCE and TCE were detected in groundwater at levels in the vicinity of the CAMCO site at concentrations exceeding regulatory standards.

Further evaluation of groundwater quality is recommended based on the results of the prior work conducted. This will be accomplished through the installation and sampling of two (2) permanent groundwater monitoring wells at the location of the former drum storage area located in the southwestern portion of the building. These wells will be installed at the locations of the two deep soil borings discussed in Section 7.1.2.

The proposed groundwater monitoring wells will be installed using a Geoprobe drilling rig and constructed of 2-inch diameter schedule 40 PVC casing with a 10-foot screen set to bridge the water table. Based on provided information it is anticipated that the water table will be encountered at a depth of approximately 50 feet bgs. The proposed wells will be surveyed and tied into the existing monitoring well after installation.

Following well installation and development a groundwater samples will be collected using a low flow protocol and sent to the laboratory for analysis of the full TAL/TCL parameters.

The approximate direction of groundwater flow will be assessed through interpolation of gauging data obtained from these new wells and three existing wells (MW-1, MW-2 and MW-3) that were installed in 2006.

7.2 Technical Procedures

The methodologies that will be utilized as part of this Site Characterization and Investigation Work Plan have been developed to satisfy the requirements of NYSDEC 6 NYCRR Part 375.

7.2.1 Soil Assessment

Geoprobe® Macro-Core® samples shall be collected using the direct push method at five-foot intervals to an estimated maximum depth of 65 feet to assess potential stratigraphic variability in the vicinity of the Site using a Geoprobe® 8040 drilling rig. 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*. The on-site hydrogeologist will examine and identify the sample immediately upon collection. The samples will also be screened for VOCs using a handheld photoionization detector (PID).

7.2.1.1 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 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 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.

7.2.1.2 Soil Logging

The on-site 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 on-site hydrogeologist will label the jars or plastic bags with soil boring or well number, sample interval, date, and time.

7.2.1.3 Soil Sampling

Soil samples chosen from selected intervals based on PID response will be placed into laboratory supplied containers and sent to the laboratory for analysis of the full NYSDEC TCL/TAL list compounds.

- Drill cuttings will be placed into 55-gallon drums and staged on-site.
- Detailed notes will be maintained by supervising hydrogeologist in the field book including:
  - Location and orientation of the 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.

7.2.2 Groundwater Assessment

7.2.2.1 Monitoring Well Installation

Groundwater monitoring wells will be installed at the Site to assess the possibility of impacts to groundwater resulting from historic operations at 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.* 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.*

Following completion of drilling and soil sampling pertaining to locations MW-4 and MW-5, as described in Section 7.1.2, each boring will be completed as a 2-inch diameter PVC monitoring well in accordance with NYSDEC requirements. All monitoring well installation, drilling, - construction, development, testing and sampling will be overseen by a qualified hydrogeologist who will maintain detailed records (e.g., soil boring logs, screening data, field observations, odors, pumping rate/yield during development) at each well. Figure 7-2 provides general well construction information.

The need for using water during drilling is not anticipated. All water used during drilling (if required) and/or steam-cleaning operations shall be from a potable source and so designated in writing. All permits from the local water purveyor and any other concerned authorities, and provision of any required back-flow prevention devices as required will be obtained prior to initiation of drilling activities.

Monitoring Well Drilling Procedures

Boreholes shall be advanced by the direct push drilling method using a Geoprobe® 8040 drilling machine as described in Section 7.2.1.

Drill Cuttings

Soil 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 properly labeled and staged on-site pending off-site disposal.

Well Construction Materials

All monitoring wells shall be constructed of 2-inch inside diameter, threaded flush joint, schedule 40 PVC casing and screens 10 feet in length, PVC construction having slot openings of 0.010-inches.

The on-site 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. All 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 on-site 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.

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 properly. 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 on-site 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 on-site hydrogeologist or the Field Team Leader (FTL).

Each well will be developed to remove at a minimum, the volume of water introduced during drilling (if water is used), 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 on-site hydrogeologist will be responsible for collection of NTU, pH, conductivity, and temperature measurements after each well volume is removed from the well.

7.2.2.2 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.

Groundwater samples shall be collected using low-flow purging and sampling protocol. Further detail can be found in the ASTM guidance document D6771-02, *Standard Practice for Low-Flow Purging and Sampling for Wells and Devices Used for Groundwater Quality Investigations.*

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.

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.

Groundwater Sample Collection

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.

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 not detected in the well, continue with the low-flow sampling procedures described below.

<u>Low-Flow Sampling</u>

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

Typical Sampling Equipment List

- Adjustable-rate, positive displacement pump (i.e., bladder pump) constructed of stainless-steel or Teflon®). The selected pump must be specifically designed for low flow rates (i.e., use of a high volume pump that is adjusted down to a low flow setting is not permitted).
- 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® and Teflon®-lined polyethylene tubing must be used to collect samples for organic analysis. For samples collected for inorganic analysis, Teflon® or Teflon®-lined polyethylene, PVC, Tygon, or

polyethylene or silicon 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 Collection Procedure

1. Lower the pump, safety cable, tubing, and electric lines 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 100 to 500 milliliters per minute. 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).

    a. 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. However, once stabilization is indicated, a minimum of 3 consecutive readings at 3 to 5 minute intervals will be recorded prior to sample collection.

b. 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.
c. 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. During purging, measure and record the field indicator parameters using the in-line meter (turbidity, temperature, specific conductance, pH and dissolved oxygen) every 3 to 5 minutes (or as appropriate). If purging continues for more than 30 minutes, readings will be recorded at approximately 10-minute intervals. However, once stabilization is indicated, a minimum of 3 consecutive readings at 3 to 5 minute intervals will be recorded prior to sample collection.

    a. The well is considered stabilized and ready for sample collection once all the field indicator parameter values remain within 10 percent for 3 consecutive readings.
    b. If drawdown in the well is measured at 1 foot or more, continue to low flow purge until a minimum of the equivalent volume of 1 well casing volume is removed. Using the flow equation to calculate the volume of purge water. Then collect the groundwater sample.

4. Before sampling, either disconnect the in-line cell or use a bypass 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.

7.2.3 Soil Vapor Assessment

The presence of volatile compounds in shallow soil vapor within the foot print of the main building will be assessed using procedures specified in the New York State Department of Health's Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006).

7.2.3.1 Soil Vapor Sampling

Soil vapor probes (Figure 7-2) used for this project will be may be permanent installations for data consistency reasons and to ensure outdoor air infiltration does not occur. The probes will be constructed in the same manner at all sampling locations to minimize possible discrepancies. The following procedures will be included in the vapor probe construction protocol:

1. Due to shallow depth the implants will be installed using a manually driven auger;
2. Porous, inert backfill material (e.g., glass beads, washed #1 crushed stone, etc.) will be used to create a sampling zone 1 to 2 feet in length;
3. The probe will be fitted with inert tubing (e.g., polyethylene, stainless steel, nylon, Teflon®, etc.) of the appropriate size (typically 1/8 inch to 1/4 inch diameter) and of laboratory or food grade quality to the surface;
4. Soil vapor probes will be sealed above the sampling zone with a bentonite slurry for a minimum distance of 3 feet to prevent outdoor air infiltration and the remainder of the borehole backfilled with clean material; and
5. Steps will be taken to minimize infiltration of water or outdoor air and to prevent accidental damage (e.g., setting a protective casing around the top of the probe tubing and grouting in place to the top of bentonite, sloping the ground surface to direct water away from the borehole like a groundwater monitoring well, etc.).

To obtain representative samples and to minimize possible discrepancies, soil vapor samples will be collected in the following manner at all locations:

1. At least 24 hours after the installation of permanent probes and shortly after the installation of temporary probes, one to three implant volumes (i.e., the volume of the sample probe and tube) will be purged prior to collecting the samples;
2. Flow rates for both purging and collecting will not exceed 0.2 liters per minute to minimize outdoor air infiltration during sampling;
3. 8-hour duration samples will be collected, using 6 liter Summa® canisters and controllers provided by the laboratory and analyzed using EPA Method TO-15; and
4. A tracer gas will be used when collecting soil vapor samples to verify that adequate sampling techniques are being implemented (i.e., to verify infiltration of outdoor air is not occurring) [see below].

When soil vapor samples are collected, the following actions will be taken to document local conditions during sampling that may influence interpretation of the results:

1. Outdoor plot sketches will be drawn that include the site, area streets, neighboring commercial or industrial facilities (with estimated distance to the site), outdoor air sampling locations (if applicable), and compass orientation (north);
2. Weather conditions (e.g., precipitation and outdoor temperature) will be noted for the past 24 to 48 hours; and
3. Any pertinent observations will be recorded, such as odors and readings from field instrumentation.

Additional information that may be gathered to assist in the interpretation of the results includes barometric pressure, wind speed and wind direction.

The field sampling team should maintain a sample log sheet summarizing the following:

- Sample identification;
- Date and time of sample collection;
- Sampling depth;
- Identity of samplers;

- Sampling methods and devices;
- Purge volumes;
- Volume of soil vapor extracted;
- Canister vacuum before and after samples were collected;
- Apparent moisture content (dry, moist, saturated, etc.) of the sampling zone; and
- Chain of custody protocols and records used to track samples from sampling point to analysis.

Tracer gas

When collecting soil vapor samples, a tracer gas serves as a quality assurance/quality control measure to verify the integrity of the soil vapor probe seal. Without the use of a tracer, there is no way to verify that a soil vapor sample has not been diluted by outdoor air. Helium will be used as the tracer as it is readily available, has low toxicity, can be monitored with portable measurement devices and can be detected in the laboratory.

The protocol for using a tracer gas is straightforward: simply enrich the atmosphere in the immediate vicinity of the area where the probe intersects the ground surface with the tracer gas, and measure a vapor sample from the probe for the presence of high concentrations (> 10%) of the tracer. A plastic pail will serve to keep the tracer gas in contact with the probe during the testing.

There are two basic approaches to testing for the tracer gas:

1. Include the tracer gas in the list of target analytes reported by the laboratory; or
2. Use a portable monitoring device to analyze a sample of soil vapor for the tracer prior to and after sampling for the compounds of concern. (Note that the tracer gas samples can be collected via syringe, Tedlar® bag etc. They need not be collected in Summa® canisters or minicans.)

The advantage of the second approach is that the real time tracer sampling results can be used to confirm the integrity of the probe seals prior to formal sample collection. For the purposes of this project both methods will be employed to better ensure that soil vapor samples are representative of subsurface conditions and to help minimize the possibility of shipping cross-contaminated (compromised) samples to the laboratory. Tracer gas samples will be collected during sampling at each of the soil vapor sampling locations.

Figure 7-2 depicts the method that will be employed for tracer gas testing. The selected tracer gas (helium) will be released in the enclosure prior to initially purging the sample point, taking care to avoid excessive purging prior to sample collection. Care will also be taken to prevent pressure build-up in the enclosure during introduction of the tracer gas. Inspection of the installed sample probe, specifically noting the integrity of the surface seal and the porosity of the soil in which the probe is installed, will help to determine the tracer gas setup. The same tracer gas application will be used for all probes.

A portable field monitoring device with a detection limit in the low ppm range will be used to screen samples for the tracer. If high concentrations (> 10%) of tracer gas are observed, the probe seal will be enhanced to reduce the infiltration of outdoor air prior to proceeding to collection of the laboratory sample.

7.2.3.2 Outdoor Air Sampling

An outdoor air sample will be collected simultaneously with the soil vapor samples to identify potential outdoor air interferences associated with infiltration of outdoor air into the sampling apparatus while the soil vapor was collected. To obtain representative samples that meet the data quality objectives, the outdoor air sample will be collected in a manner consistent with that for the soil vapor samples. The outdoor air sample will be situated at an upgradient on-site location with respect to wind direction on the day of sample collection. If no wind is detected or a direction cannot be reliably confirmed, the outdoor sample will be located on the western side of the main building footprint as the prevailing wind direction is westerly.

The following actions will be taken to document conditions during outdoor air sampling and ultimately to aid in the interpretation of the sampling results:

1. An outdoor plot sketch will be drawn that include the testing site, area streets, outdoor

air sampling locations, the location of potential interferences (e.g., gasoline stations, factories, lawn movers, etc.), compass orientation (north), and paved areas;

2. Weather conditions (e.g., precipitation and outdoor temperature) will be reported; and
3. Pertinent observations, such as odors, readings from field instrumentation, and significant activities in the vicinity (e.g., operation of heavy equipment or dry cleaners) will be recorded.

7.3 Equipment Decontamination

To minimize the possible occurrence of cross-contamination, dedicated disposable equipment will be used to collect samples at the Site whenever possible. If the sampling methodology requires reuse of equipment in the field, then decontamination procedures will be conducted following guidelines established in the USEPA Region II CERCLA Quality Assurance Manual. All non-disposable sampling Equipment will be cleaned before each use by washing with solutions in the following order:

1. Phosphate-free detergent wash;
2. Tap water rinse;
3. Air dry; and
4. Wrap in aluminum foil until use.

The tap water may be obtained from any municipal supply system. Sampling equipment will be decontaminated in an area covered by plastic near the sampling location. All spent liquids developed during the decontamination process will be collected for proper disposal.

7.4 Sample Collection

Samples will be collected as per New York State Department of Environmental Conservation (NYSDEC) Sampling Guidelines and Protocols (6 NYCRR part 375 and TAGM 4046) and in accordance with the New York State Department of Health's Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006).

Vertically, where borings are to be advanced, samples will be collected continuously to predetermined depth or when ground water is encountered. Sampling methodologies and equipment used will be biased towards the location, depth, medium as well as the purpose of the sample. One sample will be collected and retained from each soil boring location for laboratory analysis based on PID response and at the discretion of the on-site geologist.

7.5 Field Calibration and Maintenance of Equipment

A maintenance, calibration, and operation program will be implemented to ensure that routine calibration and maintenance is performed on all field instruments. The instrument that will be used at the site is a Photo Ionization Detector (Mini RAE 2000 Classic Field Portable PID or equivalent) with 10.6 ev lamp.

Team members are familiar with the field calibration, operation, and maintenance of the equipment, and will perform the prescribed field operating procedures outlined in the Operation and Field Manuals accompanying the respective instruments. They will keep records of all field instrument calibrations and field checks in the field log books.

If on-site monitoring equipment should fail, the Project Manager will be contacted immediately. The Project Manager will either provide replacement equipment or have the malfunction repaired immediately.

Field equipment will be maintained through the use of a tracking system. Each piece of equipment will carry a tag which identifies the date of the most recent maintenance, and/or battery charge, and the condition. When equipment is damaged or in need of repair it will be immediately and appropriately flagged for the required maintenance to be performed. This process ensures that only operable and maintained equipment enters the field. Routine daily maintenance procedures conducted in the field will include:

- Removal of surface dirt and debris from exposed surfaces of the sampling equipment and measurement systems;
- Protection of equipment from adverse weather conditions;
- Daily inspections of sampling equipment and measurement systems for possible problems such as cracked or clogged lines or tubing or weak batteries;

- Daily checks of instrument calibration; and
- Charge battery packs for equipment that is not in use.

7.6 Sample Preparation, Transportation and Holding

Sample bottles will be labeled with the sample location, identification number, and date and time of sampling prior to being filled with sample. Once filled the sample containers will be immediately capped and placed into an iced cooler for transport to the laboratory.

Field Chain-of Custody records completed at the time of sample collection will accompany the samples inside the cooler for shipment to the laboratory. These record forms will be sealed in a ziplock plastic bag to protect them against moisture. Each cooler will contain sufficient ice packs to insure that a 4^0C temperature is maintained, and will be packed in a manner to prevent damage to sample containers. Temperature blanks will accompany the coolers from the laboratory to the site and back to the laboratory. Sample coolers will be sealed with nylon strapping tape and the Field Team Leader (FTL) will sign and date a custody seal and place it on the cooler in such a way that any tampering during shipment will be detected.

All coolers will either be driven to or shipped by an overnight courier according to current US DOT regulations. Upon receiving the samples, the Sample Custodian at the laboratory will inspect the condition of the samples, compare the information on the sample labels against the field Chain-of-Custody record, assign a laboratory control number, and log the control number into the computer sample inventory system. The Sample Custodian will then store the sample in a secure sample storage cooler maintained at 4°C and maintain custody until the sample is assigned to an analyst for analysis. Custody will be maintained until disposal of the analyzed samples.

The Sample Custodian at the laboratory will note any damaged sample vials, void space within the vials, or discrepancies between the sample label and information on the field Chain-of-Custody record when logging the sample. This information will also be communicated to the FTL or field personnel so proper action can be taken. The Chain-of-Custody form will be signed by both the relinquishing and receiving parties and the reason for transfer indicated each time the sample changes hands.

An internal Chain-of-Custody form will be used by the laboratory to document sample possession from laboratory Sample Custodian to Analysts and final disposition. All Chain-of-Custody information will be supplied with the data packages for inclusion in the document control file.

7.7 Record Keeping

One or more bound books will be maintained for the site; each book will be consecutively numbered. All sample collection, handling and shipping information will be recorded in the field notebook. Accurate and detailed field notes will be maintained. Decontamination procedures will also be documented in the field notebook. The book(s) will remain with the site evidence file. Copies will be made for the Project Manager and for the person who made the entries if requested. All entries in the Logbook will be made in ink. Logbook entries will include but not be limited to the following:

First Page:

- Site Name and number;
- Date and time started; and
- Personnel on site.

Subsequent Pages:

- Detailed description of investigative activities including lithology, physical characteristics, sampling, on-site meetings and any problems encountered along with the duration of these activities;
- Documentation of all personnel monitoring results (e.g. PID readings);
- List of all samples obtained and sample appearance (referenced to field logs if necessary);
- List of personal protection used and documentation procedure; and
- All other pertinent daily activities.

Each New Day Will Contain:

- Date and time started;
- Weather;
- Personnel on-site;
- Activity information; and
- Initials of note keeper.

*Note: 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 #;
- Date and Time Sample collected;
- Source of Sample;
- 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;
- Sampling equipment;
- Analysis and QA/QC required;
- Field instrument calibration including date of calibration, standards used; and their source, results of calibration and any corrective actions taken;
- Field data;
- Field observations - all significant observations will be documented;
- Sample condition;
- Site conditions (stressed vegetation, exposure of buried wastes, erosion problems, etc.);
- 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, conversations with the client, public official or private citizen; and instrument calibration, equipment problems, and field changes.

7.8 Analytical Procedures

Analysis of the soil vapor/air samples will be conducted by Air Toxics LTD., Folsom, CA. Air Toxics is accredited by the National Environmental Laboratory Accreditation Program (NELAP) and is certified by the New York State Department of Health. Soil vapor and air samples will be analyzed for VOCs including helium using EPA Method TO-15.

Analysis of the soil and groundwater samples will be conducted by Alpha Analytical, Westborough MA. Alpha Analytical is certified in New York State to conduct work under the Environmental Laboratory Approval and Analytical Services Programs (ELAP/ASP). Soil and groundwater samples will be analyzed for the full TAL/TCL list of constituents including TCL VOCs, TCL SVOCs, PCBs, TCL Organochlorine Pesticides, TAL Metals and Total Cyanide.

Quality Assurance Samples consisting of a Sample Duplicate, a Field Method Blank (soil and aqueous samples), a Trip Blank (aqueous samples), a Matrix Spike, and a Matrix Spike Duplicate (soil and aqueous samples) will be collected at a rate of 5 percent (1 for every 20 samples collected in the field). The laboratory will also conduct internal calibration and method testing. Laboratory deliverables packages will follow the NYS ASP Category B format in data quality and content.

7.9 Data Reduction and Reporting

A Level IV (full review) data validation report will be prepared by Environmental Data Services, Inc. (EDS), Williamsburg, VA, for each laboratory data package using the most recent USEPA Region II data validation standard operating procedures (SOPs). Data reduction will consist primarily of tabulating analytical results, comparing those results to regulatory criteria and posting those results on site figures to show the location and distribution of concerns identified. Data generated during the project will be placed in the central file maintained by the Project Manager. Following reduction and review of the data, a reported will be prepared as provided in 6 NYCRR 375-1.6(b) documenting the activities conducted at the site, observations, findings and resultant conclusions.

8.0 SCHEDULE

The activities described herein will be initiated within 1 week after receiving NYSDEC approval of this work plan.

Figures

TOPOGRAPHIC MAP

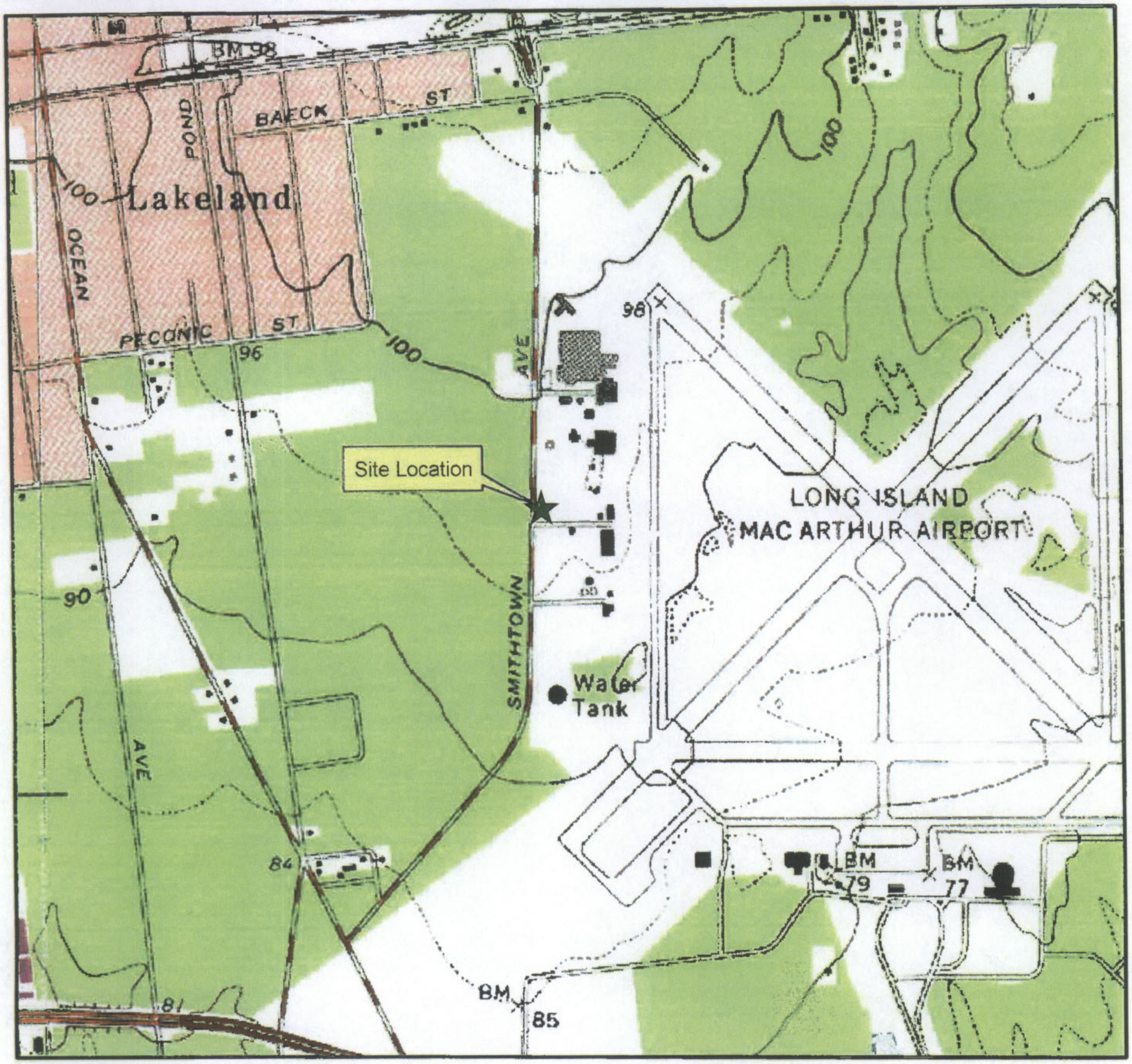


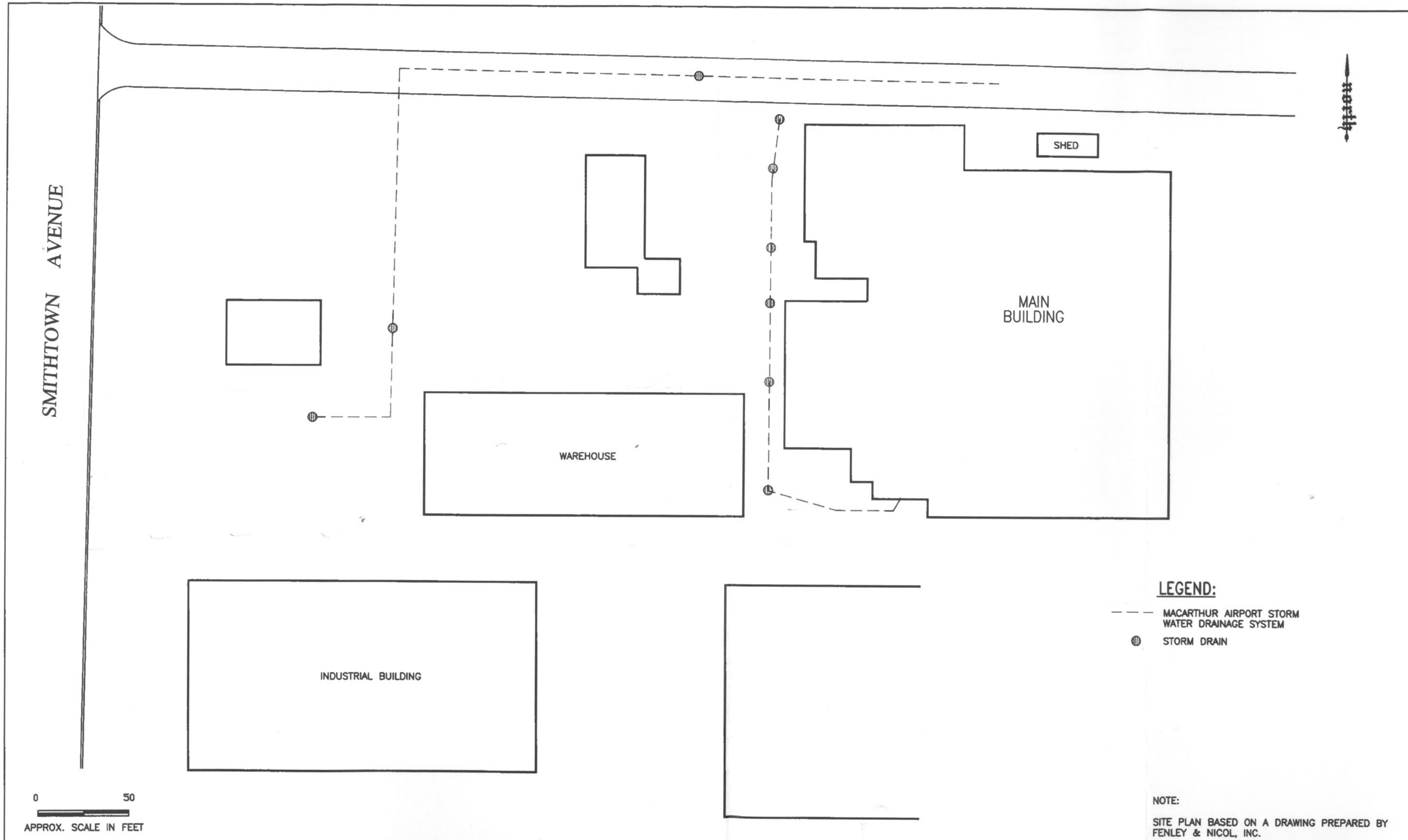
Figure 2.1
Site Location

2125 Smithtown Avenue
Ronkonkoma, NY

USGS Quadrangle:
Central Islip

Approx. Elevation:
87 feet

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



NOTE:

SITE PLAN BASED ON A DRAWING PREPARED BY FENLEY & NICOL, INC.

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

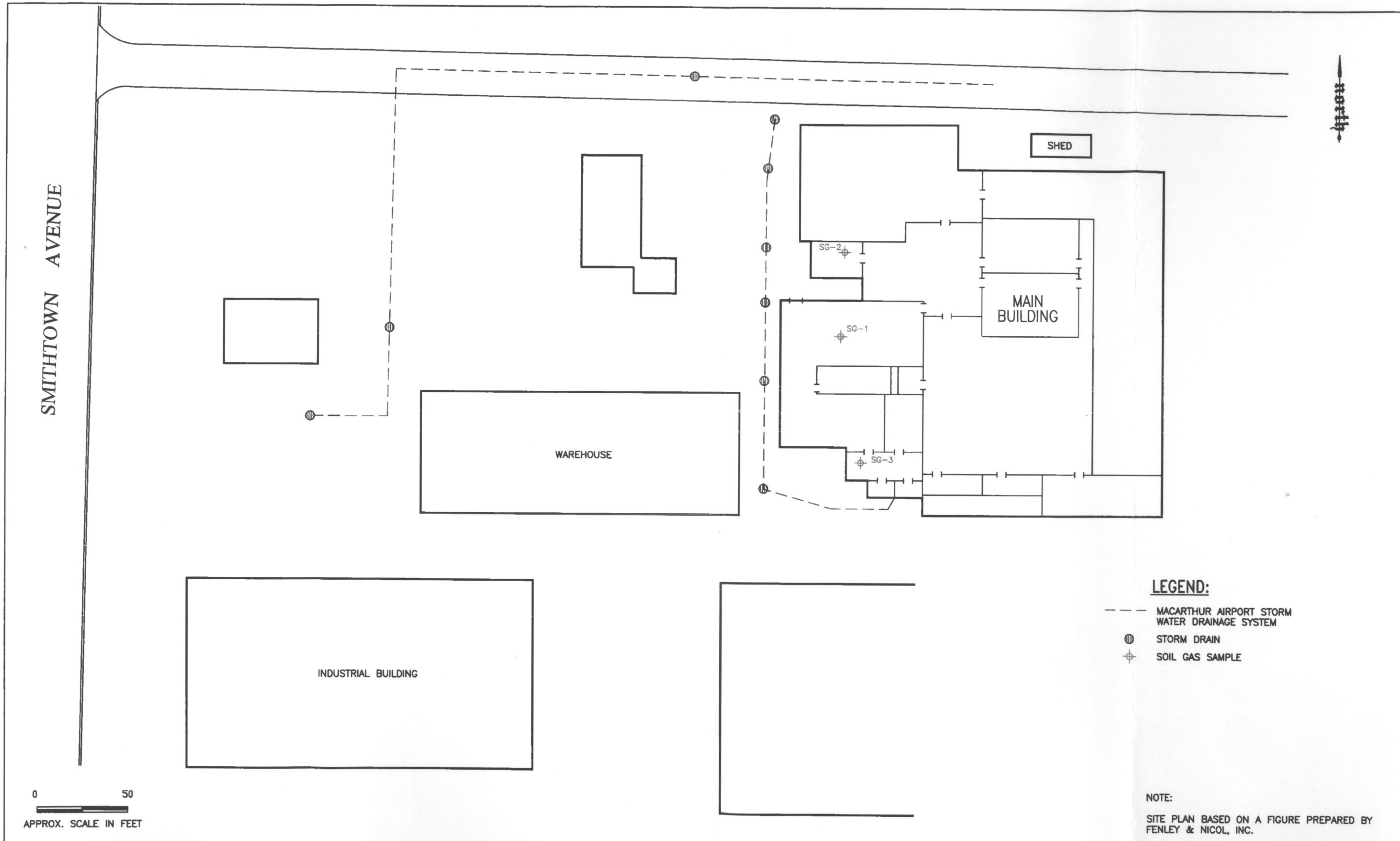
REVISION DATE: JULY 28, 2010

REVISED BY: B.S.

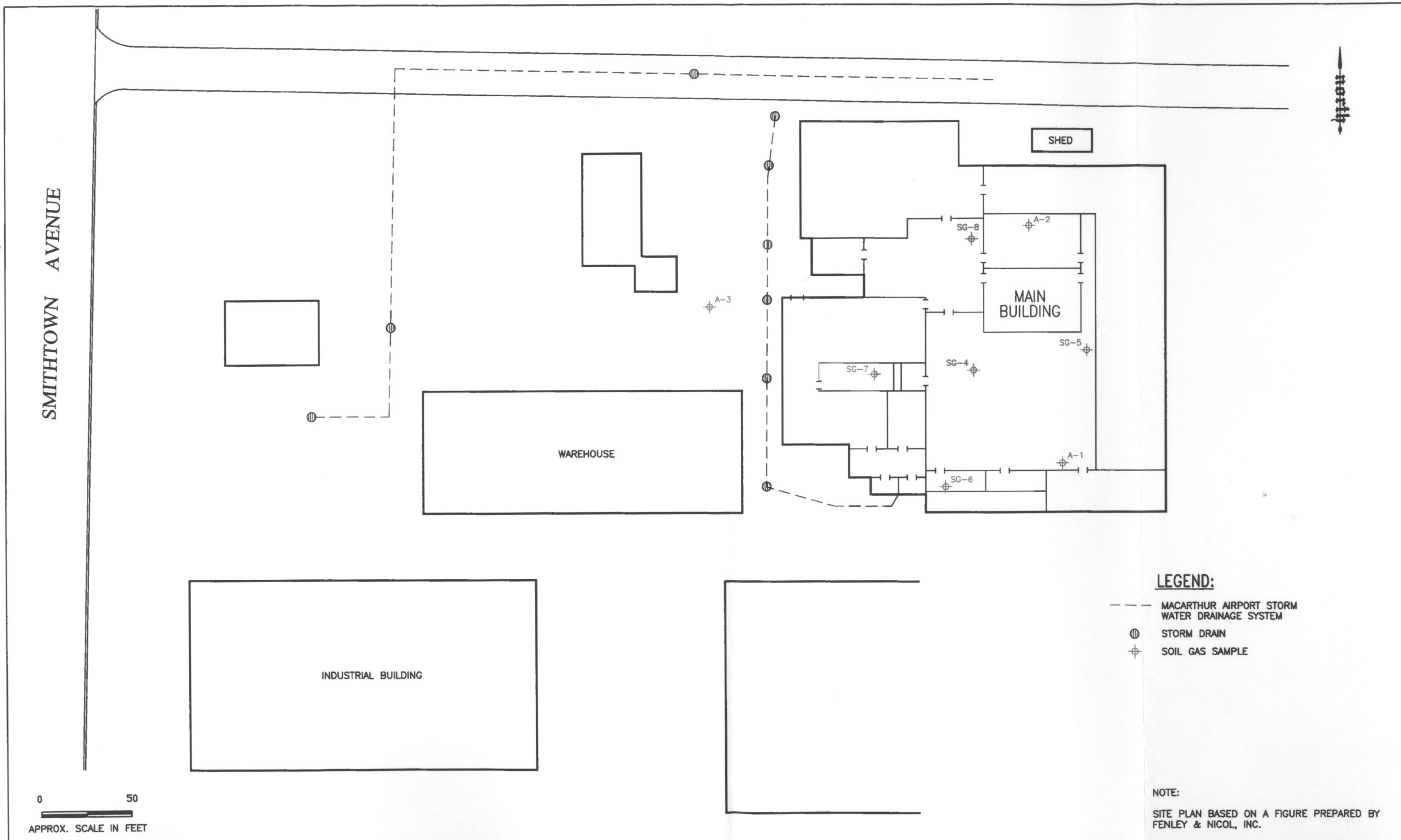
CAMCO
2125 SMITHTOWN AVENUE
RONKONKOMA, NEW YORK

GENERAL SITE PLAN

FIGURE # 2-2



EnviroTrac ENVIRONMENTAL SERVICES 5 OLD DOCK ROAD, YAPHANK, NEW YORK 11980 PHONE: (631)924-3001 FAX: (631)924-5001	REVISION DATE: JUNE 14, 2010 REVISED BY: BS	CAMCO 2125 SMITHTOWN AVENUE RONKONKOMA, NEW YORK	SOIL VAPOR TESTING LOCATIONS MARCH 18, 2008	FIGURE # 4-1



LEGEND:

- MACARTHUR AIRPORT STORM WATER DRAINAGE SYSTEM
- STORM DRAIN
- SOIL GAS SAMPLE

NOTE:

SITE PLAN BASED ON A FIGURE PREPARED BY FENLEY & NICOL, INC.

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

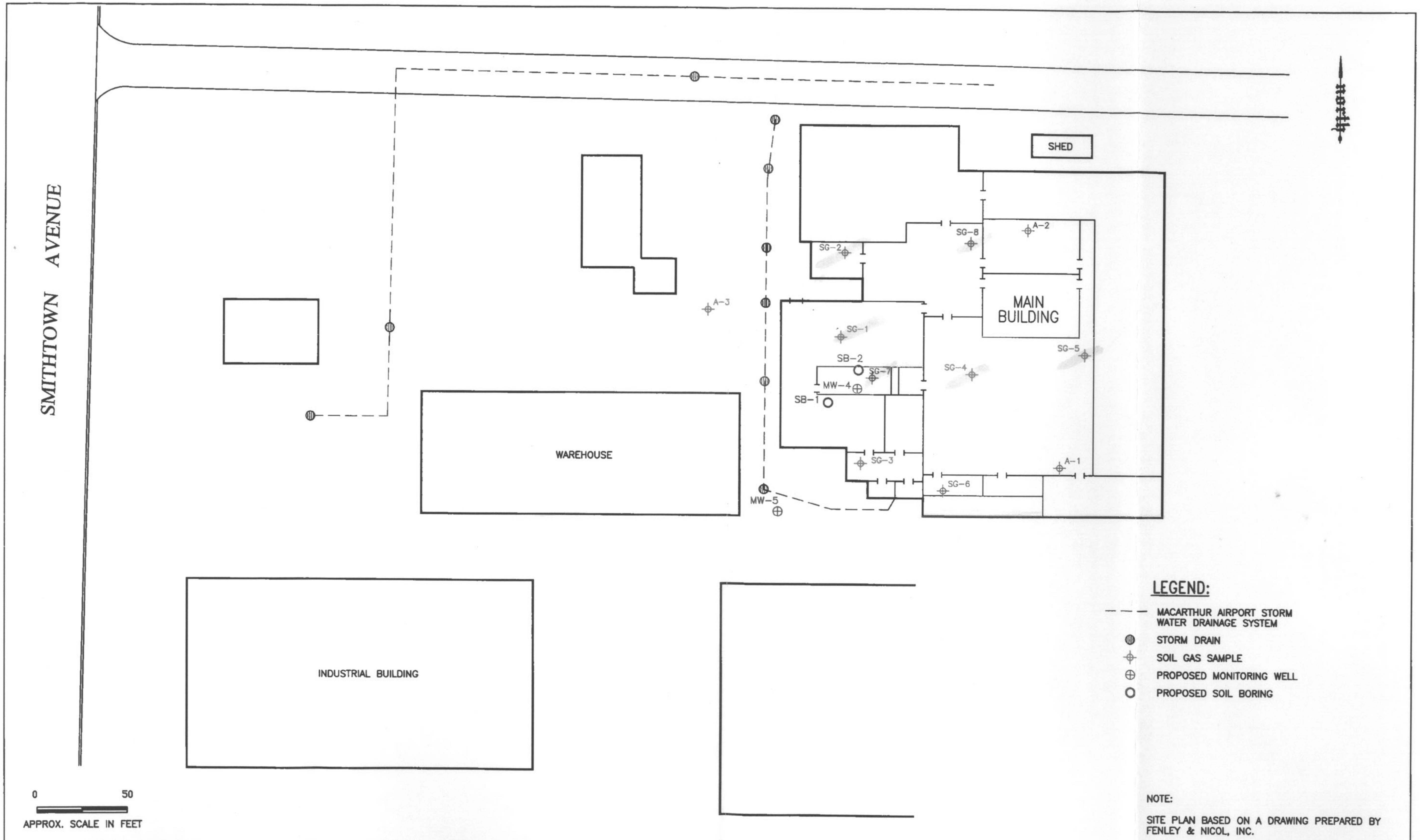
REVISION DATE: JUNE 14, 2010

REVISED BY: BS

CAMCO
2125 SMITHTOWN AVENUE
RONKONKOMA, NEW YORK

SOIL VAPOR TESTING LOCATIONS
SEPTEMBER 15, 2008

FIGURE # 4-2



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

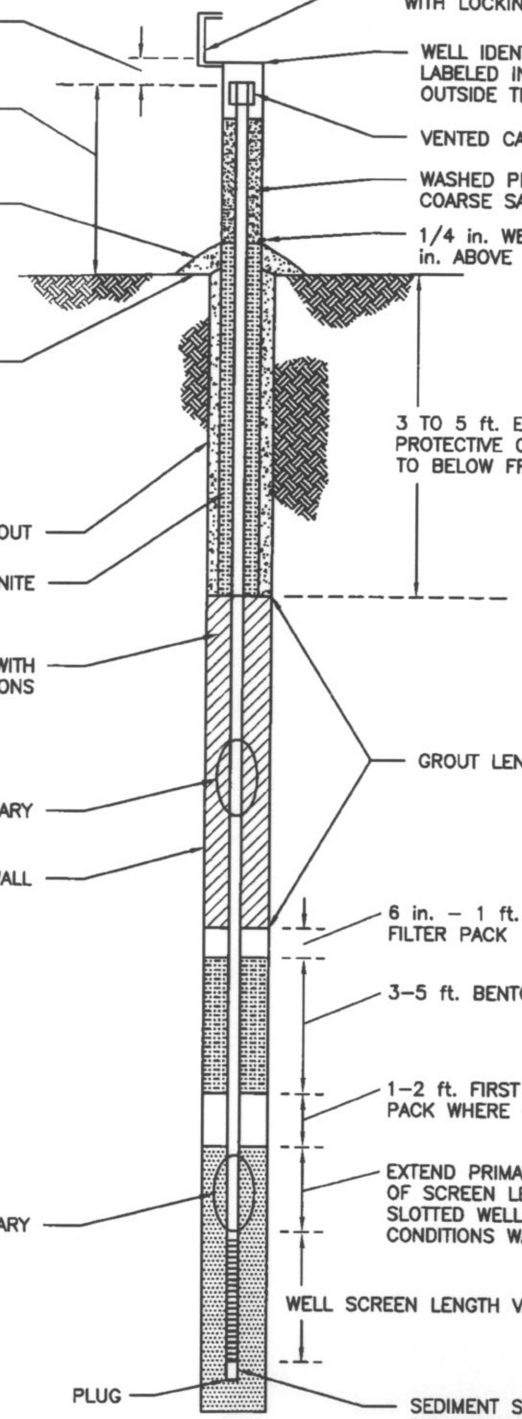
REVISION DATE: JULY 28, 2010

REVISED BY: B.S.

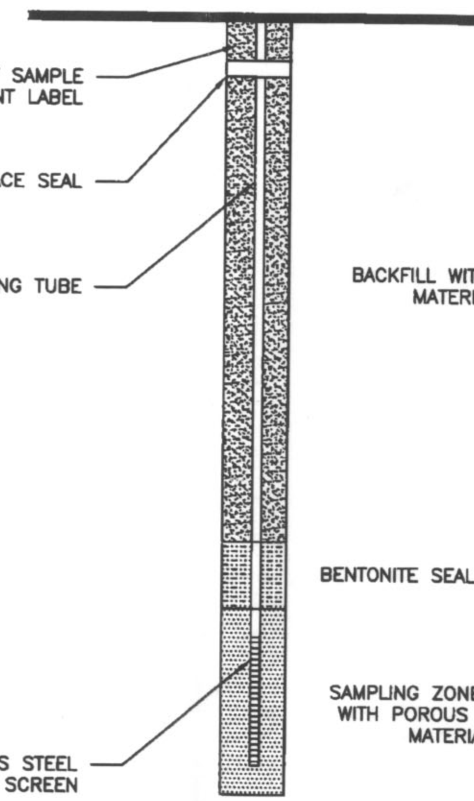
CAMCO
2125 SMITHTOWN AVENUE
RONKONKOMA, NEW YORK

PROPOSED SOIL BORING AND MONITORING WELL LOCATIONS

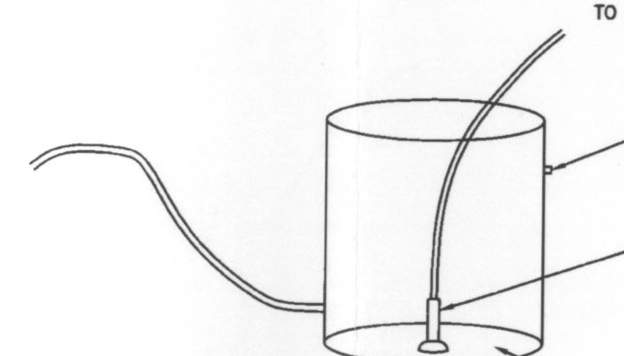
FIGURE # 7-1



MONITORING WELL DESIGN - SINGLE CASED WELL



PERMANENT SOIL VAPOR PROBE



TRACER GAS APPARATUS SCHEMATIC

NOTE:

FIGURE BASED ON A DRAWING PREPARED BY FENLEY & NICOL, INC.

DRAWING IS NOT TO SCALE.

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

REVISION DATE: JULY 28, 2010

REVISED BY: B.S.

CAMCO
2125 SMITHTOWN AVENUE
RONKONKOMA, NEW YORK

TESTING APPURTENANCE CONSTRUCTION DETAILS

FIGURE # 7-2

Tables

Table 4-1
Summary of Soil Vapor Testing - March 18, 2008
Former CAMCO Site, Ronkonkoma, NY

	SAMPLE DESIGNATION		
COMPOUND NAME	**SG-1**	**SG-2**	**SG-3**
1,1,1-Trichloroethane	75	17	120
Trichloroethene	940	1600	240
Tetrachloroethene	290	51	210

Notes:

ND - compound not detected.

Results in ug/m^3.

Testing conducted by Fenley & Nicol Environmental.

Table 4-2
Summary of Soil Vapor Testing - September 15, 2008
Former CAMCO Site, Ronkonkoma, NY

	SAMPLE DESIGNATION				
COMPOUND NAME	**SG-4**	**SG-5**	**SG-6**	**SG-7**	**SG-8**
Freon 12	ND	ND	3.4	ND	ND
Bromomethane	ND	ND	3	ND	ND
Freon 11	ND	ND	4.7	ND	ND
Freon 113	ND	ND	ND	ND	22
Ethanol	26	ND	62	ND	ND
Acetone	20	25	78	ND	24
2-Propanol	26	ND	82	ND	ND
Carbon disulfide	5.5	ND	4.7	ND	12
Methylene Chloride	3.7	ND	6.2	ND	ND
2-Butanone (Mehyl Ethyl Ketone)	5.1	ND	14	ND	4.1
Chloroform	ND	ND	ND	ND	4.5
1,1,1-Trichloroethane	150	700	3.8	ND	130
Cyclohexane	4.6	ND	6	ND	ND
1,2-Dichloroethane	4.8	ND	7.3	ND	ND
1,1-Dichloroethane	ND	27	ND	ND	ND
Cis-1,2-Dichloroethene	ND	8.9	ND	4600	ND
Hexane	ND	ND	6.3	ND	ND
Tetrahydrofuran	ND	ND	8.6	ND	ND
Heptane	ND	ND	4.4	ND	ND
Trans-1,2-Dichloroethene	ND	ND	ND	150	ND
Trichloroethene	490	2000	45	32000	600
1,4-Dioxane	ND	ND	14	ND	ND
4-Methyl-2-pentanone	ND	ND	5.7	ND	ND
Toluene	40	ND	95	ND	5.3
Tetrachloroethene	180	65	22	920	90
Ethyl Benzene	22	ND	86	ND	ND
M,P-Xylene	100	5.5	360	ND	14
O-Xylene	11	8.8	47	ND	13
Styrene	ND	ND	5.4	ND	ND
Cumene	ND	ND	3.4	ND	ND
Propylbenzene	ND	ND	5.5	ND	ND
4-Ethytoluene	ND	ND	25	ND	ND
1,3,5-Trimethylbenzene	ND	ND	20	ND	ND
1,2,4-Trimethylbenzene	ND	ND	41	ND	ND

Notes:

ND - compound not detected.

Results in ug/m^3.

Testing conducted by Fenley & Nicol Environmental.

APPENDIX A

Quality Assurance Project Plan

Quality Assurance Project Plan

TABLE OF CONTENTS

TABLES

ATTACHMENTS

1.0 PURPOSE AND OBJECTIVES

1.1 Purpose

This Quality Assurance Project Plan (QAPP) has been prepared for site characterization activities at the former CAMCO Site located at 2125 Smithtown Avenue in Ronkonkoma, New York, herein referred to as the Site. This QAPP applies to the activities set forth in the Site Characterization and Investigation Work Plan for the Site prepared by EnviroTrac Ltd. (EnviroTrac) dated July, 2010, 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. Analysis of the soil vapor/air samples will be conducted by Air Toxics LTD., Folsom, CA. Air Toxics is accredited by the National Environmental Laboratory Accreditation Program (NELAP) and is certified by the New York State Department of Health.

Analysis of the soil and groundwater samples will be conducted by Alpha Analytical, Westborough MA. Alpha Analytical is certified in New York State to conduct work under the Environmental Laboratory Approval and Analytical Services Programs (ELAP/ASP) producing Category B deliverables.

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 sampling program and relevant field/laboratory QA/QC requirements are summarized in Tables A-1 through A-7.

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 site characterization activities and any subsequent actions. DQO define the total uncertainty in the data that is acceptable for each specific activity conducted. 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 rinsate and soil 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 Site Characterization and Investigation Work Plan of which this QAPP is a part. This plan 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 A-6 and A-7 present the relevant precision and accuracy criteria for the analytical parameters related to this Site Characterization and Investigation Work Plan. 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.

2.0 FIELD QUALITY ASSURANCE/QUALITY CONTROL

2.1 Equipment Maintenance

In addition to the laboratory analyses conducted during the course of implementing work at the Site, field measurements will be collected for total volatile organics (soil sample screening). 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 photo-ionization detector (PID) will have a 10.6ev lamp and will be calibrated on a periodic basis with isobutylene. A trained team member will perform daily field checks and instrument maintenance prior to use. 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.

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

Laboratory supplied pipettes or similar device will be used during rinsate sampling. In the event that field decontamination of reusable sampling equipment is necessary, procedures for decontamination 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.

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 Sampling Program

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

2.4.1 Field QA/QC Samples

Trip Blanks

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.

<u>Temperature Blanks</u>

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

<u>Blind Field Duplicate Samples</u>

Blind field duplicate samples will be collected and analyzed to check laboratory reproducibility of analytical data. 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

Split samples are not anticipated for work conducted at the Site; however, if split samples are required, then the following procedures will be conducted:

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.

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 project objectives 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 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 (Commercial Envelope Manufacturing Company, 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 location is to be completed before sampling is initiated at any other location 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.

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.

A more detailed description of each sample to be collected can be found in Table A-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., FB110110 would represent a field blank collected on 01 November 2010). 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 project can be found in Table A-1.

2.6.3 Sample Preservation

Sample Preservation

In general, soil and groundwater samples collected during the project will be preserved by cooling 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 project can be found in Table A-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 project can be found in Table A-1. These holding times are consistent with NYSDEC ASP Exhibit I although technical holding times vary.

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 soil and groundwater samples collected during the project 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). Air samples will be submitted to a NELAP certified laboratory and holding certification from the NYSDOH.

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 project will be used to determine the presence and concentration of certain analytes in rinsate and soil samples.

Analysis of the soil vapor/air samples will be conducted by Air Toxics LTD., Folsom, CA. Air Toxics is accredited by the National Environmental Laboratory Accreditation Program (NELAP) and is certified by the New York State Department of Health.

Analysis of the soil and groundwater samples will be conducted by Alpha Analytical, Westborough MA. Alpha Analytical is certified in New York State to conduct work under the Environmental Laboratory Approval and Analytical Services Programs (ELAP/ASP).

2.8 Analytical Test Parameters

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

Air samples will be analyzed for VOCs by USEPA Method TO-15 Hi/Lo (LL Full List) and helium by Modified ASTM D-1946 (Sh).

Soil samples will be analyzed for VOCs by USEPA SW-846 Method 8260B, SVOCs by USEPA SW-846 Method 8270C, PCBs by USEPA SW-846 Method 8082, TCL Organochlorine Pesticides by USEPA SW-846 8081A, TAL Metals by USEPA Method SW-846 Methods 6010B/7471 and Cyanide by USEPA Method SW-846 9010B.

Aqueous samples will be analyzed for VOCs by USEPA SW-846 Method 8260B, SVOCs by USEPA SW-846 Method 8270C, PCBs by USEPA SW-846 Method 8082, TCL Organochlorine Pesticides by USEPA SW-846 8081A, TAL Metals by USEPA Method SW-846 Methods 6010B/7470 and Cyanide by USEPA Method SW-846 9012B.

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 project 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 project goals and QAPP in an efficient and high quality manner thereby maximizing the confidence in the data in terms of precision, accuracy, representativeness, completeness, and comparability (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 file management, reporting, usability analysis and use of consistent formats for the 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 project will be reported following NYSDEC ASP 2005 specifications. Soil and groundwater laboratory analytical data will be reported as NYSDEC Category B deliverables.

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) format and a PDF copy of each ASP deliverable. Air data reporting will include Level IV electronic Comprehensive Validation Packages (eCVP).

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 scope of work will primarily consist of data associated with soil boring/soil vapor probe advancement and screening, soil classification information and groundwater sampling field parameters. This data will be assessed by review of the project documentation to check that the scope of work specified in the Work Plan and this QAPP have been correctly implemented and that documentation exists for the specified field instrument calibrations. This documentation will be considered sufficient to provide that proper procedures have been followed during the field investigation.

Laboratory Data Validation Protocol

Environmental Data Services, Inc. (EDS), Williamsburg VA, will conducted Level IV (full review) data validation services for all analytical data generated during the project including air, soil and aqueous media. A data validation report will be prepared for each data package using the most recent USEPA Region II data validation standard operating procedures (SOPs).

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.

Data Records

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.

3.0 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 Attachment A.

Mr. Patrick Condon will serve as the project manager and have responsibility for the overall coordination and implementation of the project.

Mr. Peter Breen will oversee technical aspects of the project and provide support to the project team as needed. Mr. Breen has 26 years of experience in conducting environmental site assessment and remediation work.

Mr. Jeff Romano will serve as the Quality Assurance Officer (QAO) for EnviroTrac. As necessary, Mr. Romano will interface with laboratory, data validation and field personnel regarding quality issues that might arise during the project and will bring any quality assurance/quality control concerns to the attention of EnviroTrac's project manager.

Mr. Michael Clark, CHMM has over 20 years experience in the environmental, health and safety field and is the corporate director of EnviroTrac's Health and Safety program. He will be available to evaluate and resolve issues that may arise during the project on an as-needed basis and to assist the project manager and QAO in the overall implementation.

ATTACHMENT A

Resumes of Key Project Personnel

Michael A. Clark, MS, CHMM
Health and Safety

Experience Summary

- *Directed company safety operations for construction and operations in New York City.*
- *Directed environmental, health, and safety program for materials and metals recovery/recycling operations, successfully obtained ISO 14001 certification.*
- *Managed hazardous material, waste, and petroleum storage operations, including emergency response programs and site remediation activities, for over 300 sites.*
- *Experienced trainer for safety programs: HazWOPER. - 40-hr & 8-hr refresher, Trenching & Excavation, Respiratory Protection, Confined Space Entry, etc.; defensive driver classes; and environmental awareness.*

Education

- *Master of Science, Environmental Science, New Jersey Institute of Technology, Newark, NJ, 1994.*
- *Bachelor of Science, Biology and Chemistry, Rowan University, Glassboro, NJ, 1987.*
- *Advanced Safety Certification, National Safety Council, 1998.*

EnviroTrac
Environmental Services

400 Corporate Court, Suite E
South Plainfield, NJ 07080

Phone: (908) 757-1900
Fax: (908) 757-0017

Mr. Clark has over 20 years experience in the environmental, health and safety field managing and directing programs in large corporate settings (Fortune 100), manufacturing and construction companies, and consulting firms. He currently is the Director of EnviroTrac's Health and Safety program. Safety is a strategic part of EnviroTrac's operations and as Director of Health and Safety, Michael ensures that the safety program focuses on our employees and that they have the knowledge and the tools to perform their jobs safely.

Using a behavior-based safety model, EnviroTrac employees are taught to take accountability for their own safe work practices. Task-specific hazards are identified and employees are trained, updated, and reviewed on how to avoid these hazards and mitigate their risks.

As Director of Health and Safety, he has developed and implemented: accident reporting, investigating, & root cause analysis procedures; ground disturbance procedures for subsurface investigation, drilling, and trenching & excavation; safe driving and behind-the-wheel training; in-house 40-hour OSHA HazWOPER and 8-hour refresher training; temporary traffic control and work area protection; respiratory protection; confined space entry; and various other safety programs.

EnviroTrac uses a network of Regional Safety Coordinators to oversee the safe work practices in every EnviroTrac office and Mr. Clark manages this network and has personally written, reviewed, and updated our Health & Safety Program so that the practices, polices, and procedures meet or exceed safety laws, regulations, client-specific requirements, and our own standards for the health and safety of our employees.

Professional Certifications

Certified Hazardous Materials Manager (CHMM), Institute of Hazardous Materials Management - Master's Level
Advanced Safety Certification, National Safety Council
40-hour HazWOPER certificate and subsequent 8-hr refresher training
Fundamentals of Industrial Hygiene - Harvard School of Public Health
Industrial Ventilation Workshop - AIHA
Advanced IAQ/HVAC Diagnostics Training Course - HL Turner Group
Implementing the ISO 14001:2004 Program workshop
Smith System Driver Safety Trainer
American Petroleum Institute—API Work Safe Certification

Think before you act, remember - Safety First!!!

Michael A. Clark, MS, CHMM
Health and Safety

Professional Highlights and Selected Projects

- Mr. Clark has directed the health and safety program for construction and installation operations conducted throughout all five boroughs of New York City. He developed and implemented programs that addressed heavy equipment/construction operations, work area protection, confined space entry, working at heights, and exposure to heat/cold, hazardous materials, personal safety, and other factors unique an extreme urban environment.
- In addition to his focus on safe work environments, Mr. Clark implemented a safe driving program for operations in New York City. The program addressed the requirements of operating vehicles in the most congested urban area of the country and used both classroom training and behind-the-wheel instruction to educate drivers on techniques to safely operate in this unique environment. Following the training, motor vehicle accidents for the company in that market decreased by 30%, resulting in overall cost savings estimated at over $100,000 per year.
- Developed and administered Respiratory Protection Programs for multiple companies encompassing hundreds of employees. These programs have included hazard identification, employee medical monitoring, baseline and periodic biological monitoring, respirator selection and change schedules, and annual review and update of the program as required by OSHA. Mr. Clark is a "Competent Person" as defined by OSHA to administer respirator fit tests and manage a respiratory protection program.
- Conducted over 200 indoor air quality and industrial ventilation investigations and implemented exposure control and remediation actions for worker exposure to heavy metals, VOC's, and other hazardous materials; confined spaces contaminated with hazardous materials; sick building syndrome and mold contamination; and industrial ventilation controls during manufacturing processes.
- Developed the in-house EnviroTrac 40-hour OSHA Hazardous Waste Operations and Emergency Response (HazWOPER) certification and 8-hour annual refresher training programs within the 29CFR 1910.120, Appendix A recommendations. Mr. Clark has personally delivered both the 40-hour and 8-hour training to EnviroTrac employees.
- In the environmental field, Mr. Clark has managed multi-faceted programs from hazardous material/waste management for 300+ facilities, emergency response operations for hazmat spills and releases, over a two-state area, petroleum storage operations, and environmental discharge permitting.
- Petroleum storage operation encompassed the installation of the storage systems, periodic monitoring and inspections, developing and updating SPCC plans, and upgrades to and removals of the tanks systems. Mr. Clark has managed multiple remediation activities from full site excavation of contaminated soils, to pump and treat systems, underground injection and extraction systems, and passive remediation and monitoring.
- For environmental discharge permitting, Mr. Clark wrote and obtained over 400 air and water discharge permits from environmental state agencies, implemented and audited programs to ensure that the permit requirements were followed, and submitting the required reports to the appropriate agencies. Type of permits include: Title V Air Discharge Permit, NJDEP RADIUS permits, NJDEP Air Quality Permits, PA DEP Air Quality Permits, NPDES permits.
- During the restoration efforts at *Ground Zero* in NYC after the attacks of 9/11, Mr. Clark designed and implemented procedures for the decontamination of a 30,000+ gallon fuel spill at the Verizon building that facilitated the restoration of 2M data and 1.5 M voice lines that re-established communications for lower Manhattan and Wall St.
- While directing the environmental operations for a materials and metals recovery/recycling firm, Mr. Clark developed and implemented the company's environmental program under the strict requirements of ISO 14001:2004. The program applied for and successfully passed the ISO audit with no "non-compliance" issues identified by the Accreditation body and was issued an ISO 14001 certification.

Peter C. Breen
Senior Project Manager

Experience Summary

- *Environmental site investigation and remediation*
- *Data assessment and conceptual model development*
- *Strategic planning and scoping*
- *Groundwater flow and transport modeling*
- *Aquifer testing*
- *Surface and borehole geophysical evaluations*
- *Soil vapor intrusion assessments*
- *Project management*
- *Regulatory agency negotiation*
- *Litigation and public affairs support*
- *Staff development, training and mentoring*

Education

- *BS Biology, University of Miami, Coral Gables, Florida*
- *MS Earth Science, Adelphi University, Garden City, New York, concentration in Applied Hydrogeology.*

EnviroTrac
Environmental Services

5 Old Dock Road
Yaphank, NY 11980

Phone: 631-924-3001
Fax: 631-924-5001
Website: www.envirotrac.com

Mr. Breen has been providing professional services to clients, focusing on environmental site investigation and remediation, for twenty six years. Before joining EnviroTrac, he was a member of Kleinfelder's Technical Resources Council (TRC) and Principal Professionals Group (PPG); associations representing the highest level of technical practitioners in the firm. During his career he has worked throughout the United States including California, Connecticut, Delaware, Florida, Kansas, Massachusetts, New Hampshire, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia and Wisconsin.

Mr. Breen is responsible for the development of cost-effective methods in the investigation, delineation and remediation of environmentally impacted sites and in the implementation of emerging sustainable and "green" technologies. His extensive experience has been gained as a result of managing and serving as technical director for large and complex site investigation and remedial projects. In those roles he was responsible for the development and implementation of technical scopes, budgets and schedules, served as primary contact with regulatory agencies, and assisted clients with related public affairs and legal issues. Additional expertise provided by Mr. Breen includes the performance of technical "cold eyes" review and forensic evaluations.

Professional Certifications

OSHA Certification, 40 hr Health & Safety Training at Hazardous Waste Sites

OSHA Certification, 8 hr Refresher Health & Safety Training at Hazardous Waste Sites

Loss Prevention System (LPS) 8-hour Training, 2004

Professional Affiliations

National Ground Water Association

Peter C. Breen
Senior Project Manager

Professional History

- 1984 – 1990, Roux Associates, Hydrogeologist/Project Manager
- 1990 – 1991, Blasland & Bouck Engineers, Project Manager
- 1991 – 2003, Environmental Resources Management, Senior Project Manager
- 2003 – 2008, Geologic Services Corporation/Kleinfelder, Principal Professional
- 2008 – Present, EnviroTrac Ltd., Senior Project Manager

Professional Highlights and Selected Projects

Litigation Support

- **Oil Company** – Mr. Breen was retained in 2009 to provide expert testimony regarding a matter involving methyl tertiary butyl ether (MTBE), a gasoline additive, detected in a public water supply distribution system on Long Island, New York. In excess of 30,000 documents were reviewed during a one-year discovery phase. That information included results of the expedited assessment/well installation and sampling effort, aquifer testing, well response and water level analyses, down-hole geophysical testing, 3-dimensional numerical groundwater flow and contaminant transport simulations, a two-phase interim remedial measure (IRM) groundwater extraction and cleanup effort and other work conducted by, or on behalf of, the regulatory Agency. It also included various reports and data pertaining to the client's properties and various reports and data pertaining to a multitude of facilities of the other named parties, information pertaining to the activities conducted by the water supply districts (plaintiff's facilities) and hydrogeologic reports and data developed by others. This work is ongoing.

- **Insurance Firm** - Assessed environmental records pertaining to a portfolio of 14 retail petroleum sites located in Florida. The work was conducted to support negotiations between client insurance firm and successor firm. The client had been the provider of insurance for the sites until late 2004 at which time responsibilities for policy management were transferred to the successor firm. Recently, petroleum contaminated soil and groundwater was discovered at the sites. Responsibility for the funding of the investigative and remedial work to address these issues is being negotiated by the two insurance firms.

- **Major Oil Company** - Reviewed environmental records pertaining to 16 MTBE release sites on Long Island, New York. Results of the evaluations were used to develop/update/critique conceptual site models, focusing on assessing spill histories, groundwater plume migration pathways, and plume persistence.

- **Major Oil Company** - Technical director of a groundwater remediation project located on Long Island, New York. The project is conducted under the oversight of the New York State Department of Environmental Conservation (NYSDEC) under a negotiated Order on Consent. Mr. Breen assisted defense council in a civil action brought forth by local residents. The project scope includes high definition delineation, monitoring and remediating an extensive off-site plume containing methyl tertiary butyl ether (MTBE). This is accomplished through testing and sampling of 1,000+ vertically nested monitoring well points installed throughout a residential neighborhood, wetland assessments, indoor air quality evaluations and through the use of a high capacity (500 gpm) groundwater pump and treat system. Supporting technical evaluations conducted to assess plume migration included gamma logging of boreholes to assess stratigraphic heterogeneities, and slug and constant rate pump testing to support remediation goals. The project includes assessment and remediation activities at the sources of the off-site plume; two former retail gasoline stations. Remedial efforts at these on-site locations have included groundwater pump and treat, soil vapor extraction and air sparging (SVE/AS), in-situ chemical oxidation (ISCO) using modified Fenton's Reagent and hotspot soil excavation conducted during demolition activities.

Litigation Support (continued)

- **Commercial Real Estate Development/Property Management -** Managed site investigation and remedial activities at an industrial park located in New York. Site consisted of eight associated properties, activities included evaluation of leaching pools associated with sanitary and storm water systems, and potable water testing. The intent of the work, conducted on the behalf of council in supporting cost recovery efforts, included the identification of responsible parties for historic spills and discharges and preparation of remedial cost estimates. Based on site assessment results it was determined that sediments and liquids present in numerous leaching pools associated with both systems were impacted with chemical contaminants including VOCs, PAHs and inorganic compounds at levels requiring remediation in accordance with Suffolk County Department of Health Action Levels.

- **Mining Facility -** Lead hydrogeologist for a regional-scale ground water investigation conducted in the vicinity of a salt mining facility located in south central Kansas. Project was conducted in support of litigation, working for defendants. Aquifer characterization resulted in delineation of saline ground water and assessment of contaminated soil resulting from historic solution mining activities. The plume was found to extend more than seven miles from the Site over an area of approximately 2,500 acres within a highly prolific alluvial aquifer utilized locally for central pivot crop irrigation and potable water supply. In excess of 100 test wells were installed, including three 16-inch diameter groundwater extraction wells. Mr. Breen planned, supervised and analyzed results of three 72-hour high capacity aquifer pumping tests, tested soil and groundwater and conducted other evaluations, including the construction of a numerical groundwater flow model utilizing Modflow to support litigation strategy and assess remedial alternatives.

Petroleum Industry

- **Oceanside, New York -** Project director of a former petroleum terminal site investigation and remediation project conducted under a stipulation agreement with the New York State Department of Environmental Conservation (NYSDEC). The project scope includes delineating, monitoring and remediating ground water containing petroleum compounds including benzene, toluene, ethylbenzene and xylene (BTEX), methyl tertiary butyl ether (MTBE). Initial work conducted to support cost recovery efforts by the client included a forensic evaluation of prior site use and spill history. An interim remedial measure (IRM) implemented to reduce on-site chemical constituent concentrations entailed the use of a constructed on-site groundwater pump and treat system consisting of seven recovery wells and air stripping technology. Supplemental remediation technologies are in the process of being evaluated to achieve site closure goals. This process will be supported through additional site testing and stratigraphic evaluation.

- **Linden, New Jersey -** Managed a Remedial Investigation for a 72-acre research and development site conducted under an Administrative Order of Consent with the New Jersey Department of Environmental Protection (NJDEP). Work included a detailed forensic evaluation of historic site activities which resulted in the identification of 30 Areas of Environmental Concern (AOCs) and led to the assessment of associated soil and ground water in overburden and layered siltstone bedrock aquifers. Due to the varied historic activities conducted at the Site a wide range of chemical constituents including inorganics, organics and semi -volatile compounds were found in soil and groundwater. Petroleum related constituents represented the primary COCs in the overburden groundwater while TCE and associated breakdown products were found in the bedrock Associated work included evaluation of sediment and surface water at on-site wetlands, the development of a baseline ecological evaluation (BEE) and removal of thirteen formerly abandoned in place USTs ranging in capacity from 550 to 10,000 gallons. Bedrock evaluations employed regional and local fracture trace analysis and an innovative testing approach utilizing downhole closed circuit television, acoustic televiewer, heat pulse flow meter and pumping test applications.

Peter C. Breen
Senior Project Manager

Petroleum Industry (continued)

- **Florham Park, New Jersey -** Managed a Remedial Investigation conducted in support of divesting a 270-acre research and development Site. A significant portion of the Site is occupied by wetland areas that were evaluated within the context of a BEE. Environmental impacts found at the Site included pesticides and inorganic compounds resulting from historic agricultural use of the land, and VOCs and SVOCs from activities conducted by the current occupant. Remedial activities to address these impacts included soil mixing and sediment excavation, groundwater pump and treat and soil vapor extraction/air sparging (SVE/AS) technologies, and in-situ treatment options.

- **Retail Station Portfolio, Metropolitan New York -** Served as the senior technical advisor supporting environmental activities pertaining to a large portfolio of retail petroleum site investigation and remediation projects located throughout the Long Island and New York City metropolitan area, advising clients and assisting project managers with construction of site conceptual models, investigation approach and remedial and public affairs strategy development, and serving in a peer review capacity. Project sites are situated within urban and suburban settings and are located in ice contact or glacial outwash settings.

Manufacturing Facilities

- **Bay Shore, New York -** Managed site assessment and remediation activities conducted at a large medical products manufacturing facility. The scope of work included soil and groundwater evaluations consisting of soil boring and well installations, soil and groundwater sampling, and developing a historic use model of on-site drains and leaching pools. Chemical constituents of concern included metals and chlorinated VOCs. Approximately 1,300 tons of metals contaminated soil was excavated and disposed offsite. Based on Mr. Breen's evaluation of the prior consultant's groundwater modeling and site assessment findings he was successful in negotiating the elimination of significant quantity of groundwater related site assessment and remediation work that had previously been proposed to the overseeing regulatory agency, and afforded the client considerable cost savings.

- **Yaphank, New York -** Conducted Phase II site investigation and remediation activities at an automotive parts manufacturing plant. A detailed evaluation of historic manufacturing process/waste management was conducted and revealed the use of improper practices that resulted in the contaminated of soil at waste staging area and on-site sanitary and storm water management facilities. The remediation of soil and leaching pool structures was required based on the presence of VOCs, SVOCs and inorganic chemical constituents at levels exceeding NYSDEC and SCDOHS criteria. As a result of cleanup activities conducted, 67 tons of soil contaminated with petroleum related compounds and chlorinated VOCs was excavated from the former drum staging area was hauled from the Site for disposal. Remedial activities associated with the onsite leaching pools resulted in 45,000 gallons of liquid and 71 tons of solids requiring disposal containing a mixture of sanitary and chemical waste. Following completion of these activities a notice of no further action (NFA) was obtained.

Peter C. Breen
Senior Project Manager

Aerospace Industry

- **Eatontown, New Jersey -** Managed a Remedial Investigation performed under ECRA, ISRA requirements at a manufacturing facility. Media of investigation included soil, ground water, sediment, surface water and air. The principal contaminants of concern included chlorinated VOCs. As a result of compiling and analyzing the significant repository of environmental documentation and constructing a detailed conceptual site model, Mr. Breen was the first investigator to link the on-site groundwater contaminant plume with a small stream located nearby. Subsequent testing revealed elevated concentrations of vinyl chloride in surface water associated with that stream persisting at detectable concentrations at locations more than a mile off-site.

- **Greenfield, Massachusetts -** Managed an intensive investigation resulting in characterization and delineation of a TCE plume in ground water emanating from a former tool and die manufacturing facility. Work included establishment of on-site and off-site monitoring well networks, assessment of surface water resulting from seeps located within the core of the plume and investigating potential volatilization to a nearby child daycare facility, residences and commercial structures located within the plume footprint. An additional component of the project related to monitoring and evaluating the performance of an on-site UV peroxidation groundwater treatment facility.

- **Bethpage and Calverton, New York -** Conducted environmental site assessment evaluations at two large manufacturing facilities as part of site decommissioning activities. Work activities included a comprehensive review of historic manufacturing practices resulting in the identification of numerous areas of environmental concern and required subsequent tracing and testing of interior and exterior locations of drains and leaching structures, former ordinance testing locations, and conducting soil and groundwater characterization activities.

Industrial Sites

- **Woburn, Massachusetts** - Conducted hydrogeologic and geophysical evaluations to define the extent of animal hide piles and former on-site chemical disposal lagoons, and assess associated impacts of volatile and inorganic chemical constituents to soil, sediment and groundwater at the 245-acre Industri-Plex Superfund Site. Geophysical testing included the use of electromagnetics, resistivity and metal detection techniques. Hydrogeologic assessments included slug testing and constant rate pump testing techniques.

- **Mount Pleasant, Tennessee -** Characterized the hydrogeology of a karst limestone watershed setting at a large chemical formulation facility. The site consisted of raw material mining areas and an associated chemical manufacturing plant. Key on-site features that were investigated included a bedrock fault zone, a stream that bisects the site and numerous springs. Work elements included the installation of test wells in unconsolidated and bedrock settings and conducting hydraulic parameter assessments, surface water flow monitoring, hydrologic budget estimations and assessment of ground water/surface water hydraulic relationships.

Peter C. Breen
Senior Project Manager

Regulatory and Public Agencies

- **NYSDEC: Nassau County, New York -** Managed a program of SVI testing conducted to evaluate potential intrusion of chlorinated solvent compounds and monitor the progress of an ongoing remedial action in a neighborhood of 65 residences during the 2009 and 2010 heating seasons. Directed field activities and served as the primary contact for the NYSDEC and coordinated analytical laboratory and data validator subcontractor services. Work was conducted in accordance with the 2006 NYSDOH Guidance on SVI evaluations and included the collection of 24-hour duration sub-slab, indoor and outdoor air TO-15 samples.

- **NYSDEC: New York State -** Managed a program of geophysical surveys conducted at 25 inactive hazardous waste sites located throughout New York State. Developed technical approach, analyzed data, prepared reports and served as primary contact with the NYSDEC. Methods included the use of magnetometer, electrical resistivity, electromagnetic (EM) and metal detection techniques. The work assignment also included conducting four Phase II Site Investigations at facilities located on Long Island, New York that included on-site soil and groundwater quality evaluations conducted through the installation of soil borings and groundwater monitoring wells and performance of slug tests.

- **NYSDEC: Blooming Grove, New York -** Evaluated impacts to soil and groundwater at a former landfill. Geophysical testing utilizing a variety of techniques was conducted to delineate the lateral and vertical extent of fill material. Monitoring well installations were completed in unconsolidated material and underlying shale bedrock to assess environmental impacts and to support fate and transport assessments; ground water flow pathway identification within the bedrock was assisted through the use of 3D photographic fracture trace analysis. Numerous ephemeral seeps were identified and assessed to determine potential impacts to on-site ponded water and local streams.

- **EPA: Holbrook, New York -** Evaluated impacts to soil and groundwater at a former audio recordings manufacturing site through the implementation of a RI/FS conducted for the EPA. Potential impacts to a nearby municipal water supply well field and a down gradient wetland were assessed utilizing site test data and groundwater flow and transport modeling techniques.

- **Middlesex County Utility Authority: Middlesex County, New Jersey -** Performed a detailed third party peer review and technical critique of a comprehensive hydrogeologic investigation conducted to support the proposed expansion of a major municipal landfill. The study was conducted on behalf of the utility authority to support proposed expansion of the landfill and considered potential effects to nearby wetlands and estuarine environments as the site is located adjacent to a large tidally influenced surface water feature. In addition, the hydraulic effects of an existing containment slurry wall were assessed, under existing conditions and under scenarios representing the expanded landfill.

Peter C. Breen
Senior Project Manager

Publications, Presentations and Events

April 2004 - *Evaluating Plume Capture Through Mass Flux Estimates*. LIG Conference SUNY Stony Brook, New York.

March 2006 - *Evaluating the Performance of a Groundwater Recovery System Through a Detailed Site Characterization and Contaminant Mass Flux Estimate.* ExxonMobil Global Remediation Conference, Orlando, Florida.

Spring 2008 - *Engineering Social Responsibility: Kleinfelder Adopts Company-Wide Sustainability Principles*. EFCG Sustainability Newsletter, Edition 1.

May 2008 - Environmental Services Sector Representative, *Round Table Discussion*. Queens Sustainability Summit at CUNY School of Law, Flushing, New York.

January 2009 - Panelist, *Environmental Law -Turning Brown Fields Green*. Queens Green Business Summit at Queens College, Flushing, New York.

February 2010 - Panelist, *Green Remediation -Turning Brown Fields Green*. Queens Green Business Summit at Queens College, Flushing, New York.

Patrick Condon
Project Manager

Experience Summary

- *Oversight and management of soil and ground-water investigations*
- *Evaluation of field and laboratory data and technical reporting*
- *Pilot testing for soil and ground-water remediation*
- *Underground storage tank (UST) closures*
- *Oversight and coordination of soil and ground-water remediation system operation and maintenance*

Education

- *BS Geology, SUNY Stony Brook, December 2001*

Mr. Condon has over 8 years experience in the environmental consulting field. He has extensive experience performing and overseeing soil and ground-water investigations and remediation projects, as well as UIC cleanups, UST removals and environmental site assessments. Currently as a Project Manager, Mr. Condon coordinates subsurface investigations, monitoring well installations, UST removals and remedial construction projects. These duties include the scheduling of technicians to perform monthly operation and maintenance on existing remediation systems, as well as ground-water monitoring and sampling. His responsibilities also include the preparation of budgets and the financial oversight of projects.

Professional Certifications

OSHA Hazardous Waste Operations and Emergency Response (HAZWOPER) 40 Hour Training

OSHA HAZWOPER 8 Hour Refresher Training

American Petroleum Institute (API) WorkSafe Training

ExxonMobil Loss Prevention System Training

CPR and First Aid Training

EnviroTrac
Environmental Services

5 Old Dock Road
Yaphank, NY 1980

Phone: 631.924.3001
Fax: 631.924.5001
www.envirotrac.com

Patrick Condon
Project Manager

Professional Highlights and Selected Projects

Project Experience:

- Specific experience includes, but is not limited to, the following: Phase I and II Environmental Site Assessments (ESAs) throughout New York State in conformance with ASTM Standard E1527-05 and federal All Appropriate Inquiry (AAI) requirements; subsurface soil and ground-water investigations using soil borings, hydropunch/GeoProbe, monitoring wells; UST closures; UIC cleanups; product line closures; hydraulic lift closures; oil/water separator closures; work in conjunction with other Project Managers to prepare site specific Remedial Action Plans, such as product recovery, pump and treat, high vacuum extraction, soil vapor extraction and air sparge.

- Provide management and support as well as oversight for several complex projects involving asbestos removal, building demolitions, sheeting and shoring installation, UST removal, and excavation.

- As a geologist, Mr. Condon's experience includes oversight and performance of soil and ground-water investigations at numerous petroleum and hazardous waste sites. Investigation techniques included oversight of soil borings, Geoprobe sampling and ground-water monitoring well installation. Drilling methods include hollow stem auger, air rotary, Rotasonic, mud rotary and rock coring.

- Mr. Condon has overseen and performed numerous drywell and septic system investigations, remediations and closures. All remediated systems had to meet federal or local guidelines. The drywell/ septic systems were then stabilized for future use, removed or abandoned. Mr. Condon was also responsible for the disposal of all hazardous and non-hazardous material removed from the drywells.

- Mr. Condon has conducted numerous multilevel aquifer characterization and sampling programs to monitor the vertical profile of off-site plumes affecting drinking water wells. Methods of aquifer characterization included using geophysical techniques and pump tests.

- Mr. Condon oversees and performs operation and maintenance of remediation systems that include product recovery, soil vapor extraction, air sparge, pump and treat and high vacuum extraction. Operation and maintenance responsibilities include sampling, recording system operating conditions, maximizing system operation and troubleshooting component failures.

Jeffrey S. Romano
Project Scientist

Experience Summary

- *Safety Officer at Environmental Construction & Remediation Projects*
- *Site Specific Heath and Safety Plans*
- *Community Health and Safety Plans*
- *Human Exposure Risk assessment*
- *Development of Personal Protective Equipment Programs*
- *Personal and Community Air Monitoring*

Education

- *State University at Stony Brook, Stony Brook , NY—2006 Bachelor of Science, Health Science / Major in Environmental Health and Safety*

EnviroTrac
Environmental Services

5 Old Dock Road
Yaphank, NY 11980

Phone: 631.924.3001
Fax: 631.924.5001
www.envirotrac.com

Mr. Romano has over 3 years experience in Environmental Consulting and Industrial Hygiene. Specific experience includes developing and implementing site specific health and safety programs as site safety officer. These programs were developed by Mr. Romano to address potential human exposure risk from demolition and construction activities conducted at project sites. As site safety officer Mr. Romano's responsibilities included preparing site/task specific health and safety plans, training personnel, evaluating personal protective equipment (PPE) requirements, initiating medical monitoring, developing and implementing community health and safety plans (CHASPs), coordinating personal and community air monitoring, evaluating exposure assessments and reporting in accordance with OSHA regulations. He has extensive experience in safe excavation techniques and construction safety procedures.

Mr. Romano has worked as site safety officer on many projects with a wide range of contaminants that included chlorinated solvents, petroleum hydrocarbons, PCBs, coal tar and metals. These projects included work at inactive hazardous waste sites, industrial facilities, public utilities, landfills, petroleum spill sites, environmental property assessments (Phase I and II), indoor vapor intrusion/soil-gas investigations/mitigates, and superfund sites.

As project level Industrial Hygienist for EnviroTrac, Mr. Romano is responsible for both the development and field management of safety programs for individual projects.

Professional Certifications/Training

SBU Internship, Environmental Audit of Laboratory facility, 2006

MTA, Metro-North Railroad Track Safety Training, 2007

Loss Prevention System Training, 2007

API Training, 2008

OSHA Certification, 40 hr Haz-Waste Operations & Emergency Response

OSHA Certification, 8 hr Refresher HAZWOPER

OSHA Certification, Confined Space Entry and Supervision

American Red Cross Community First Aid and Safety Certification

American Red Cross Adult, Infant, and Child CPR/AED Certification

Jeffrey S. Romano
Project Scientist

Professional Highlights and Selected Projects

Project Experience:

- *Webster Avenue Bridge, New Rochelle, NY*

  Mr. Romano managed construction worker safety as site safety officer for the disassembly and demolition of the Webster Avenue Rail Bridge in New Rochelle, NY. The bridge structure, transmission poles and catenary towers required de-leading of the areas to be cut by torch or saw. Air quality monitoring equipment was required to assess the level of contamination present on the structure during the de-leading process. Mr. Romano was responsible to implement the personal protective equipment program which included conducting respirator fit tests, coordinating blood lead analysis both before and after de-leading. Lead air levels were subsequently recorded and used to attain the correct level of PPE and containment required to complete the task.

- *Atlantic Avenue, Brooklyn, NY*

  As Site Safety Officer for a Major Oil Company, Mr. Romano was responsible for safety at a high profile excavation/remediation site located in downtown Brooklyn. The site was safely excavated to 15 feet below grade and petroleum impacted soil was removed and trucked to a treatment facility. A total of 1.92 miles of lateral pipe was then installed as part of a sub-slab depressurization system. A soil vapor extraction system was installed to remediation soil below the depth of excavation. Mr. Romano was responsible for developing site specific health and safety plan providing safe excavation techniques, working safely in excavations and protecting workers and community from potential vapor/dust exposure. The project was safely finished ahead of schedule and under budget.

- *Verrazano Narrows Bridge Paint Staging Area, Staten Island, NY*

  Mr. Romano conducted Phase II exit audits of the paint staging area for a major construction company working on the Verrazano Bridge. He was responsible to confirm that the projects health, safety and environmental protection program was adhered to during the work. The audit included visual inspection and with confirmatory soil samples taken from key areas on site. Photographs and grab samples were the basis for the results of the Phase II exit audit analysis.

- *Retail Oil Facility 2748 Coney Island Avenue, Brooklyn, NY*

  Mr. Romano was responsible for health and safety at a retail site for a major oil company while remediation by excavation was performed down to 13 fbg. The project included installation and removal of twenty-five (25) foot steel sheet shoring combined with steel frame, crossbeams and whalers. Impacted soils were directly loaded in trucks for offsite transportation and disposal. Mr. Romano directed the safe operation during excavation, shoring and backfilling.

- *Soil Vapor Mitigation System and Backdraft Testing, Oyster Bay, NY*

  Mr. Romano conducted Sub-slab depressurization system safety and efficiency testing. Using a manometer to quantitatively evaluate negative pressure of system piping, system efficiency was determined. Back draft testing for the new construction boiler units was also required and completed. All quantitative and qualitative testing results were entered into a system safety evaluation report.

- *Phase I and II Environmental Investigations*

  Mr. Romano was the Site Safety Officer for multiple retail gasoline stations for a Major Oil Company within the tri-state area while performing drilling, well installation, soil and ground water sampling, and product recovery.

APPENDIX B

Health and Safety Plan

Health and Safety Plan

TABLE OF CONTENTS

FIGURES

TABLES

ATTACHMENTS

1.0 INTRODUCTION

This Health and Safety Plan has been developed by EnviroTrac Ltd, for conducting work at the former CAMCO site located at 2125 Smithtown Avenue, in Ronkonkoma, New York (see Figure 2-1 as provided in the Work Plan). This plan will serve to provide recommended health and safety procedures for those employees who may be exposed to hazardous materials and conditions that may be present during the site activities.

The procedures set forth in this plan are designed to reduce the risk of exposure to chemical substances that may be present in the soil, water and/or air associated with the investigative work that will be conducted at the site. The procedures described herein were developed in accordance with the provision of OSHA rule 29 CFR 1910.120 and in accordance with the Town of Islip's and Envirotrac's experience in similar field investigations. The recommended health and safety guidelines suggested within this document may be modified as further information is made available through monitoring, sample analyses, and on-site characterization.

1.1 Background

From approximately 1936 until 1996 CAMCO leased the subject property from the Town of Islip. During its occupation at the Site CAMCO operated a repair and overhaul shop for aircraft parts and accessories. Prior to 1980 CAMCO's facility wastewater discharged on site to a series of leaching pools and storm drains. From the early 1980s to 1996 CAMCO treated, containerized and transferred operational wastewater to an off-site recycling or disposal facility. Sanitary wastes were discharged to cesspools located east of the main building and west of the smaller structure. During operation, electricity, natural gas and potable water were supplied to the Site by off-site providers. In 1996, CAMCO vacated the property and since then the main building has been vacant and the warehouse used for limited storage; the majority of the facility has been dormant.

The Town of Islip contracted EnviroTrac Ltd, to investigate areas of environmental concern within the subject property. The investigation will include soil vapor testing, soil borings, installation of groundwater monitoring wells as well as soil and groundwater testing.

The presence of volatile organic compounds, including trichloroethene (TCE) and tetrachloroethene (PCE), that were detected in soil vapor during prior testing suggests the possibility of environmental impacts in the vicinity of those findings. In addition TCE and PCE were detected in groundwater in the vicinity of the Site in 2008.

1.2 Site Location and Land Usage

The Town owns the property located at 2125 Smithtown Avenue, Ronkonkoma, New York, where Central Aviation & Marine Corporation (hereinafter "CAMCO") was formerly located. The latitude and longitude coordinates for the approximate center of the Site are 40° 47' 56.8" north and 73° 6' 31.7" west, respectively. The Site is identified as Tax Map: Section 106; Block 1: Lot 6.6.

The Site is located on the west side of the Long Island McArthur Airport complex and on the east side of Smithtown Avenue, approximately one (1) mile north of the Veterans Memorial Hwy. (NYS Rte 454): one (1) mile south of the Long Island Expressway (1-495); and three thousand five hundred (3,500) feet east of Lakeland Avenue (C.R.93), in the hamlet of Ronkonkoma, Town of Islip, County of Suffolk, New York.

The Site consists of two parcels, measuring approximately 2.03 acres and 0.62 acres, respectively. The larger parcel is comprised of a one and two story wood frame structure and a small wood-frame shed that occupies approximately 50,000 square feet of area. The remainder of the Site consists of asphalt/gravel for parking purposes. The structures were not occupied during a site walk through conducted on April 16, 2010 and are in a general condition of disrepair. This area has been historically utilized as a repair shop for overhauling and repairing aircraft accessories and turbine engines. The smaller parcel is comprised of a steel frame building that occupies approximately 13,000 square feet of area. The remainder of the Site consists of asphalt paved and vegetated land.

Based on prior testing conducted at the Site the depth to groundwater is approximately 50 feet below land surface. N.D. Eryou, PhD, PE, a previous investigator at the Site, has reported the general direction of groundwater flow to be to the south southwest.

1.3 Project Description

The Town of Islip, Suffolk County, New York (the Town) is seeking consulting services to conduct environmental evaluations needed to comply with an Order on Consent and Administrative Settlement "Order" between the Town and the New York State Department of Environmental Conservation (the Department), Index #A1-0627-12-09. Specifically, the Town is seeking services including the preparation of plans, monthly reports, closeout documents, sampling, laboratory testing and other services for compliance with the Order.

Impacts to soil and groundwater quality have been found as a result of prior investigations and studies that have been performed at and in the vicinity of the CAMCO site. The purpose of the proposed work is to confirm previous results and to obtain updated information regarding site conditions, concentrating efforts at the location of a former drum storage area on the southwestern portion of the building measuring approximately 500 ft^2. This will be accomplished through the collection and analysis of soil gas, soil and groundwater samples. The Town has determined that all above ground structures and foundations present at the Site will be removed. This demolition is outside of the EnviroTrac scope of work and will be conducted by others prior to the implementation of the activities specified in the work plan. The general activities involve investigating areas of environmental concern within the site property which includes soil vapor testing, soil borings, installation of groundwater monitoring wells as well as soil and groundwater testing. The locations of the projected work areas are illustrated on Figure 7-2 as provided in the Work Plan.

1.4 Potential Chemical I Hazards

The primary chemicals of concern are volatile and semi-volatile organic compounds, chlorinated compounds, and metals that were suspected or detected during investigation and remedial work previously conducted at the project site by F&N and other environmental firms. Analysis conducted on soil vapor samples collected below the building slab indicate concentration levels ranging from 150 micrograms per cubic meter (ug/m3) for trans-1,2-dichloroethene to 32,000 (ug/m3) for TCE. Analysis conducted on soil samples collected below the drum storage area slab indicate concentration levels ranging from 23,500 micrograms per kilogram (ug/kg) for chromium to 41,000 (ug/kg) for 1,2-dichlorobenzene. Table B-1 provides a summary of the identified chemicals of concern that may be encountered during the site investigation activities.

2.0 PERSONNEL RESPONSIBILITIES

The Town of Islip with EnviroTrac has developed a Health and Safety Management Team to ensure that the project is carried out safely. The following responsibilities and authorities have been or will be assigned to designated personnel for the scheduled activities.

2.1 Account Manager /Senior Project Manager and Technical Advisor

Mr. Dan Kovarik will be the Account manager for EnviroTrac in relation to the CAMCO project. Mr. Kovarik will be responsible for overall management and client relations for the project.

Mr. Peter Breen will be the technical director and will provide technical expertise for EnviroTrac in relation to the CAMCO project. Mr. Breen will be responsible for the overall planning and technical advisement for the project.

2.2 CAMCO Project Manager /Designated Representative

Mr. Patrick Condon will be the project manager for EnviroTrac. Mr. Condon will be responsible for overall coordination and implementation of the project. Mr. Condon or his designee will keep the Town of Islip and the NYSDEC updated on the status of the project.

Mr. Jeff Romano will serve as the Quality Assurance Officer (QAO) for EnviroTrac. As necessary, Mr. Romano 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. Romano will work with the data validator to develop a project specific data usability report.

Mr. Jeff Romano has been appointed by EnviroTrac to act in a supervisory capacity over all EnviroTrac employees and activities with respect to EnviroTrac's contractual obligations to the Town of Islip during the project.

This Health and Safety plan will be reviewed with the appropriate employees prior to working at the site. A Health and Safety Plan Review Record is provided in Attachment A for such documentation. EnviroTrac employees and subcontractors will sign documentation that they have read and are familiar with the contents of this Health and Safety Plan.

2.3 Site Safety Officer

Mr. Jeff Romano as the Site Safety Officer appointed by EnviroTrac will be responsible for EnviroTrac employees and subcontractors, unless otherwise specified in an appropriate contractual agreement. The site safety officer retains responsibility and authority to:

- implement, evaluate, and perform any necessary modifications of this Health and Safety Plan;
- maintain adequate supplies of all personal protective equipment as well as calibration and maintenance of all monitoring instruments;
- suspend operations at the site due to any ineffectiveness of this Health and Safety Plan;
- supervise emergency response activities; and
- implement and document pre-task briefings.

An alternate EnviroTrac Site Safety Officer will be designated by EnviroTrac to act accordingly when the primary EnviroTrac Site Safety Officer is unable to supervise and maintain EnviroTrac Health and Safety responsibilities on site. All site safety personnel will have received the appropriate level of training necessary to perform applicable duties as per 29 CFR Part 1910.120 Subpart H – Hazardous Materials.

Initial training for general site workers engaged in either hazardous substance removal or other activities that expose or potentially expose workers to hazardous substances and health hazards shall receive a minimum of 40 hours of instruction off the site, and a minimum of three days actual field experience under the direct supervision of a trained, experienced supervisor.

Workers who are either unlikely to be exposed over permissible exposure limits (PELs) and published exposure limits or who work in areas that have been monitored and fully characterized indicating that exposures are under permissible exposure limits and published exposure limits where respirators are not necessary, and the characterization indicates that there are no health hazards or the possibility of an emergency developing shall receive a minimum of 24 hours of instruction off the site, and a minimum of 1 day actual field experience under the direct supervision of a trained, experienced supervisor.

On-site management and supervisors directly responsible for, or who supervise employees engaged in, hazardous waste operations shall receive 40 hours initial training, and 3 days of supervised field experience and at least 8 additional hours of specialized training at the time of job assignment on such topics as, but not limited to, the employer's safety health program and the associated employee training program, personal protective equipment (PPE) program, spill containment program, and health hazard monitoring procedure and techniques.

2.4 EnviroTrac Subcontractors

EnviroTrac subcontractors who may potentially be put at risk from environmental contaminants present at the site will review this Health and Safety Plan for information purposes only. Subcontractors are responsible, at a minimum, for maintaining the health and safety requirements presented in this plan. Information, such as air monitoring and past analytical results obtained by EnviroTrac, will be shared with the subcontractors to assist them in fulfilling the health and safety recommendations. Subcontractors must prepare and implement a health and Safety Plan that meets or exceeds the requirements of this plan and all applicable state and federal rules and regulations. In addition, subcontractors will also certify that personal employed during site related activities have met the requirements of OSHA Hazardous Waste Operations Standard (29 CFR 1910.120) and other applicable OSHA standards (Attachment B).

3.0 MEDICAL MONITORING AND PERSONNEL TRAINING REQUIREMENTS

The Occupational Safety and Health Administration (OSHA) has established requirements for a medical surveillance program designed to monitor and reduce health risks for employees who may potentially be exposed to hazardous materials. This program has been designed to provide baseline medical data for each employee involved in hazardous waste operations. This will include field activities and determination of their ability to wear personal protective equipment, such as chemical resistant clothing and respirators. The medical examinations are administered on an annual basis and as warranted by symptoms of exposure or specialized activities. Symptoms or exposures, related to the site field program, will be reported to EnviroTrac's Health and Safety Coordinator as soon as possible and the individual will be examined by a physician.

All site personnel involved with the site activities may be required to have participated in a medical monitoring program meeting specifications of 20 CFR 1910.120. The examining physician is required to make a report to the employer of any medical condition that would place employees at increased risk of wearing a respirator or other personal protection equipment. EnviroTrac and its effected subcontractors shall assume the responsibility of maintaining site personnel medical records as regulated by 29 CFR 1910.20, where applicable.

A respiratory protection program is required for those employees who wear or may wear respiratory protection as regulated by 29 CFR 1910.134.

3.1 Personnel Training

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

As dictated by the nature of site activities, additional specialized training such as confined space entry must also be provided. Specialized training may be provided for activities such as confined space entry, excavations and handling of unidentified substances.

4.0 SITE MONITORING AND PERSONAL PROTECTIVE EOUIPMENT

Analyses on soil samples previously collected at the site have identified VOCs present; the principal compounds are listed in Table B-1. To provide safeguards for exposures to these compounds, a monitoring and protection program has been designed for the compounds with the lowest permissible exposure limit (PELs). Exposure information and physical and chemical properties of these compounds are provided in Attachment C. Engineering controls, site monitoring, and good work practices will be used during the project to minimize the potential exposure to these and less threatening compounds. These are discussed in succeeding sections.

4.1 Engineering Controls

Good industrial hygiene practices recommend that engineering controls should initially be used to reduce environmental concentrations to the permissible exposure level. These controls may include continuous positive air displacement, the use of blowers and/or an aggressive dust suppression program. Monitoring of these areas will be conducted to check the effectiveness of the controls.

4.2 Site Monitoring

Field activities may create or subject project personnel to potentially hazardous conditions, such as hazardous substances in the breathing space. These substances may be in the form of mists, vapors, dusts, or fumes that can enter the body through ingestion, inhalation, absorption and direct contact. Monitoring of these substances and/or protective measures must be performed to ensure appropriate personal protection during site activities. Monitoring will be tailored to the location of work, type of work, wind direction and contaminant of concern.

The following describes the monitoring parameters to be evaluated during the site operations. Recommended instruments to be used are also provided in the discussion. All instruments to be used during site activities will meet the established requirements set forth by OSHA, NIOSH and state agencies where applicable. Action levels based on monitoring results are discussed in the following section.

Organic vapor concentrations will be monitored routinely in the breathing space using a portable photo ionization detection (PID) meter. Particulates containing possible base neutral, PCB and metal compounds will be monitored using a particulate monitor. The instruments used will give real time contaminant/particulate levels as well as time weighted averages for the targeted chemical(s). Minimally, monitoring will be conducted at the initiation of a task, location change and where different chemicals are being encountered. Air quality will be monitored prior to entry. Organic vapor concentrations, contaminant concentrations in soils and water may be used as action level criteria for upgrading or downgrading protective equipment and implementing additional precautions or procedures.

The potential for explosive atmospheres and oxygen content will be monitored by combustible gas indicator/oxygen meter. The monitoring will be conducted together with the organic vapor monitoring. Special examination will be given to high and low areas of the work zones such as excavations.

All site monitoring will be conducted by or under the supervision of the Site Safety Officer. All readings obtained will be recorded in a dedicated site notebook or the Air Monitoring/Observation Form in Attachment D. The Site Safety Officer will maintain all monitoring instruments throughout the site investigation to ensure their reliability and proper operation.

4.3 Action Levels

The following action levels have been established for activity cessation, site evacuation, emergency response, and upgrade or downgrade in the level of personal protective equipment. All site work will be accomplished at level D personal protection. Discontinuation of site activities will occur when personnel exposure to total concentrations of organic vapors exceed 25 ppm above background levels or when airborne particulate levels exceed 150 ug/m^3 above background levels. If conditions meet or exceed the action level for a sustained period of time (15 minutes), re-evaluation of engineering controls may be necessary. If concentrations remain constant all personnel must leave work area or apply the appropriate level of protection. The compounds listed in Table B-2 will not be individually monitored. The photo ionization device measures all volatile organic compounds, for this reason 25 ppm has been chosen as the general action level. Mandatory safe occupational work practices will be followed at all times.

4.4 Personal Protective Equipment

The types of protective clothing and equipment to be used during the site activities are discussed in this section. Personal protective equipment is in conformance with EPA criteria for Level B, C, and D protection. All respiratory protective equipment used will be approved by NIOSH/MSHA.

Level C protection, as described in this plan, will be available at a minimum, for those activities that involve surface and subsurface soil strata disturbance such as excavation, and dewatering activities. It is anticipated that the activities that will be implemented will be conducted using Level D protection. In addition, the identified chemicals of concern are known to have skin absorption potential. Consequently in those areas were direct dermal exposure to the chemicals of concern is possible through either contact with contaminated water or muck material, the protective ensemble should also include chemical resistant clothing and contaminant impervious gloves.

The Site Safety Officer will determine whether or not a level of protection can be upgraded or downgraded. Changes in the level of protection will be recorded in the dedicated site logbook along with the rationale for the changes. Level D protection may be used either for those activities that do not pose a potential threat of exposure to toxic or hazardous substances or when adequate engineering controls minimizing the threat of contaminant exposure are in place. Consistent with 051-IA training, prior to donning Level C, oxygen percent must be >19.5% and continuously monitored.

Level B Protection

a. Full-face pressure demand cascade air system or other suitable self-contained, pressure demand breathing apparatus.
b. Chemical-resistant clothing such as Poly-coated Tyveks or Saranex. Suits will be hooded and one piece with booties and elastic wrists bands.
c. Outer nitrile and inner (nitrile) gloves (both chemical resistant).
d. Steel toed work boots.
e. Chemical-resistant tape over protective clothing (as necessary).
f. Options as required:
   1. Coveralls
   2. Disposable outer boots
   3. Face shield
   4. Escape mask (as appropriate)
   5. Hard hat as needed
   6. Ear protection
   7. Leather work gloves

Level C Protection

a. Full-face piece air purifying respirator equipped with appropriate, organic vapor and dust canisters or cartridges (all personnel requiring respiratory protection are fit-tested with the respirator to be used in the field). HEPA dust filters will be available and utilized as warranted by site conditions.
b. Tyvek coveralls. Chemical-resistant clothing such as Poly-coated Tyveks or Saranex in those areas where there may be potential dermal contact with the identified chemicals of concern.
c. Outer nitrile gloves and inner nitrile gloves.
d. Steel toed work boots.

e. Options as required:
   1. Coveralls
   2. Disposable outer boots
   3. Escape mask
   4. Face shield
   5. Hearing protection
   6. Hard hat as needed
   7. Chemical-resistant tape
   8. Leather work gloves

Level D Protection

a. Shirts and long pants.
b. Outer nitrile gloves at a minimum. Inner nitrile gloves are recommended where practical.
c. Steel toed work boots.
d. Options as required:
   1. Disposable outer boots
   2. Hearing protection
   3. Leather work gloves
   4. Hard hat as needed
   5. Safety Glasses

5.0 DECONTAMINATION

5.1 General

Personnel involved with the site activities may be exposed to compounds in a number of ways, despite the most stringent protective procedures. Site personnel may come in contact with vapors, gases, mists, or particulates in the air, or other site media while performing site duties. Use of monitoring instruments and site equipment can also result in exposure and transmittal of hazardous substances.

In general, decontamination involves scrubbing with a detergent water solution followed by clean water rinses. All disposable items shall be disposed of in a dry container. Certain parts of contaminated respirators, such as harness assemblies and leather or cloth components, are difficult to decontaminate. If grossly contaminated, they may have to be discarded. Rubber components can be soaked in detergent and water and scrubbed with a brush. In addition to being decontaminated, all respirators, non-disposable protective clothing, and other personal articles must be sanitized before they can be used again if they become soiled from exhalation, body oils, and perspiration. The manufacturer's instructions should be followed in sanitizing the respirator masks.

The Site Safety Officer will be responsible for the proper training covering the maintenance, decontamination, and sanitizing of all respirator equipment.

The decontamination zone layout and procedures should match the prescribed levels of personal protection. A detailed discussion for the establishment of the project decontamination zone and the procedures required for the various levels of personnel protection follows.

Exclusion Zone (EZ): The exclusion zone will be the tunnel during activities conducted in the Elizabeth Lane are and in those areas where chemicals of concern may be encountered. These areas include but are not limited to, the shaft entrance, the muck stockpiling area, and the water treatment area.

Contaminant Reduction Zone (CRZ): It is within this zone that the decontamination process is undertaken. Personnel and their equipment must be adequately decontaminated before leaving this zone for the support zone. This zone will be set up between the EZ and a well-ventilated open area.

Support Zone (SZ): The support zone is considered to be uncontaminated; as such, protective clothing and equipment are not required but should be available for use in emergencies. All equipment and materials are stored and maintained within this zone. Protective clothing is put on in the support zone before entering the contaminant reduction zone.

The following procedures have been established to provide site personnel with minimum guidelines for proper decontamination. These minimum procedures must be followed by personnel leaving the point of operations designated as the exclusion zone. The decontamination process shall take place at a reasonable distance away from any area of potential contamination.

5.2 Minimum Decontamination Procedure

Personnel leaving the point of operations should remove outer clothing gloves and boots. At a minimum, the outer boots shall be removed first and stored in an appropriate area or disposed of properly. Outer boots must be properly washed where gross contamination is evident. Personnel shall then remove and dispose of the Tyvek coveralls. Personnel should remove the Tyvek coveralls so that inner clothing does not come in contact with any contaminated surfaces. After Tyvek removal, personnel shall remove and discard outer nitrile gloves. Personnel shall then remove the respirator, where applicable. Respirators shall be disinfected between use with towelettes or other sanitizing methods. Potable water, at a minimum, will be present so that site personnel can thoroughly wash hands and face after leaving the point of operations.

In the event that identified chemicals of concern are encountered, portable wash stations shall be utilized for easy and efficient access. The wash station shall consist of a potable water supply, hand soap and clean towels. Portable sprayer units filled with Alconox solution and potable water should also be available to wash and rinse off grossly contaminated boots, gloves and equipment. The Site Safety Officer will monitor decontamination procedures to ensure their effectiveness. Modifications of the decontamination procedure may be necessary as determined by the Site Safety Officer's observations.

5.3 Standard Decontamination Procedures

The following decontamination procedures should be implemented during site operations for the appropriate level of protection.

Level B - Personal Protection Decontamination Procedure

Step 1 - Segregated Equipment Drop

Deposit equipment (tools, sampling devices, notes, monitoring instruments, radios, etc.) used on the site onto plastic drop cloths.

Step 2 - Boot Covers and Glove Wash

Outer boot covers and outer gloves should be scrubbed with a decontamination solution of detergent and water.

Step 3 - Rinse Boot Covers and Gloves

Decontamination solution should be rinsed off boot covers and gloves using generous amounts of water. Repeat as many times as necessary.

Step 4 - Tape Removal

Remove tape from around boots and gloves and place into container with plastic liner.

Step 5 - Boot Cover Removal

Remove disposable boot covers and place into container with plastic liner.

Step 6 - Outer Glove Removal

Remove outer gloves and deposit in container with plastic liner.

Step 7 - Suit/Safety Boot Wash

Completely wash splash suit, SCBA, gloves, and safety boots. Care should be exercised that no water is allowed into the SCBA regulator. It is suggested that the SCBA regulator be wrapped in plastic.

Step 8 - Suit/Safety Boot Rinse

Thoroughly rinse off all decontamination solution from protective clothing.

Step 9 - Tank or Canister Changes

This is the last step in the decontamination procedure for those workers wishing to change air tanks and return to the exclusion zone. The worker's air tank or cartridge is exchanged, new outer glove and boot covers are donned, and joints taped.

Step 10 - Removal of Safety Boots

Remove safety boots and deposit in container with a plastic liner.

Step 11 - SCBA Backpack Removal

Without removing face piece, the SCBA backpack should be removed and placed on a table. The face piece should then be disconnected from the remaining SCBA unit and then proceed to the next station.

Step 12 - Splash Suit Removal

With care, remove splash suit. The exterior of the splash suit should not come in contact with any inner layers of clothing.

Step 13 - Inner Glove Wash

The inner gloves should be washed with a mild decontamination solution (detergent/water).

Step 14 - Inner Glove Rinse

Generously rinse inner gloves with water.

Step 15 - Face Piece Removal

Without touching face with gloves, remove face piece. Face piece should be deposited into a container which has a plastic liner.

Step 16 - Inner Glove Removal

Remove inner glove and deposit in container with plastic liner.

Step 17 - Field Wash

Wash hands and face thoroughly. If highly toxic, skin corrosive, or skin absorbent materials are known or suspected to be present, a shower should be taken.

Level C and Level D Personal Protection Decontamination Procedure

This decontamination procedure for Level C and Level D personal protection will employ applicable steps detailed in the Level B decontamination process.

5.4 Sampling Equipment and Sample Container Decontamination

All non-disposable sampling equipment will be decontaminated by either steam cleaning or by cleaning with an Alconox/water solution followed by a clean water rinse. As an added precaution against cross-contamination, all non-disposable sampling equipment will be rinsed with distilled water. All disposable sampling equipment will be properly disposed of in dry containers.

Before leaving the site, all sample containers will be thoroughly decontaminated using a detergent and water solution followed by a clean water rinse. The decontamination procedure should include a complete scrubbing of the container's surface to remove possible contamination. Care must be exercised to prevent damage to sample container identification labels.

6.0 SITE ACCESS AND SITE CONTROL

6.1 Site Access

Access to site activities within the work zone will be limited to authorized personnel. Such personnel include EnviroTrac employees, designated subcontractor's personnel and designated agency representatives. However, access into the established exclusion zone section will be limited to those authorized personnel wearing appropriate personal protective equipment.

6.2 Site Control

Certain procedures must be followed to ensure suitable site control and limitation of access so that those persons who may be unaware of site conditions are not exposed to inherent hazards. The exclusion zones will be monitored by the Site Safety Officer, or his designated representative to ensure personnel do not enter without proper personal protection. Sign-in and sign-out procedures may be implemented to ensure that only authorized personnel will participate in the activities and can all be accounted for at any time. The Site Safety Officer will coordinate this effort and maintain the generated documentation accordingly.

7.0 EMERGENCY RESPONSE

7.1 Notification of Site Emergencies

Emergency Response (Ambulance, Fire, Police) Call 911

Senior Project Manager
Dan Kovarik (631) 413-9793

Project Manager
Patrick Condon (631) 294-3695

Ref Figure B-1 Route to Hospital

8.0 SPECIAL PRECAUTIONS AND PROCEDURES

8.1 Potential Risks

The site activities pose potential exposure risks from both chemical and physical hazards. The chemical risks have been explained in detail in the previous sections. The potential for chemical exposure to hazardous substances is significantly reduced through the use of personal protective clothing, engineering controls and implementation of safe work practices.

Prior to working in any building compartment all doors and windows in the vicinity will be open to allow the area to ventilate. Entry monitoring will then be conducted to evaluate the need for engineering controls.

8.2 Additional Safety Practices

The following are important safety precautions, which will be enforced during construction on the project site:

1. Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases that probability of hand-to-mouth transfer and ingestion of material is prohibited in any area designated as contaminated,
2. Hands and face must be thoroughly washed upon leaving the work area and before eating, drinking, or any other activity.
3. Whenever decontamination procedures for outer garments are in effect, the entire body should be thoroughly washed as soon as possible after the protective garment is removed.
4. No excessive facial hair, which interferes with the effectiveness of a respirator, will be permitted on personnel required to wear respiratory protection equipment. The respirator must seal against the face so that the wearer receives air only through the air purifying cartridges attached to the respirator. Fit check (inhalation/exhalation) shall be performed prior to respirator use to ensure a proper seal is obtained by the wearer.

5. Contact with potentially contaminated surfaces should be avoided whenever possible. One should not walk through puddles, mud, or other discolored surfaces; kneel on ground; lean, sit or place equipment on drums, containers, vehicles, or the ground.
6. Medicine and alcohol can potentiate the effect from exposure to certain compounds. Prescribed drugs and alcoholic beverages should not be consumed by personnel involved in the project.
7. Personnel and equipment in the work areas should be minimized, consistent with effective site operations.
8. Work areas for various operational activities should he established.
9. Procedures for leaving the work area must be planned and implemented prior to going to the site. Work areas and decontamination procedures must be established on the basis of encountered site conditions.
10. Respirators will be issued for the exclusive use of one worker and will be cleaned and disinfected after each use.
11. Safety gloves and boots shall be taped to the disposable, chemical-protective suits as necessary.
12. Cartridges for air-purifying respirators in use will be changed every shift at a minimum.

9.0 PROCEDURES FOR PROTECTING THIRD PARTIES

9.1 EnviroTrac Employees and Subcontractors

EnviroTrac will be responsible only for monitoring the health and safety practices of EnviroTrac employees. EnviroTrac assumes that subcontractors are trained and competent to perform the scheduled tasks. EnviroTrac subcontractors are required to provide documentation regarding applicable regulatory compliance as discussed in Section 3.0 of this document. The subcontractors will be presented a copy of this plan and certification of receipt and understanding of its content will be procured by EnviroTrac prior to the start of the field program.

9.2 Public and Other Personnel

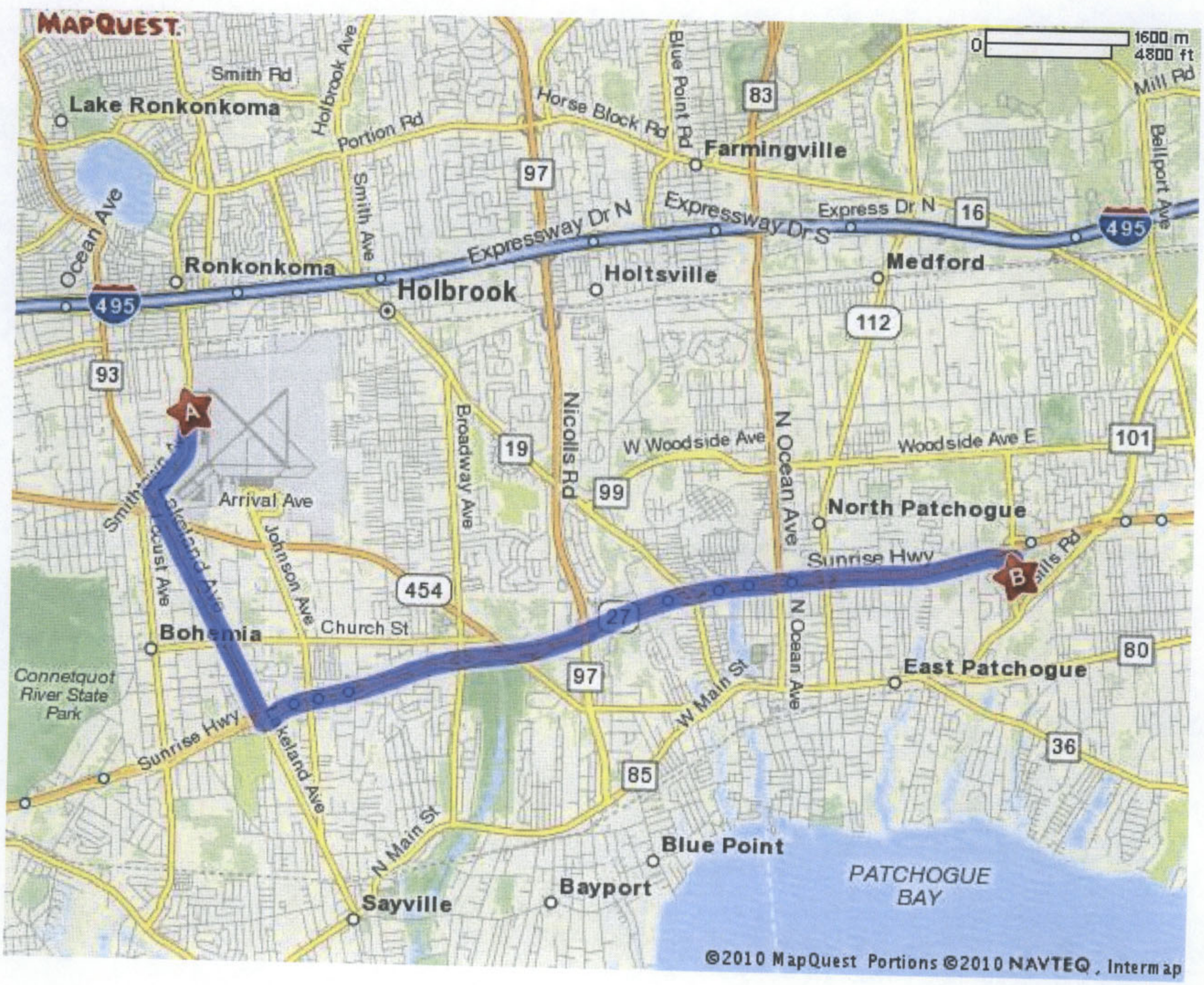
EnviroTrac will perform periodic and routine monitoring during site operations to determine the concentration of compounds in the breathing zone. If warranted, EnviroTrac will monitor the perimeter of the work site to determine contaminant levels in the ambient air that may affect off-site personnel. EnviroTrac will evaluate appropriate measures to reduce the risk of hazard to off-site personnel, whenever a required upgrade in personal protective equipment is employed during site operations. EnviroTrac will evaluate and affect appropriate corrective measures as necessary to reduce the risk of chemical hazard to off-site personnel.

Figures

Figure B-1
Route to Hospital
Former CAMCO Site – Ronkonkoma, New York

1. Start out going SOUTH on SMITHTOWN AVE/CR-29 toward S 2ND ST. -- 0.8 miles
2. Turn LEFT onto LAKELAND AVE/CR-93. -- 2.2 miles
3. Turn LEFT onto SUNRISE HWY. -- 0.1 mile
4. Merge onto NY-27 E/SUNRISE HWY via the ramp on the LEFT. -- 5.4 miles
5. Take EXIT 54 toward HOSPITAL ROAD/PATCHOGUE. -- 0.2 miles
6. Turn SLIGHT LEFT onto S SERVICE RD/SUNRISE HWY SERVICE RD S. -- 0.8 miles
7. Turn RIGHT onto HOSPITAL RD. -- 0.2 miles
8. 101 HOSPITAL RD is on the LEFT.

Brookhaven Memorial Hospital Medical Center
101 Hospital Rd, Patchogue, NY 11772-4870
Total Travel Estimate: 9.7 miles - about 13 minutes



Tables

Table B-1
Previously Identified Chemicals of Concern
Former CAMCO Site – Ronkonkoma, New York

Although a variety of chemicals will be tested for during the investigation at the CAMCO Site, the following summaries represent the highest detected concentrations based on prior testing conducted by others.

Soil Vapor

Chemical Name	Maximum Concentration (ug/m3)
1,1,1-Trichloroethane	700
cis-1,2-Dichloroethene	4,600
trans-1,2-Dichloroethene	150
Trichloroethene	32,000
Tetrachloroethene	920
m,p-Xylene	360

Soil

Chemical Name	Maximum Concentration (ug/kg)
1,2-Dichlorobenzene	41,000
Chromium	23,500

Groundwater

Chemical Name	Maximum Concentration (ug/l)
Trichloroethene	59
Tetrachloroethene	24
m,p-Xylene	5

Table B-2
Air Monitoring Action Levels
Former CAMCO Site – Ronkonkoma, New York

Airborne Volatile Organics

Compound Name	Action Level (ppm)	Protection	Monitoring Device
1,1,1-Trichloroethane	1-350	D	PID
	>350	$B^{(1)}$	
cis-1,2-Dichloroethene	1-200	D	PID
	>200	$B^{(1)}$	
trans-1,2-Dichloroethene	1-200	D	PID
	>200	$B^{(1)}$	
Trichloroethene	1-100	D	PID
	>100	$B^{(1)}$	
Tetrachloroethene	1-100	D	PID
	>100	$B^{(1)}$	
m,p-Xylene	1-100	D	PID
	>100	$B^{(1)}$, $C^{(2)}$	
1,2-Dichlorobenzene	1-50	D	PID
	>50	$B^{(1)}$, $C^{(2)}$	

Airborne Inorganics

Compound Name	Action Level (mg/m^3)	Protection	Monitoring Device
Chromium	0-1	D	Dust Indicator
	>1	$B^{(1)}$, $C^{(0)}$	

$C^{(0)}$: N-95 filtering face piece respirator (dust mask)
$C^{(1)}$: Chemical cartridge respirator with organic vapor cartridge(s).
$C^{(2)}$: Chemical cartridge respirator with a full-face piece and organic vapor cartridge(s).
$C^{(3)}$: Air supplied respirator operated in pressure demand or other positive pressure mode.
$C^{(4)}$: Air supplied full face respirator operated in pressure demand or other positive pressure mode.
$B^{(1)}$: Re-evaluate engineering controls. If concentrations remain constant leave work area.
D : Level D personal protection.

Concern	Action Level	Action
Explosive Vapors	>10% LEL	Backoff; let vent
	>20% LEL	Evacuate Area; let vent
Oxygen Level	<19.5%	Evacuate Area

EnviroTrac
Environmental Services

ATTACHMENT A

HASP Review Record

Attachment A
Acknowledgement Agreement
Former CAMCO Site – Ronkonkoma, New York

HEALTH AND SAFETY PLAN REVIEW RECORD

I acknowledge that I have read and understood the contents of this Health and Safety Plan and I agree to abide by all provisions as set forth.

If unidentified or new hazards not listed in this HASP are indentified or if the scope of work changes, I will report these finding to the Site Safety Officer and work will stop and not re-start work until contingencies and/or control measures are in place to address the hazards.

NAME & SIGNATURE	COMPANY	DATE

Add additional sheets as necessary

ATTACHMENT B

Subcontractor Occupational Safety and Health Certification

Attachment B
Subcontractor Occupational Safety and Health Certification
Former CAMCO Site – Ronkonkoma, New York

Project: ______________________________

Subcontractor: ______________________________

1. Subcontractor certifies that the following personnel to be employed during related activities have met the requirements of the OSHA Hazardous Waste Operations Standard (29 CFR 1910.120) and other applicable OSHA standards.

Name	Training	Certification	Medical Examination

2. Subcontractor certifies that it has received a copy of the Site Health and Safety Plan and will ensure that its employees are informed and will comply with its requirements.

3. Subcontractor further certifies that it has read and understands and will comply with all provisions of its contractual agreement with EnviroTrac, and The Town of Islip.

4. Subcontractor certifies that it has received a copy of EnviroTrac's Health and Safety Plan and understands that this plan is supplied for information purposes only unless subcontractor is willing to accept it as his plan too. Should you not be willing to accept this plan, then you are responsible for your own health and safety program. The subcontractor's attention is called to the fact that field operations will not be allowed to begin until such plan is approved. Also field operations may be halted by EnviroTrac if subcontractors do not affect protective measures warranted by site conditions.

5. Subcontractor will not be allowed to work until have met the training, respirator certification and medical examination requirements of the OSHA Hazardous Waste Operations Standard (29 CFR 1910.120). Subcontractors are required to provide EnviroTrac with completed certification forms (Exhibit 1) for this purpose.

Signed ______________________________ Date ______________________________

ATTACHMENT C

Chemical Property Information

Centers for Disease Control and Prevention
Your Online Source for Credible Health Information

September 2005

NIOSH Publication Number 2005-149

Search the Pocket Guide

SEARCH

Enter search terms separated by spaces.

Methyl chloroform

Synonyms & Trade Names Chlorothene; 1,1,1-Trichloroethane; 1,1,1-Trichloroethane (stabilized)

CAS No. 71-55-6	RTECS No. KJ2975000	DOT ID & Guide 2831 160
Formula CH_3CCl_3	Conversion 1 ppm = 5.46 mg/m3	IDLH 700 ppm See: 71556

Exposure Limits
NIOSH REL : C 350 ppm (1900 mg/m3) [15-minute] See Appendix C (Chloroethanes)
OSHA PEL †: TWA 350 ppm (1900 mg/m3)

Measurement Methods
NIOSH 1003
See: NMAM or OSHA Methods

Physical Description Colorless liquid with a mild, chloroform-like odor.

MW: 133.4	BP: 165°F	FRZ: -23°F	Sol: 0.4%	VP: 100 mmHg	IP: 11.00 eV
Sp.Gr: 1.34	Fl.P: ?	UEL: 12.5%	LEL: 7.5%		

Combustible Liquid, but burns with difficulty.

Incompatibilities & Reactivities Strong caustics; strong oxidizers; chemically-active metals such as zinc, aluminum, magnesium powders, sodium & potassium; water [Note: Reacts slowly with water to form hydrochloric acid.]

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms irritation eyes, skin; headache, lassitude (weakness, exhaustion), central nervous system depression, poor equilibrium; dermatitis; cardiac arrhythmias; liver damage

Target Organs Eyes, skin, central nervous system, cardiovascular system, liver

Personal Protection/Sanitation (See protection codes)
Skin: Prevent skin contact

First Aid (See procedures)
Eye: Irrigate immediately

Eyes: Prevent eye contact **Wash skin:** When contaminated **Remove:** When wet or contaminated **Change:** No recommendation	**Skin:** Soap wash promptly **Breathing:** Respiratory support **Swallow:** Medical attention immediately

Respirator Recommendations

NIOSH/OSHA

Up to 700 ppm:
(APF = 10) Any supplied-air respirator*
(APF = 50) Any self-contained breathing apparatus with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions:

(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister
Any appropriate escape-type, self-contained breathing apparatus

Important additional information about respirator selection

See also: INTRODUCTION See ICSC CARD: 0079 See MEDICAL TESTS: 0141

Page last reviewed: February 3, 2009
Page last updated: February 3, 2009
Content source: National Institute for Occupational Safety and Health (NIOSH) Education and Information Division

Centers for Disease Control and Prevention 1600 Clifton Rd. Atlanta, GA 30333, USA
800-CDC-INFO (800-232-4636) TTY: (888) 232-6348, 24 Hours/Every Day - cdcinfo@cdc.gov

September 2005

NIOSH Publication Number 2005-149

Search the Pocket Guide

SEARCH

Enter search terms separated by spaces.

1,2-Dichloroethylene

Synonyms & Trade Names Acetylene dichloride, cis-Acetylene dichloride, trans-Acetylene dichloride, sym-Dichloroethylene

CAS No. 540-59-0	**RTECS No.** KV9360000	**DOT ID & Guide** 1150 130P
Formula ClCH=CHCl	**Conversion** 1 ppm = 3.97 mg/m3	**IDLH** 1000 ppm See: 540590

Exposure Limits
NIOSH REL : TWA 200 ppm (790 mg/m3)
OSHA PEL : TWA 200 ppm (790 mg/m3)

Measurement Methods
NIOSH 1003 ;
OSHA 7
See: NMAM or OSHA Methods

Physical Description Colorless liquid (usually a mixture of the cis & trans isomers) with a slightly acrid, chloroform-like odor.

MW: 97.0	BP: 118-140° F	FRZ: -57 to -115° F	Sol: 0.4%	VP: 180-265 mmHg	IP: 9.65 eV
Sp.Gr(77°F): 1.27	Fl.P: 36-39°F	UEL: 12.8%	LEL: 5.6%		

Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F.

Incompatibilities & Reactivities Strong oxidizers, strong alkalis, potassium hydroxide, copper [Note: Usually contains inhibitors to prevent polymerization.]

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms irritation eyes, respiratory system; central nervous system depression

Target Organs Eyes, respiratory system, central nervous system

Personal Protection/Sanitation (See protection codes)	First Aid (See procedures)
Skin: Prevent skin contact **Eyes:** Prevent eye contact **Wash skin:** When contaminated **Remove:** When wet (flammable) **Change:** No recommendation	**Eye:** Irrigate immediately **Skin:** Soap wash promptly **Breathing:** Respiratory support **Swallow:** Medical attention immediately

Respirator Recommendations

NIOSH/OSHA

Up to 1000 ppm:
(APF = 25) Any supplied-air respirator operated in a continuous-flow mode£
(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)£
(APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister
(APF = 50) Any self-contained breathing apparatus with a full facepiece
(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions:

(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister
Any appropriate escape-type, self-contained breathing apparatus

Important additional information about respirator selection

See also: INTRODUCTION See ICSC CARD: 0436

Page last reviewed: February 3, 2009
Page last updated: February 3, 2009
Content source: National Institute for Occupational Safety and Health (NIOSH) Education and Information Division

Centers for Disease Control and Prevention 1600 Clifton Rd. Atlanta, GA 30333, USA
800-CDC-INFO (800-232-4636) TTY: (888) 232-6348, 24 Hours/Every Day - cdcinfo@cdc.gov

CDC Centers for Disease Control and Prevention
Your Online Source for Credible Health Information

September 2005

NIOSH Publication Number 2005-149

Search the Pocket Guide

SEARCH

Enter search terms separated by spaces.

Trichloroethylene

Synonyms & Trade Names Ethylene trichloride, TCE, Trichloroethene, Trilene		
CAS No. 79-01-6	RTECS No. KX4550000	DOT ID & Guide 1710 160
Formula $ClCH=CCl_2$	Conversion 1 ppm = 5.37 mg/m3	IDLH Ca [1000 ppm] See: 79016
Exposure Limits NIOSH REL : Ca See Appendix A See Appendix C OSHA PEL †: TWA 100 ppm C 200 ppm 300 ppm (5-minute maximum peak in any 2 hours)		Measurement Methods **NIOSH** 1022, 3800; **OSHA** 1001 See: NMAM or OSHA Methods

Physical Description Colorless liquid (unless dyed blue) with a chloroform-like odor.

MW: 131.4	BP: 189°F	FRZ: -99°F	Sol: 0.1%	VP: 58 mmHg	IP: 9.45 eV
Sp.Gr: 1.46	Fl.P: ?	UEL(77°F): 10.5%	LEL(77°F): 8%		

Combustible Liquid, but burns with difficulty.

Incompatibilities & Reactivities Strong caustics & alkalis; chemically-active metals (such as barium, lithium, sodium, magnesium, titanium & beryllium)

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms irritation eyes, skin; headache, visual disturbance, lassitude (weakness, exhaustion), dizziness, tremor, drowsiness, nausea, vomiting; dermatitis; cardiac arrhythmias, paresthesia; liver injury; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system, heart, liver, kidneys, central nervous system

Cancer Site [in animals: liver & kidney cancer]

Personal Protection/Sanitation (See protection codes) **Skin:** Prevent skin contact **Eyes:** Prevent eye contact **Wash skin:** When contaminated **Remove:** When wet or contaminated **Change:** No recommendation **Provide:** Eyewash, Quick drench	First Aid (See procedures) **Eye:** Irrigate immediately **Skin:** Soap wash promptly **Breathing:** Respiratory support **Swallow:** Medical attention immediately

Respirator Recommendations

NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration:
(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister
Any appropriate escape-type, self-contained breathing apparatus

Important additional information about respirator selection

See also: INTRODUCTION See ICSC CARD: 0081 See MEDICAL TESTS: 0236

Page last reviewed: February 3, 2009
Page last updated: February 3, 2009
Content source: National Institute for Occupational Safety and Health (NIOSH) Education and Information Division

Centers for Disease Control and Prevention 1600 Clifton Rd. Atlanta, GA 30333, USA
800-CDC-INFO (800-232-4636) TTY: (888) 232-6348, 24 Hours/Every Day - cdcinfo@cdc.gov

Centers for Disease Control and Prevention
Your Online Source for Credible Health Information

September 2005

NIOSH Publication Number 2005-149

Search the Pocket Guide

SEARCH

Enter search terms separated by spaces.

Tetrachloroethylene

Synonyms & Trade Names Perchlorethylene, Perchloroethylene, Perk, Tetrachlorethylene

CAS No. 127-18-4	RTECS No. KX3850000	DOT ID & Guide 1897 160
Formula $Cl_2C{=}CCl_2$	Conversion 1 ppm = 6.78 mg/m^3	IDLH Ca [150 ppm] See: 127184

Exposure Limits
NIOSH REL : Ca Minimize workplace exposure concentrations. See Appendix A
OSHA PEL †: TWA 100 ppm
C 200 ppm (for 5 minutes in any 3-hour period), with a maximum peak of 300 ppm

Measurement Methods
NIOSH 1003 ; OSHA 1001
See: NMAM or OSHA Methods

Physical Description Colorless liquid with a mild, chloroform-like odor.

MW: 165.8	BP: 250°F	FRZ: -2°F	Sol: 0.02%	VP: 14 mmHg	IP: 9.32 eV
Sp.Gr: 1.62	Fl.P: NA	UEL: NA	LEL: NA		

Noncombustible Liquid, but decomposes in a fire to hydrogen chloride and phosgene.

Incompatibilities & Reactivities Strong oxidizers; chemically-active metals such as lithium, beryllium & barium; caustic soda; sodium hydroxide; potash

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms irritation eyes, skin, nose, throat, respiratory system; nausea; flush face, neck; dizziness, incoordination; headache, drowsiness; skin erythema (skin redness); liver damage; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system, liver, kidneys, central nervous system

Cancer Site [in animals: liver tumors]

Personal Protection/Sanitation (See protection codes)	First Aid (See procedures)
Skin: Prevent skin contact **Eyes:** Prevent eye contact **Wash skin:** When contaminated **Remove:** When wet or contaminated **Change:** No recommendation **Provide:** Eyewash, Quick drench	**Eye:** Irrigate immediately **Skin:** Soap wash promptly **Breathing:** Respiratory support **Swallow:** Medical attention immediately

Respirator Recommendations

NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration:
(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister
Any appropriate escape-type, self-contained breathing apparatus

Important additional information about respirator selection

See also: INTRODUCTION See ICSC CARD: 0076 See MEDICAL TESTS: 0179

Page last reviewed: February 3, 2009
Page last updated: February 3, 2009
Content source: National Institute for Occupational Safety and Health (NIOSH) Education and Information Division

Centers for Disease Control and Prevention 1600 Clifton Rd. Atlanta, GA 30333, USA
800-CDC-INFO (800-232-4636) TTY: (888) 232-6348, 24 Hours/Every Day - cdcinfo@cdc.gov

Centers for Disease Control and Prevention
Your Online Source for Credible Health Information

September 2005

NIOSH Publication Number 2005-149

Search the Pocket Guide

SEARCH

Enter search terms separated by spaces.

m-Xylene

Synonyms & Trade Names 1,3-Dimethylbenzene; meta-Xylene; m-Xylol

CAS No. 108-38-3	**RTECS No.** ZE2275000	**DOT ID & Guide** 1307 130
Formula $C_6H_4(CH_3)_2$	**Conversion** 1 ppm = 4.34 mg/m3	**IDLH** 900 ppm See: 95476

Exposure Limits
NIOSH REL : TWA 100 ppm (435 mg/m3) ST 150 ppm (655 mg/m3)
OSHA PEL †: TWA 100 ppm (435 mg/m3)

Measurement Methods
NIOSH 1501 , 3800 ;
OSHA 1002
See: NMAM or OSHA Methods

Physical Description Colorless liquid with an aromatic odor.

MW: 106.2	**BP:** 282°F	**FRZ:** -54°F	**Sol:** Slight	**VP:** 9 mmHg	**IP:** 8.56 eV
Sp.Gr: 0.86	**Fl.P:** 82°F	**UEL:** 7.0%	**LEL:** 1.1%		

Class IC Flammable Liquid: Fl.P. at or above 73°F and below 100°F.

Incompatibilities & Reactivities Strong oxidizers, strong acids

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms irritation eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; corneal vacuolization; anorexia, nausea, vomiting, abdominal pain; dermatitis

Target Organs Eyes, skin, respiratory system, central nervous system, gastrointestinal tract, blood, liver, kidneys

Personal Protection/Sanitation (See protection codes)

First Aid (See procedures)

Skin: Prevent skin contact **Eyes:** Prevent eye contact **Wash skin:** When contaminated **Remove:** When wet (flammable) **Change:** No recommendation	**Eye:** Irrigate immediately **Skin:** Soap wash promptly **Breathing:** Respiratory support **Swallow:** Medical attention immediately

Respirator Recommendations

NIOSH/OSHA

Up to 900 ppm:
(APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*
(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*
(APF = 10) Any supplied-air respirator*
(APF = 50) Any self-contained breathing apparatus with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions:

(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister
Any appropriate escape-type, self-contained breathing apparatus

Important additional information about respirator selection

See also: INTRODUCTION See ICSC CARD: 0085

Page last reviewed: February 3, 2009
Page last updated: February 3, 2009
Content source: National Institute for Occupational Safety and Health (NIOSH) Education and Information Division

Centers for Disease Control and Prevention 1600 Clifton Rd. Atlanta, GA 30333, USA
800-CDC-INFO (800-232-4636) TTY: (888) 232-6348, 24 Hours/Every Day - cdcinfo@cdc.gov

September 2005

NIOSH Publication Number 2005-149

Search the Pocket Guide

SEARCH

Enter search terms separated by spaces.

p-Xylene

Synonyms & Trade Names 1,4-Dimethylbenzene; para-Xylene; p-Xylol

CAS No. 106-42-3	RTECS No. ZE2625000	DOT ID & Guide 1307 130
Formula $C_6H_4(CH_3)_2$	Conversion 1 ppm = 4.41 mg/m3	IDLH 900 ppm See: 95476
Exposure Limits NIOSH REL : TWA 100 ppm (435 mg/m3) ST 150 ppm (655 mg/m3) OSHA PEL †: TWA 100 ppm (435 mg/m3)		Measurement Methods **NIOSH** 1501 , 3800 ; **OSHA** 1002 See: NMAM or OSHA Methods

Physical Description Colorless liquid with an aromatic odor. [Note: A solid below 56°F.]

MW: 106.2	BP: 281°F	FRZ: 56°F	Sol: 0.02%	VP: 9 mmHg	IP: 8.44 eV
Sp.Gr: 0.86	Fl.P: 81°F	UEL: 7.0%	LEL: 1.1%		

Class IC Flammable Liquid: Fl.P. at or above 73°F and below 100°F.

Incompatibilities & Reactivities Strong oxidizers, strong acids

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms irritation eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; corneal vacuolization; anorexia, nausea, vomiting, abdominal pain; dermatitis

Target Organs Eyes, skin, respiratory system, central nervous system, gastrointestinal tract, blood, liver, kidneys

Personal Protection/Sanitation (See protection codes)	**First Aid** (See procedures)

Skin: Prevent skin contact **Eyes:** Prevent eye contact **Wash skin:** When contaminated **Remove:** When wet (flammable) **Change:** No recommendation	**Eye:** Irrigate immediately **Skin:** Soap wash promptly **Breathing:** Respiratory support **Swallow:** Medical attention immediately

Respirator Recommendations

NIOSH/OSHA

Up to 900 ppm:
(APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*
(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*
(APF = 10) Any supplied-air respirator*
(APF = 50) Any self-contained breathing apparatus with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions:

(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister
Any appropriate escape-type, self-contained breathing apparatus

Important additional information about respirator selection

See also: INTRODUCTION See ICSC CARD: 0086

Page last reviewed: February 3, 2009
Page last updated: February 3, 2009
Content source: National Institute for Occupational Safety and Health (NIOSH) Education and Information Division

Centers for Disease Control and Prevention 1600 Clifton Rd. Atlanta, GA 30333, USA
800-CDC-INFO (800-232-4636) TTY: (888) 232-6348, 24 Hours/Every Day - cdcinfo@cdc.gov

CDC Centers for Disease Control and Prevention
Your Online Source for Credible Health Information

September 2005

NIOSH Publication Number 2005-149

Search the Pocket Guide

SEARCH

Enter search terms separated by spaces.

o-Dichlorobenzene

Synonyms & Trade Names o-DCB; 1,2-Dichlorobenzene; ortho-Dichlorobenzene; o-Dichlorobenzol

CAS No. 95-50-1	RTECS No. CZ4500000	DOT ID & Guide 1591 152
Formula $C_6H_4Cl_2$	Conversion 1 ppm = 6.01 mg/m3	IDLH 200 ppm See: 95501

Exposure Limits
NIOSH REL : C 50 ppm (300 mg/m3)
OSHA PEL : C 50 ppm (300 mg/m3)

Measurement Methods
NIOSH 1003 ;
OSHA 7
See: NMAM or OSHA Methods

Physical Description Colorless to pale-yellow liquid with a pleasant, aromatic odor. [herbicide]

MW: 147.0	BP: 357°F	FRZ: 1°F	Sol: 0.01%	VP: 1 mmHg	IP: 9.06 eV
Sp.Gr: 1.30	Fl.P: 151°F	UEL: 9.2%	LEL: 2.2%		

Class IIIA Combustible Liquid: Fl.P. at or above 140°F and below 200°F.

Incompatibilities & Reactivities Strong oxidizers, aluminum, chlorides, acids, acid fumes

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms irritation eyes, nose; liver, kidney damage; skin blisters

Target Organs Eyes, skin, respiratory system, liver, kidneys

Personal Protection/Sanitation (See protection codes)
Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet or contaminated

First Aid (See procedures)
Eye: Irrigate immediately
Skin: Soap wash promptly
Breathing: Respiratory support

Change: No recommendation	**Swallow:** Medical attention immediately

Respirator Recommendations

NIOSH/OSHA

Up to 200 ppm:
(APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)
(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)£
(APF = 50) Any self-contained breathing apparatus with a full facepiece
(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions:

(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister
Any appropriate escape-type, self-contained breathing apparatus

Important additional information about respirator selection

See also: INTRODUCTION See ICSC CARD: 1066 See MEDICAL TESTS: 0255

Page last reviewed: February 3, 2009
Page last updated: February 3, 2009
Content source: National Institute for Occupational Safety and Health (NIOSH) Education and Information Division

Centers for Disease Control and Prevention 1600 Clifton Rd. Atlanta, GA 30333, USA
800-CDC-INFO (800-232-4636) TTY: (888) 232-6348, 24 Hours/Every Day - cdcinfo@cdc.gov

CDC Centers for Disease Control and Prevention
Your Online Source for Credible Health Information

September 2005

NIOSH Publication Number 2005-149

Search the Pocket Guide

SEARCH

Enter search terms separated by spaces.

Chromium metal

Synonyms & Trade Names Chrome, Chromium		
CAS No. 7440-47-3	RTECS No. GB4200000	DOT ID & Guide
Formula Cr	Conversion	IDLH 250 mg/m3 (as Cr) See: 7440473
Exposure Limits NIOSH REL : TWA 0.5 mg/m3 See Appendix C OSHA PEL *: TWA 1 mg/m3 See Appendix C [*Note: The PEL also applies to insoluble chromium salts.]		Measurement Methods **NIOSH** 7024, 7300, 7301, 7303, 9102; **OSHA** ID121, ID125G See: NMAM or OSHA Methods

Physical Description Blue-white to steel-gray, lustrous, brittle, hard, odorless solid.

MW: 52.0	BP: 4788°F	MLT: 3452° F	Sol: Insoluble	VP: 0 mmHg (approx)	IP: NA
Sp.Gr: 7.14	FI.P: NA	UEL: NA	LEL: NA		

Noncombustible Solid in bulk form, but finely divided dust burns rapidly if heated in a flame.

Incompatibilities & Reactivities Strong oxidizers (such as hydrogen peroxide), alkalis

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms irritation eyes, skin; lung fibrosis (histologic)

Target Organs Eyes, skin, respiratory system

Personal Protection/Sanitation (See protection codes)	First Aid (See procedures)
Skin: No recommendation **Eyes:** No recommendation **Wash skin:** No recommendation **Remove:** No recommendation **Change:** No recommendation	**Eye:** Irrigate immediately **Skin:** Soap wash **Breathing:** Respiratory support **Swallow:** Medical attention immediately

Respirator Recommendations

NIOSH

Up to 2.5 mg/m3:
(APF = 5) Any quarter-mask respirator.
Click here for information on selection of N, R, or P filters.*

Up to 5 mg/m3:
(APF = 10) Any particulate respirator equipped with an N95, R95, or P95 filter (including N95, R95, and P95 filtering facepieces) except quarter-mask respirators. The following filters may also be used: N99, R99, P99, N100, R100, P100.
Click here for information on selection of N, R, or P filters.*
(APF = 10) Any supplied-air respirator*

Up to 12.5 mg/m3:
(APF = 25) Any supplied-air respirator operated in a continuous-flow mode*
(APF = 25) Any powered, air-purifying respirator with a high-efficiency particulate filter.*

Up to 25 mg/m3:
(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter.
Click here for information on selection of N, R, or P filters.
(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter*
(APF = 50) Any self-contained breathing apparatus with a full facepiece
(APF = 50) Any supplied-air respirator with a full facepiece

Up to 250 mg/m3:
(APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions:

(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:
(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter.
Click here for information on selection of N, R, or P filters.
Any appropriate escape-type, self-contained breathing apparatus

Important additional information about respirator selection
See also: INTRODUCTION See ICSC CARD: 0029

Page last reviewed: February 3, 2009
Page last updated: February 3, 2009
Content source: National Institute for Occupational Safety and Health (NIOSH) Education and Information Division

Centers for Disease Control and Prevention 1600 Clifton Rd. Atlanta, GA 30333, USA
800-CDC-INFO (800-232-4636) TTY: (888) 232-6348, 24 Hours/Every Day - cdcinfo@cdc.gov

ATTACHMENT D

Air Monitoring/Observation Form

Attachment D
Air Monitoring Log - Particulates
Former CAMCO Site – Ronkonkoma, New York

DATE: ______________________________

Activity: ____

Weather: ____

UPWIND	
Time	Particulates ug/m^3

DOWNWIND	
Time	Particulates ug/m^3

Notes:

EnviroTrac
Environmental Services