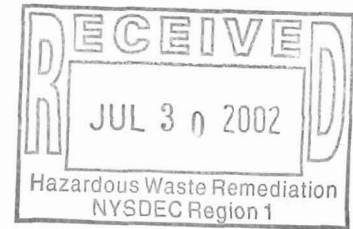


**HERBHILL ASSOCIATES
GLEN COVE, NEW YORK**



**SUPPLEMENTAL INVESTIGATION
AND
INTERIM SOIL REMEDIAL MEASURES

WORK PLAN
FOR**

**66 HERBHILL ROAD – SITE CODE NO. 1-30-054
GLEN COVE, NEW YORK**

July 2002



WALDEN ASSOCIATES, INC.

Prepared For:
New York State Department of
Environmental Conservation
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1.0 INTRODUCTION

1.1 General Site Information

Walden Associates, Inc. (Walden) has prepared this Supplemental Investigation and Interim Soil Remedial Measures (IRM) Work Plan (work plan) on behalf of Herhill Associates (Owner). The 66 Herhill Road site (also referred to as the Crown Dykman site) is located in Glen Cove, New York (see location map, Figure 1). This area has been intensively industrialized. Federal and State designated hazardous waste and Superfund sites surround it. The site is bordered to the south by Li Tungsten (EPA Superfund site code 130046), to the west by Mattiace Petrochemical (EPA Superfund site code 130017), to the northwest by Captain's Cove (NYSDEC Superfund site code 130032), and to the north and east by Konica Image (NYSDEC Superfund site code 130028). These Federal and State Superfund sites have been substantially investigated and are in the final stages of remediation. Walden has reviewed and utilized information about these sites to determine physical/geological and hydrological conditions in the vicinity of the 66 Herhill Road site.

1.2 Questions with Previous Investigations and Purpose of This Investigation

Substantial investigative efforts had been conducted previously on the site by Herhill's former consultant, EEA, from 1991 through 2001. Based on previous investigations, EEA concluded that the indoor floor drains and associated below-grade, concrete drainage trench had been leaking and are the sources for soil and groundwater contamination (summarized in section 2.0). However, Walden has noticed several obvious concerns associated with the sampling protocols followed by EEA, and questions the validity of several soil samples and the conclusions that were drawn from the sampling results. Walden therefore proposes to collect additional soil samples to supplement the identified data gaps and to challenge EEA's conclusions. The approaches and procedures Walden would utilize to either confirm or dispute EEA's conclusions are outlined in this work plan.

2.0 REVIEW OF PREVIOUS INVESTIGATION AND REMEDIATION

2.1 Overview

2.1.1 Tenant Occupancy

The site referenced as Crown Dykman (site code 130054), lies on a property covering a little less than one acre (approximately 43,500 s.f.) and includes a one-story building (approximately 13,500 s.f.). The building was originally built and occupied by Dykman Laundry from 1932 to 1975, and by Crown Union Service (dry cleaner) from 1975 to 1983. Currently Rusty Repair occupies the front of the building, (approximately 5,500 s.f.) and BNC Laundry occupies the rear of the building, (approximately 8,000 s.f.). Tenant information along with the site-related investigation/ remediation events is chronologically listed in Appendix A.

2.1.2 Initial UST Removal and NCHD Involvement

Five underground storage tanks (USTs) have been identified on the property based on a regulatory file review. Two contained dry cleaning solvents and one contained gasoline. These USTs were located along the west side of the building (see Figure 2). Two additional USTs contained heating oil. One was located at the east side and the second was located on the west side of the building.

During removal of the solvent and gasoline USTs along the west side of the building in 1990, the Nassau County Health Department (NCHD) collected soil samples for volatile organic compounds (VOCs) analysis from the UST excavations. The samples were analyzed using EPA method 625 and elevated BTEX concentrations were reported. The NCHD revisited the site and tried to collect more soil samples from the excavation, but shortly thereafter the NCHD found that the hole was filled with groundwater. Therefore, it is likely that the soil samples collected earlier by the NCHD may have been collected below the water table. Herhill Associates was required by the NCHD to perform a remedial investigation and in 1991, EEA was hired to do the work.

2.2 EEA's Investigation

EEA initiated investigative efforts of NYSDEC spill # 90-06563 in 1991 and 1992. These initial efforts led to the site being listed as New York State hazardous waste site (code 130054) because of the presence of tetrachloroethelene. EEA investigated the site in accord with Remedial Investigation/Feasibility Study (RI/FS) requirements in 1994 and performed additional work (Interim Remediation work) to identify the source and extent of soil/groundwater contamination. EEA continued to investigate and plan remedial efforts up through 2001. Copies of relevant investigative data are included in Appendix B.

2.2.1 EEA's Initial Investigation (1991-1992)

In July 1991, EEA collected three soil samples (3 feet below grade) and one groundwater sample in the area of the former solvent/gasoline USTs, as shown on Figure 2. The soil sample analytical data showed the presence of low-level BTEX and chlorinated compounds. The groundwater analytical data indicated elevated levels of chlorinated solvents.

In February 1992, EEA installed three monitoring wells. MW-1 and MW-2 are located downgradient from the former tank bed. The third one, MW-3 is located upgradient from the former tank bed. A groundwater sample collected from MW-1 indicated elevated levels of PCE and associated breakdown products. EEA recorded the depth to ground water in May 2000 from MW-1 and MW-2 as 3.51 feet and 7.72 feet (below grade) respectively. There was no noted data for MW-3, as it is inaccessible for sampling.

2.2.2 Number 2 Heating Oil UST Removal (1994)

During the removal of the oil tank located on the west side of the building in December 1994, the NCHD collected soil samples for VOC analysis (EPA method 625) and the data indicated elevated BTEX concentrations. As a result of these samplings, NYSDEC issued the site spill # 9412258 and required Herhill Associates to monitor the downgradient groundwater.

2.2.3 EEA's Interim Remediation Investigation (8/97)

In August 1997, EEA conducted an Interim Remedial Investigation in the area of the former solvent/gasoline USTs by conducting a soil gas survey at 12 locations and drilling 3 soil borings. Each soil boring was drilled to a depth of 50 feet below grade and soil samples were collected from the 4-6 foot interval, the 25-27 foot interval, and from the 48-50 foot interval. Soil

sampling locations are shown on Figure 2. In addition, two soil samples were collected from an indoor pit (Figure 2). These samples, which were analyzed for VOCs, SVOCs and metals, did not show significantly elevated concentrations of contaminants.

2.2.4 EEA's RI/FS Proposal (Submitted to NYSDEC in 1/99)

- Survey three existing monitoring wells and install a new monitoring well (MW-4).
- Drill soil borings through or adjacent to two identified indoor drains.
- Drill soil boring and sample along the west/south perimeter of the building.

2.2.5 EEA's Interim Remediation (IR) Work (7/99)

- Install three new monitoring wells (MW-1D, 4, 5) and sample them (Figure 2).
- Utilize a geoprobe to advance a groundwater sampler into the subsurface.
- Collect twenty water samples near the water table and near the deep clay layer at ten locations along the west/south sides of the building. See figures in Appendix B.
- Collect soil and water samples from two drains utilizing a geoprobe.

2.2.6 EEA's Interim Remediation (IR) Investigation (1/00)

- Collect soil samples adjacent to the two drains, approximate location of the drains where the samples were collected are shown in Appendix B.
- Drill several geoprobe soil borings within the building in the vicinity of the former wastewater trench and collect soil samples at a depth of eight feet below grade at twenty-three points along the trench and near the drains, figures shown in Appendix B.

2.2.7 Review of Two Interim Remediation Projects

The two IR investigations (12/99 and 6/00) reported twenty-seven soil samples collected beneath the building's floor slab. Seven of these samples were collected above four feet below grade. Walden's review shows that the water table recorded from on-site monitoring wells and from piezometers, which were installed through the slab as part of an EEA SVE pilot study, lies approximately four to five feet below grade. Of the twenty-seven soil samples collected beneath the slab, only 7 appear to have been collected above the water table, and only one of the seven samples contains contaminants over the NYSDEC TAGM #4046 guidelines.

One soil sample collected at 0.5 feet below grade from Drain-SB had levels of nearly all compounds below detection limits (but detection limits were significantly raised due to matrix interference). These elevated detection limits were interpreted by EEA to be an indicator of high concentrations of target compounds. In order to actually quantify analytical samples collected from the area, adequate laboratory dilutions and QA/QC procedures must be conducted to quantify target compounds. EEA's use of these data should not have been utilized in any report or used as the basis for a significant soil excavation. The "elevated" levels of PCE and associated breakdown compounds led EEA to believe the drain was a solvent source. Walden shall resample in this area and require more stringent QA/QC of the laboratory to ensure usable data is generated.

2.3 Summary

EEA's investigative efforts focused around the former solvent and gasoline USTs, two indoor drains, an indoor pit, and the wastewater trench system, along the west/south sides of the building (see data in Appendix B). Based on EEA's investigations, they concluded that material from the two indoor drains and the trench contaminated soil adjacent to or below them and remained a continuous source of groundwater contamination. However, EEA's reports indicate problems with its investigative procedures and resulting conclusions, which are either contradictory or ambiguously stated. These problems are listed below.

- No work to identify leak points or voids in the trench bottom was documented except for the detection of contaminated soil at eight feet below grade. Little data was available about the shallow soil above the water table (*e.g.*, 0-2 or 2-4 foot interval below grade) along the trench, which would support the EEAs proposed remediation plan to excavate soil beneath the floor slab.
- Soil data collected in the vicinity of the drains and used by EEA to interpret the drains as source areas were questionable because these analytical results were reported below the detection limits. In this case, the laboratory estimated all concentrations. Following stringent laboratory QA/QC procedures typical of state hazardous waste site investigative procedures would have eliminated this as a concern and produced usable analytical data.

- EEA sampled soil in the vicinity of the former USTs (spill # 90-06563) looking for a PCE source area. Sampling results indicated essentially “clean” soil, which may be an indication that EEA sampled newly placed backfill. The location and depth these samples were collected were not documented. Therefore, the sampling and the results were indeterminate, if not inadequate, to designate whether the former solvent/gasoline UST location was a source area.
- Twenty out of twenty-seven soil samples were reported to have been collected from eight feet below grade, well below the water table. Therefore, they represent a mixed soil/water matrix and should not be used for the basis of a soil remediation plan. Typically, soil samples are not collected below the water table because (1) if the soil were contaminated first, then the soil would have leached; and (2) if the groundwater were contaminated first, then soil would be contaminated by the water.

Noting the above listed concerns about the sampling plan logistics and conclusion, it is premature at best and possibly wrong to conclude that the trench is a source of groundwater or soil contamination. Our proposed investigation may reveal that local groundwater, contaminated by the documented leaks from the former USTs that were set below the water table, may be the source of elevated levels of PCE detected in soil samples collected below the water table beneath the building slab. If so, the remedial measures for this site would be entirely different than EEA's last proposal. Because of our concerns about the EEA environmental database, Walden questions the need for extensive soil removal efforts below the slab, and presents a limited scope of soil and groundwater investigation to confirm or disapprove EEA's conclusions. It would not be cost effective to undertake any remediation until Walden and NYSDEC have completed the site investigation in strict compliance with generally approved professional engineering and laboratory procedures.

3.0 Lithology Investigation and Monitoring Well Installation

3.1 Introduction

Lithology generated by soil borings to a depth of approximately twenty feet below grade is available at locations MW-1, MW-2, and MW-3, as logged by EEA. In these locations, sand or sandy materials dominate the soil lithology and are consistent with the adjacent sites (Li Tungsten, Konica and Mattiace). However, in EEA's SVE pilot study, they indicated that clay dominates the soil beneath the building. No field notes or boring logs exist to support this conclusion. In addition, the water table elevation beneath the building has neither been documented nor recorded, despite EEA's repeated use of the term "water/soil interface" and references in its work plans and reports to the location of ground water being between six and eight feet below grade. The water table in the existing on-site monitoring wells is variable across the site, ranging from three to seven feet below grade based on site topography and water table elevations reported by EEA and confirmed by Walden. Walden believes that it is necessary to establish an unambiguous database for soil lithology and the depth to the water table beneath the building in the source area so that a proper and appropriate remediation can be designed.

3.2 Lithology Investigation

Walden proposes to drill two soil borings within the building utilizing a tri-pod or a limited access-drilling rig with hollow stem augers. Soil samples will be collected continuously using a 2-foot split-spoon sampler. A Walden geologist will characterize the soil and prepare a log to record the lithology in a dedicated field book. The soil samples will be screened for the presence of VOCs utilizing the PID headspace screening technique described in Appendix C. The soil borings will be advanced to approximately 30 feet below grade, or until a clay layer is encountered. A clay layer ranging in depth from 25-35 feet below grade was identified in the investigative reports on the surrounding sites (e.g., Li Tungsten, Konica and Mattiace Petrochemical). At the conclusion of the work, the boreholes would be converted into monitoring wells, as discussed in section 3.3.

3.3 Monitoring Well Installation

Two monitoring wells will be constructed within the soil borings and will be identified as MW-6 and MW-7. The two wells will be constructed to approximately 13 feet with a screen interval set from 3 to 13 feet. A Walden geologist will complete a construction diagram for each of the monitoring wells (see Appendix C for well construction and log forms). The drill cuttings will be stored in 55-gallon drums for proper off-site disposal.

The proposed monitoring wells will be constructed using a 2-inch diameter schedule 40 PVC pipe, as shown in Appendix C. The screen will be sized based on field conditions and the surface will be sealed with bentonite. Each monitoring well will be installed with a watertight protective flush mount casing, including a positive sealing cover and an inner locking cap.

The newly installed monitoring wells will be allowed to sit for a minimum of 24 hours before the drilling subcontractor develops them. The goal of the development is to provide a low turbidity sample by removing any fine-grained materials from the well casing and sand pack. The well development includes purging at least ten volumes of standing water in the well column using a submersible pump fitted with dedicated tubing. The two wells will be surveyed and measured for the elevation of water table prior to soil sampling.

Task W-2

4.0 SOIL SAMPLING

4.1 Introduction

Once the depth to water table has been established beneath the building slab in the vicinity of the drains and trench system, Walden will collect additional soil samples from within the drain body and directly under the drains and the trench. The proposed soil sampling locations are shown on Figure 3. All proposed soil borings will be drilled within the vadose zone to gain dry soil samples.

Walden proposes to work under modifications to the previously prepared site-related Health and Safety Plan (HASP) and Quality Assurance Project Plan (QAPP) as shown in Appendix D and E. Walden will be responsible only for its own health and safety program, while its subcontractor(s) will be required to work under the approved site-specific HASP or under their own HASP(s). All site-related work tasks shall be conducted in personnel protective equipment (PPE) Level D selected properly for the tasks to be completed.

4.2 Drain Soil Sampling

Soil data collected during EEA's Remedial Investigation in Drain-SB at 0.5 foot below the floor slab elevation and in Drain at ten feet below grade (see Figure 2) indicated a presence of elevated levels of PCE and BTEX. However, levels of all analyzed compounds were below detection limits because of poor laboratory QA/QC. No specific target compounds could be identified. Walden proposes to re-sample soil by collecting soil samples from four locations, shown on Figure 3, through or within the areas adjacent to Drain-SB.

Walden will avoid sampling soil within the capillary fringe zone (as indicated by soil moisture content) because soil in this zone may be contaminated by groundwater. A hollow stem auger with split spoon will be utilized to collect soil samples. Two soil samples from Drain-SB will be collected above the water table from the 0-2 foot interval and 2-4 foot interval below grade. Four additional soil samples will be collected from locations surrounding or adjacent to Drain-SB in an attempt to bound the potential contamination, note proposed sample locations are identified as "SBs" on Figure 3. Two samples will be collected at 0-2 feet and 2-4 feet below

grade at each location. A total of ten soil samples will be collected in the adjacent areas to and through Drain-SB (see Figure 3).

A Walden geologist will log the samples (log forms in Appendix C), qualitatively screen them for VOCs utilizing a PID and forward the soil samples to a NYSDOH CLP laboratory for VOC analysis using EPA Method 8260 reporting as B deliverables as shown in Table 1.

4.3 Trench System Soil Sampling

All sections of the trench system will be examined physically for pores, voids or defects in the concrete. Soil samples will be collected from locations where voids are identified along or in the trench. In addition, soil samples will be collected in locations where EEA identified elevated PCE concentrations at a depth of eight feet below grade; the proposed sample locations are identified on Figure 3. All soil samples will be collected from 0-2 feet and 2-4 feet below grade. A minimum of ten samples will be collected from beneath the trench. Field sampling procedures will be the same as described in section 4.2.

4.4 Sample Handling

All soil and water samples will be placed in appropriate laboratory-provided glassware, properly labeled and packed in iced coolers maintained at 4°C. Samples will be shipped to a selected NYSDOH ELAP CLP laboratory in such a manner as to avoid breakage during transportation and to minimize the possibility of cross-contamination. The samples will be delivered to the analytical laboratory via an overnight courier under the appropriate Chain-of-Custody protocol.

4.5 Quality Assurance/Quality Control (QA/QC)

QA/QC samples to be collected during this work include field blanks (MSB) and matrix spike/matrix spike duplicate (MS/MSD). A field blank will be collected from the soil sampling split spoon by pouring distilled water provided by the laboratory through a typical sampling tool into a clean set of laboratory glassware at one of the sampling locations. This is done to check decontamination procedures.

One MS/MSD/MSB sample will be collected during proposed fieldwork from a soil sample at a randomly selected point. Greater details on QA/QC are found in the QAPP (Appendix E). An independent data validator will be used.

5.0 SOIL REMEDIATION

5.1 Introduction

If the proposed soil sampling results indicate PCE concentrations above the NYSDEC TAGM 4046 guidelines, Walden will propose a limited soil remedial action beneath the building slab.

5.2 Drain Surface Soil Excavation

Soil samples collected from the vicinity of the two interior floor drains would be evaluated, and as warranted, limited “hot spot” excavations would be proposed to NYSDEC. Upon NYSDEC concurrence, Walden would excavate proposed “hot spot” without digging below the water table. If excavation work is warranted, Walden would collect closure samples to determine if all contaminated soil has been removed. These samples would be analyzed for VOCs using EPA method 8260.

If excavation of contaminated soil is done, excavated soil would be disposed of at a permitted facility authorized to accept the removed materials. When remediation work is completed, Walden will prepare a summary report, which would include disposal manifests.

5.3 Trench System Soil Excavation

Soil samples will be evaluated, and limited excavation of hot spots as warranted, would be proposed to NYSDEC. Any such remedial concepts would be discussed within the NYSDEC as part of the site-related IRMs.

6.0 WORK SCHEDULE

It is anticipated that the proposed work and system installation would begin upon NYSDEC approval. NYSDEC and the state will be provided ten days written notice prior to the start of any sampling work proposed in this work plan. The following table outlines the estimated time for completion of proposed work:

TASK	COMPLETION TIME
Work Plan Approval by NYSDEC	N/A
Lithology Drilling/Monitoring Well Installation	1 Week
Drain/Trench Soil Sampling	1 Week
Soil Excavation	2 Weeks
IRM Report	2 Weeks

The above schedule is independent of NYSDEC review periods and does not take into account temporary work stoppages if required for the tenants to conduct business during particular events. Joseph M. Heaney III, PE, the Principal of Walden Associates, will be the Professional Engineer of record on this project, and will issue engineering certifications where necessary.

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HERBHILL ASSOCIATES
GLEN COVE, NEW YORK

WALDEN ASSOCIATES, INC.

TABLE 1

SOIL SAMPLING PARAMETERS
QA/QC SUMMARY

66 HERB HILL ROAD SITE



SUBTASK	MATRIX	NUMBER OF SAMPLES (MAX.)	ANALYSIS	METHOD
4.2 Drain Soil Sampling	Soil	10	VOCs	EPA Method 8260
4.3 Trench System Soil Sampling	Soil	10	VOCs	EPA Method 8260
MS/MSD/MSD	Soil	1	VOCs	EPA Method 8260

66 Herb Hill Road
Glen Cove, NY

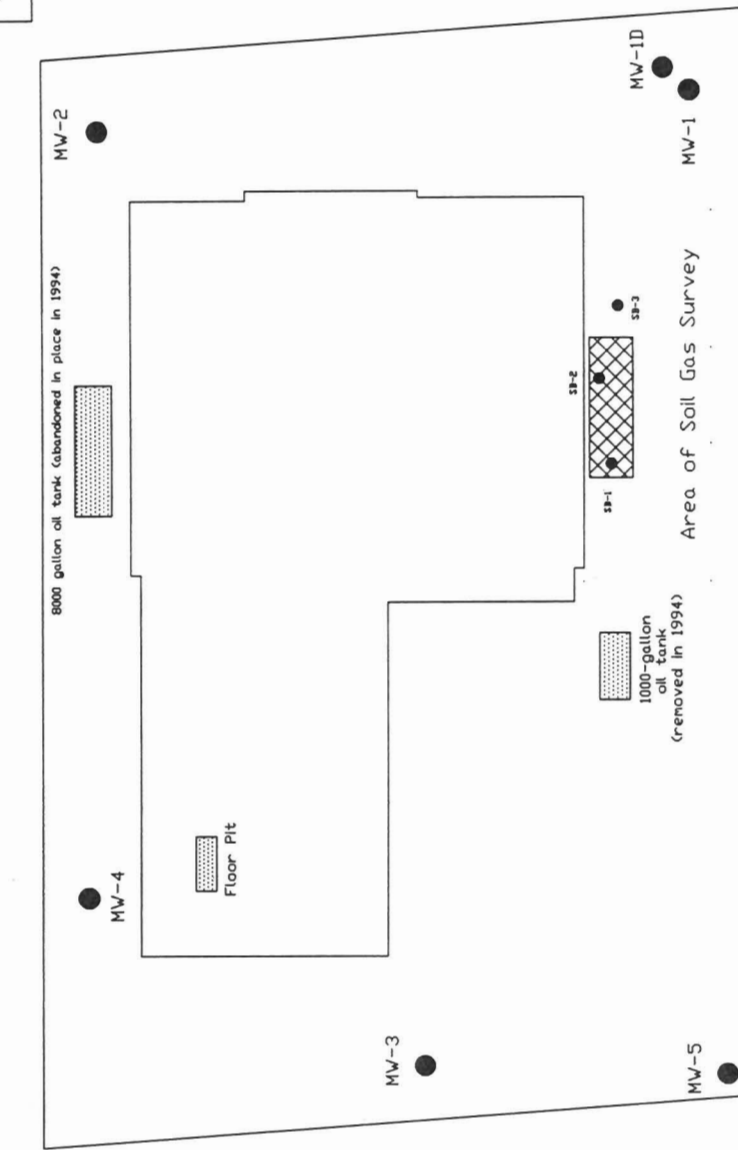
USGS LOCATION MAP

Δ
N



FIGURE 2

Herb Hill Road



KEY: Excavated area (Former location of USTs including 2 solvent tanks and 1 gasoline tank.)

● Monitor Well Location

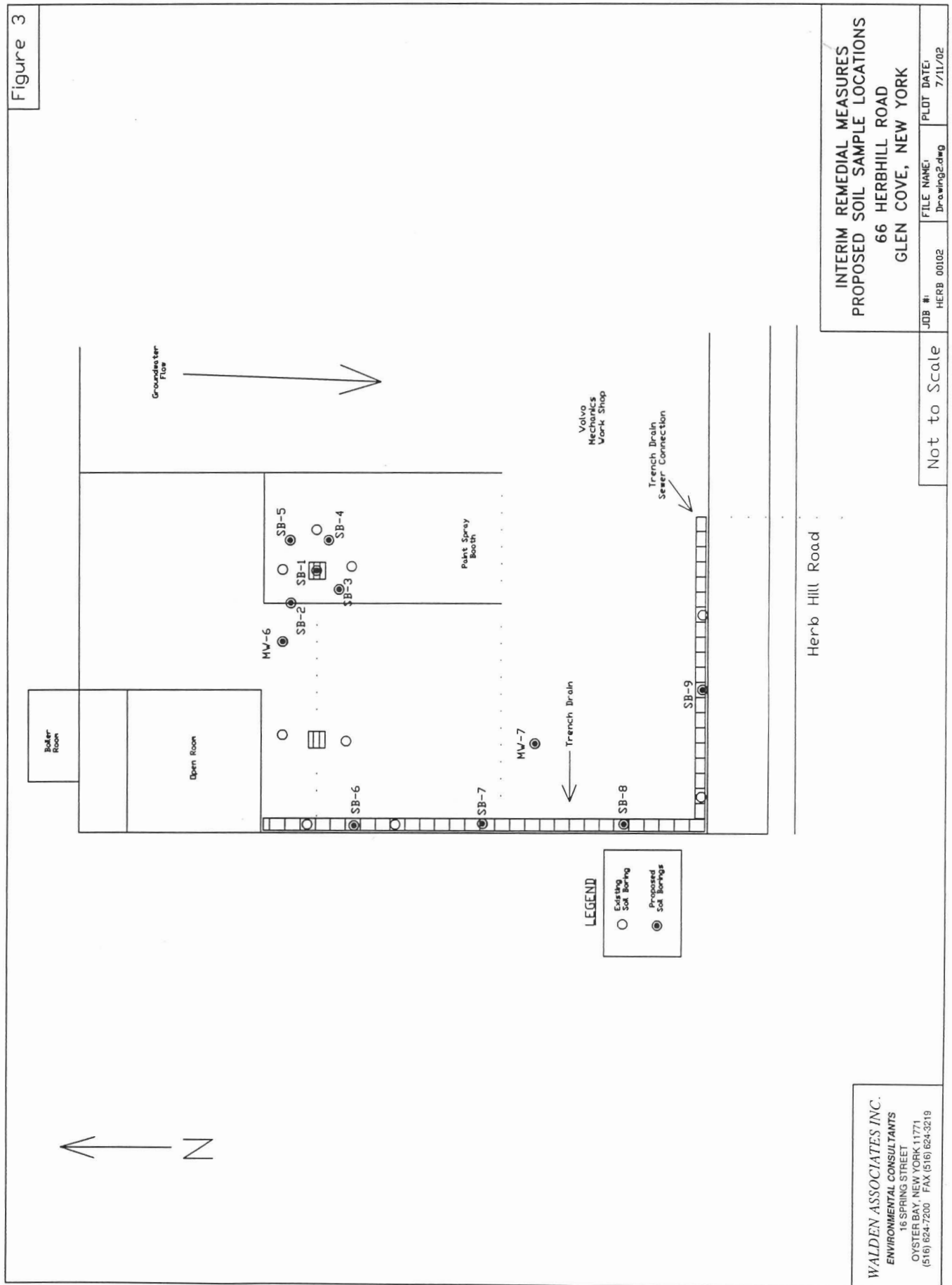
KEY:

IMPORTANT FEATURES
OF THE PROPERTY
LOCATIONS OF FORMER USTs
66 HERB HILL ROAD
GLEN COVE, NEW YORK

JOB #	FILE NAME	DATE
HERB 00102	Drawing1.dwg	7/11/02

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Figure 3



APPENDIX A

SITE-RELATED CHRONOLOGICAL EVENTS

**66 Herb Hill Road
Glen Cove, New York
Table 1**

Chronology of Site Related Events

<u>Date</u>	<u>Events</u>
	Present Tenants: B & C Laundry (6,000 sf.) and Rusty's Repair (5,500 sf.), shared area 2,000 sf.
	Property = 175'x250' (437,500 sf.), one floor building 13,500 sf., approximate depth to water 4 – 6 ft. BG GW flows towards S and SE. Tax lots 9 and 211.
1932-1975	Dykman Laundry & Cleaners, 5 UST (2 fuel oil, 1 gasoline, 2 Stoddard) The property was connected to public sewer in 1932 and used No. 2 Fuel oil to provide hot water and steam.
1975-1983	Crown Uniform Rentals: Commercial Laundry Crown used Stoddard solvent for dry cleaning then converted on uncertain date to PCE. In 1980, Crown reported using 5,000 gal. of PCE per year. After Crown, numerous other companies including an auto shop occupied the property.
-1990	NUS Corporation performs an investigation at the Li Tungsten site, an NPL site (ID# 130046) and identified two potential sources of VOCs and believed PCEs originated from dry cleaner of 66 Herhill Road.
9/14/90	NCHD obtains soil samples from the areas of removed UST located at west side of the building: BTEX= 160-7700 ppb. NCHD thus requires a remediation investigation with a Spill # 90—06563.
11/30/90	It is identified as a solvent tank leaking, 55-yards of soil was removed (no disposal documents available).
12/21/90	NCHD visits the excavated area again and detected high VOC concentrations at surface (used something like PID?), no soil samples are sampled "since the excavated area is filled with water" (it appears that the former UST was at least partially under water table).
3/26/91	EEA is retained and originally proposed to excavate soil down to the water table.

- 5/13/91 NCHD is unsatisfied with EEA work plan (**not available to Walden**) and further requires: a scaled plan showing UST location, drywells, water wells, sanitary system, drains, water & gas lines; and requires a soil gas survey, GW investigation.
- 7/91 EEA, as states in its RI/FS work plan found soil (3 ft BG-SB-1, SB-2, and SB-3) was contaminated by BTEX and *PCE/TCE* (only *SB-1*, at the north side of former UST), and GW (unknown depth, probably near WT?) was contaminated by the breakdown products of PCE.
- 2/1992 EEA installs MW-1, MW-2, and MW-3. MW-1 is downgradient from the formerly leaking solvent UST. MW-2 is upgradient, and MW-3 is side gradient.
- A letter from EEA to Owner mentions lab data collected in 1992 and 1994, similar results (available).
- 6/16/92 A letter regarding spill # 90-06563 from J. Haas of DEC states that no dissolved petroleum constituents were detected in GW. Therefore, the Bureau of Spill Prevention and Response of DEC has no more requirements for the continued investigation but refers the site to the division of hazardous waste remediation of DEC (which issued a new site ID# 130054? No documents show so but the ID appears in an EEA 4/25/94 letter referencing the site).
- 4/25/94 EEA proposes to conduct an RI/FS investigation. EEA filed EPA and NYSDEC FOIL for Li Tungsten (ID#130046) and Columbia Carbon sites (ID#130028). Also, the reference number in this letter became site ID# 130054. Walden is not sure if the new number represents a different contamination event or just a number switch from spill# 90-06563 to site ID 10054 due to a switch between the DEC departments (BSPR to DHWR?).
- 5/12/94 GW sampling event: MW-1 of GW is collected on 4/22/94 showing only chloride compounds vinyl Chloride=430 (330-collected in 1992), TCE=4300 (4000), PCE=11000(11000), t-111DCE=60 (90).
- 9/8/94 A proposal to remove a 1,000gal. at west side (?) and abandoned 8,000 gal. fuel UST at east side of the building at east side of the building by A. Volino & Son, Inc to the Owner (the field work was probably done in 12/94 based on a later DEC letter on 1/3/95 to Owner).
- 10/19/94 NYSDEC requests the Owner sign a consent order or legal action (no NYSDEC letter available but referenced in a M. Bauer letter to DEC on 11/15/94 which suggested remediation go on without dealing with a consent order).

11/15/94 Letter from the Owner to DEC requests remediation without signing a consent order.

11/18/94 A meeting between DEC and Owner as referenced in a 12/5/94 letter from DEC to the Owner (**no meeting notes available**).

12/5/94: A DEC follow-up letter regarding the 11/18/94 meeting and insists signing a consent order before performing RI/FS, but some provisions could be modified. Also suggested a VCP.

1/13/95 NYSDEC (attorney) letter to the Owner states that he is not eligible for a VCP, and must sign a consent order before performing FI/RS (the letter does not say why the Owner is not eligible, but mentions a phone conversation between DEC/Owner on 1/10/94, which probably discussed the reasons).

2/6/95 Letter from K. DeRosa of DEC to Owner states that on 12/13/94 a NCHD personnel onsite witnessed a 1,000 gal. removal by Volino (Note: Volino proposed the UST removal work on 9/8/94). Soil sampling by NCHD indicated slightly elevated BTEX and a spill# 94-12258 was issued for this. DEC does not believe the excavation had removed all contaminated soil and requires an investigation on the extent of the contamination (the letter does not indicate what has been contaminated and when the contaminants were detected).

4/3/95 Letter from DEC's attorney again requires signing a consent order.

11/29/95 Letter from Cahn Wishod & Lamb, LLP, Fred Eisenbud, states that Owner retained this law firm to work out a consent order.

1/3/96 Letter from F. Eisenbud to Owner states that he finished the comments on a draft of consent order to submit to DEC attorney.

4/2/96 The Owner, Hal Samuels signed the consent order.

5/30/96 EPA letter to Owner proposes a site inspection and soil/water sampling for this site since the site is in the CERCLIS system. The date is set on 9/30/96.

8?/96 EEA submits RI/FS to DEC (only a copy of 10 pages available without a date). In this plan, **it is described that there was a 2'x4' pit inside the Cleaner which illegally received contaminated waste.** This plan also notes that PCE and TCE from both subsurface soil and groundwater were identified at the upgradient site, Columbia Disposal Company (ID#130028) located NE of 66 Herhill Road. The work plan calls for

- EEA to install MWs with a 2' diameter and 7' screen interval, 2' above water table and 5' below water table.
- 9/13/96 Letter from DEC to EEA has 22 comments, e.g., (a) need to use stainless steel instead of PVC for casing and 10' screen interval, (b) a deep MW was needed, (c) sediment samples needed from sewers, drywells, and pits. (d) GW should be analyzed for SVOCs, (e) need to determine the extent and nature of source areas, impact to GW and to adjacent properties.
- 2/27/97 EEA submits a revised RI/FS work plan to DEC responding to DEC 9/13/96 request. Additional work including: MW-4 would be installed (screen 2' above and 5' below water table), request sampling from EPA for Li Tungsten, measure on-site MWs, do soil gas survey near former tanks and inside pit to below water table and three samples each, to use magnetometer to identify any USTs.
- 5/9/97 EEA submits work plan of Interim Remediation to do soil gas survey and sampling near the former USTs and drums located in the west side of the building.
- 8/97 EEA conducts the Interim Remediation Work Plan: 1) 12 points of soil gas survey (SG-1 to SG-12) to a depth of 3ft; 2) three soil borings (B-1, B-2, B-3) with 3 samples from each at 4-6', 25-27', 48-50'; 3) 2 soil samples inside former pits at 2-4' and 8-10'. **Walden has neither the exact locations nor analytical data regarding these SG points. Walden also needs all field notes and logs.**
- 10/14/97 EEA submits investigation report for the soil gas survey. Results include SG (6, 7, 8) in south of the former USTs show low levels of VOCs. Ambient air background VOC concentration was detected at 2.5 ppm in the north side of USTs. Soil samples (B-1, 2, 3) from the former excavated area and the pit area indicate non-detectable PCE or breakdown products at all depths. B-2 and B-3 had xylenes at 6-8' (here contradicting depth to its earlier description of 4-6'). SVOC and metals levels were also low in these soil samples.
- 1/26/98 DEC comments on EEA 10/14/97 report: investigation near former USTs failed to identify the source areas for PCE and TCE, and EEA should implement RI/FS work.
- 11/23/98 DEC letter to Owner recommends revising the RI/FS work plan and to do: a) GW sampling, b) magnetometer survey for potential USTs, c) collecting sediments from drainage areas for EPA 8260, 8270, 8015 and 8-RCRA.
- 5/12/99 DEC letter to EEA regarding RI/FS establishes the requirements on the proposed work including: a) identify PCE sources, b) install deeper MWs,

c) collect soil samples from draining areas 0-2' BG, d) set 10' screen interval for new monitoring wells. Comments similar to the 11/23/98 letter to Owner. Appears that EEA did not modify the work plan.

7/99 EEA conducts the following elements of investigation: (1) installs three monitoring wells (MW-1D, MW-4, MW-5); (2) collects a round of groundwater samples; (3) utilizes geoprobe to collect groundwater samples at water table and 30 ft BG; collects soil and groundwater samples in the two drain areas.

8/13/99 EEA submits GP water analytical data collected from water table and 30' deep along with a round of monitoring well sampling results.

10/12/99 EEA submits Interim remediation plan to DEC to conduct Geoprobe investigation inside the building to locate the source areas.

11/18/99 DEC letter to EEA regarding Interim remediation plan comments on: defining the extent of soil and submission of the results, using a NYSDOH ELAP CLP lab (first time mentions such a requirement), investigation should be done based on the 1/99 RI/FS work plan.

1/3/00 EEA letter informs DEC that "the interim remediation would commence on 1/17/00 based on EEA's plan and DEC's 11/18/99 comments" (the letter does not say what exact work, probably the soil and groundwater geoprobe investigation inside the building).

1/00 EEA conducts the following work: 1) collects soil samples from the area adjacent to the two drains; 2) collects soil samples from the trench system.

2/28/00 EEA submits a summary of investigation results to Owner and states "significant contamination is present at the property" (probably referring the soil and GW geoprobe investigation results).

6/16/00 EEA submits report of interim remediation (soil/GW geoprobe investigation) to DEC.

10/17/00 EEA sends a copy of Remediation Investigation/Feasibility Study to Glen Cove Library as required.

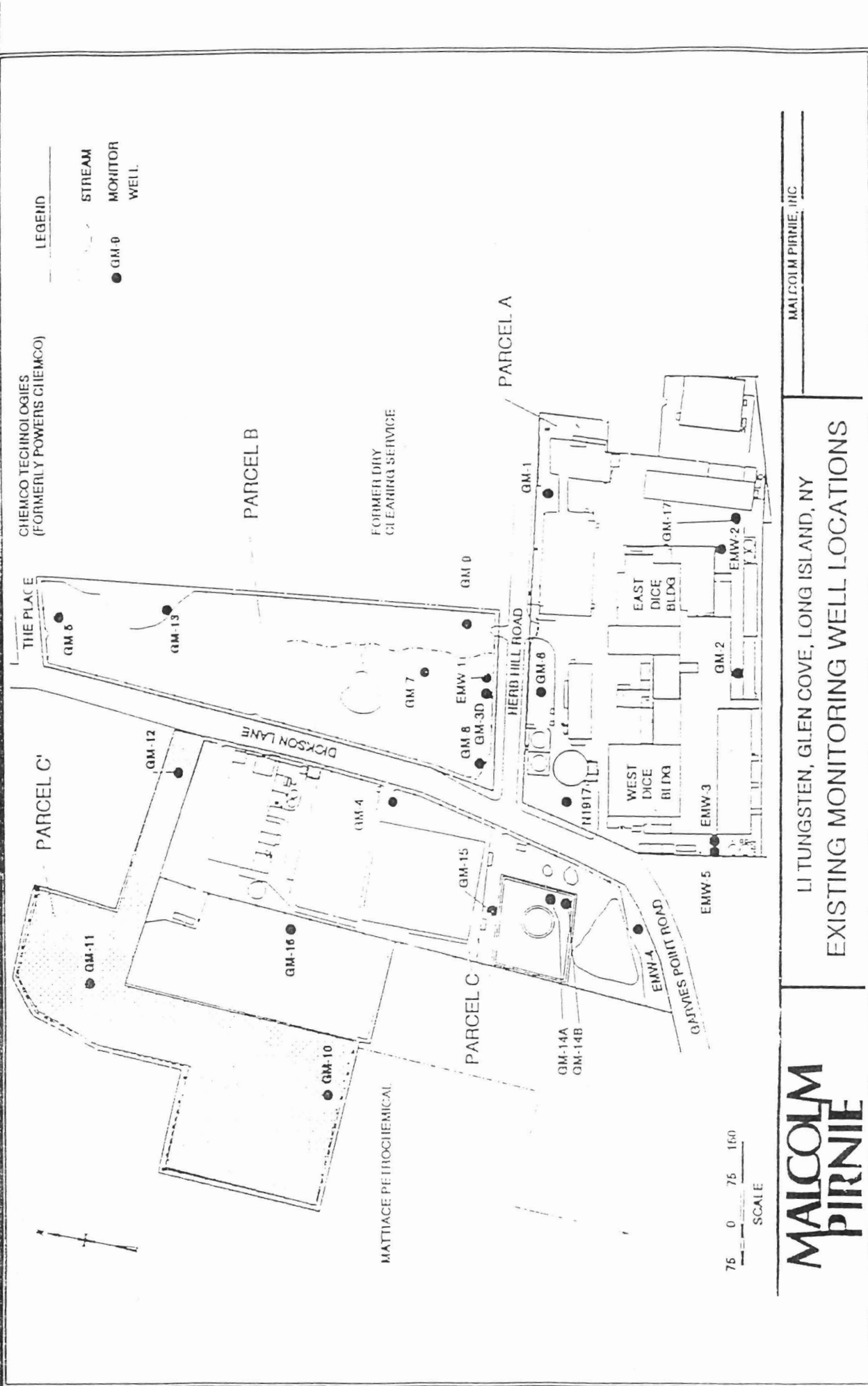
10/18/00 DEC letter (after reviewing the results of EEA's RI/FS) to EEA requests starting soil remediation ASAP. Also suggests EEA proposing and submitting an Interim Remedial Measure (IRM) for the site which should cover all remediation for soil and a pilot study for SVE, such as magnetic survey or GPRs..

- 11/15/00 EEA submits remediation plan includes a) removing soil in accessible areas, and b) applying SVE in inaccessible areas.
- 2/20/01 EEA letter with a test plot attachment to DEC states that in the week of 1/15/00, EEA did SVE pilot test. It also concludes that SVE does not work based on a 10% ROI estimate. **Walden needs logs and installation information of SVE pilot test well/monitoring wells, and the test procedure and recorded documents.**
- 6/12/01 DEC letter to EEA requests a 2nd pilot test and provides DEC with: a) a schematic of SVE test; b) determined ROI; c) system monitoring parameters including vacuum, velocity, and effluent VOC concentration; and d) a longer test (than 3 hours, the previous testing period).
- 6/26/01 EEA letter to DEC states "the first SVE pilot was unsuccessful" (GP-DR was the extraction well and 3 PZ of 1" was set 5, 10 and 15' to monitor). The second pilot test did in the week of 6/18/01: 4 wells of 2" diameter were installed in the trench where high PCE was found. 3 additional 1" PZ were installed in the auto shop. It also states "The results of 2nd test were similar to that of the 1st test": less than 1" of water vacuum was observed from the monitoring PZ at 5 ft from the vacuum extraction well based on a 10% vacuum pressure estimate.
- The letter also says air permeability in the soil was tested but "the change in velocity (flow rate) with applied vacuum was too small to measure accurately. This further confirms the air permeability is poor".
- "ORC and HRC are not good options for the same reason" due to "the first 6' of clay and clay soil".
- Therefore, EEA recommended soil removal: a) trench area: 100' (long)x4'(wide)x 5' (deep); b) 2 internal drywell areas: 25'x25'x5'(deep); c)outside, former UST:8'x10x6(deep); d)outside building SW corner, south of GP-25, about 25 to 30 yards. A total of excavation volume is estimated at 239 cubic yard.
- 8/31/01 Letter of Bowne (sub engineering consultant hired by EEA) to EEA, outlines a scope of work about assessing the building stability related to EEA on-site excavating plan.
- 9/26/01 Letter from Bowne to EEA includes a building support schematic plan and sections of the building.
- 10/15/01 EEA letter to Owner outlines the planned excavation work. A total volume of the proposed soil excavation is estimated at 239 cubic yard, and a cost estimates at \$280k.

APPENDIX B

PREVIOUSLY COMPLETED SITE WORK

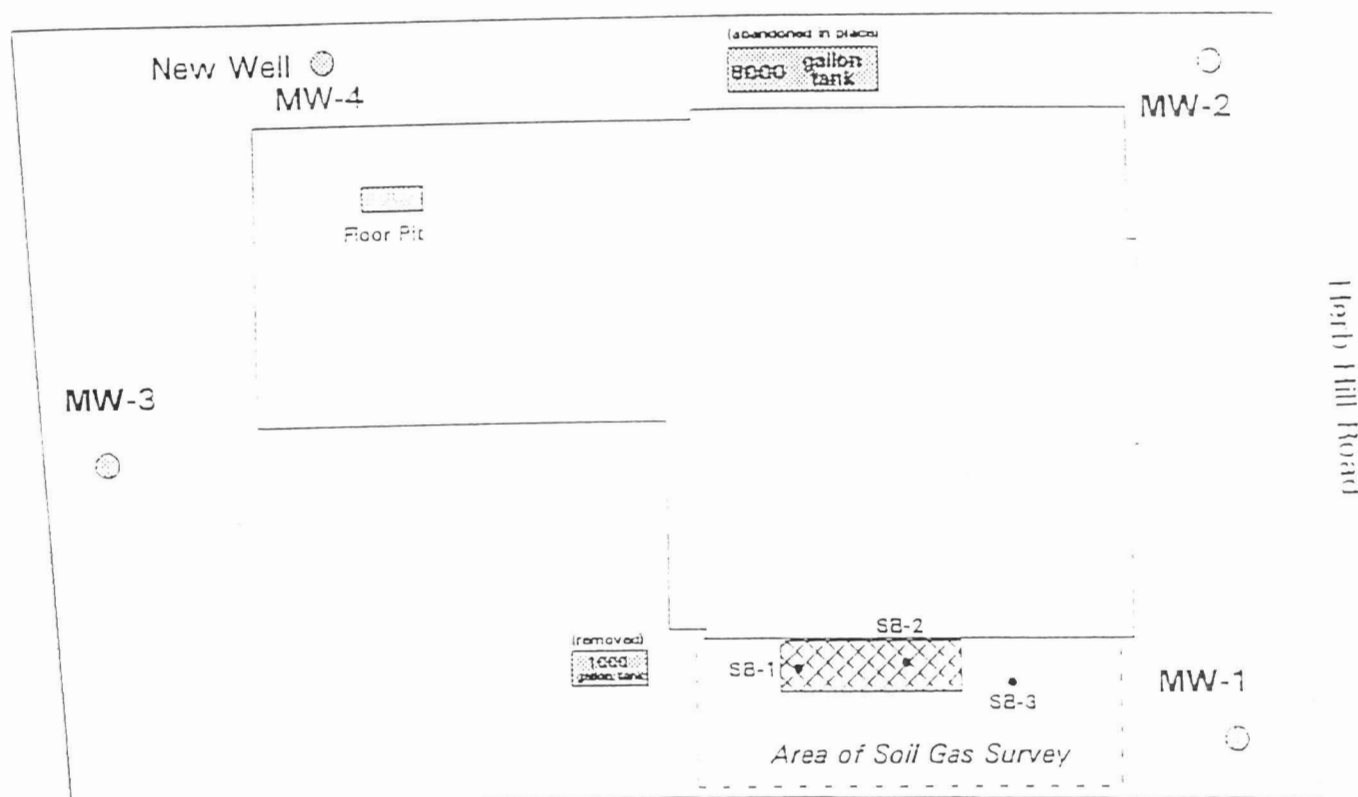
TABLES AND FIGURES



Location of Monitoring Wells at Li Tungsten

Figure 6

EEA Inc.
55 Hilton Avenue
Garden City, New York



KEY :

 Excavated area
(Former Area of Solvent Tank)

 Monitor Well Location

not to scale

Property Located at:

56 Herb Hill Road
Glen Cove, New York

Important Features of the Property

Figure 5

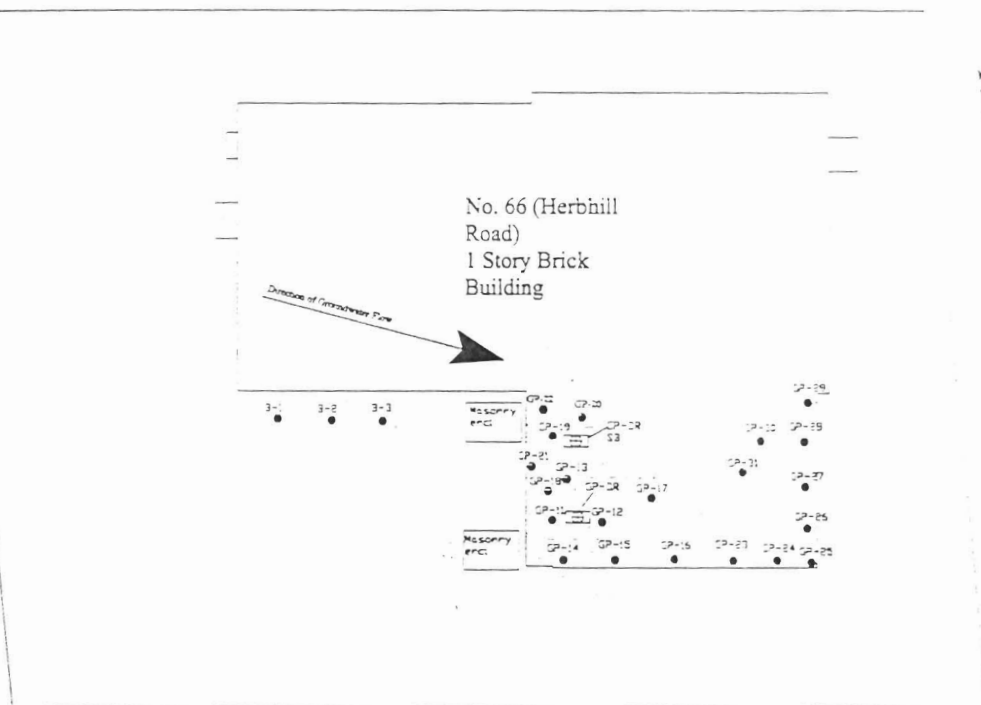
HERBHU

CONCENTRATION LEVELS (ug/l)				
Location	BTEX	Total Chlorinated Solvents	PCE	DOE
GP-11	49,230	U	U	U
GP-12	44,800	1,797	U	127
GP-13	15,274	U	U	U
GP-14	15,975	U	U	U
GP-15	59,500	3,840	U	U
GP-16	9,430	U	U	U
GP-17	41,700	U	U	U
GP-18	107,480	U	U	U
GP-19	24,552	11,937	183	2,860
GP-20	12,261	U	U	U
GP-21	24	U	U	U
GP-22	U	4,684	144	4,420
GP-23	4,472	390,200	17,100	325,000
GP-24	U	U	U	U
GP-25	U	2,858,200	16,200	2,840,000
GP-26	U	U	U	U
GP-27	379	222,470	7,530	210,000
GP-28	U	U	U	U
GP-29	U	2,273	U	1,570
GP-30	83	124	U	154
GP-31	2,59	320	U	U
GP-DR	24,200	52,112	420	3,100
GP-DR 58	U	U	U	U
3-1	21,655	U	U	U
3-2	38,500	U	U	U
3-3	5,692	U	U	U

Key:

- = Area with high levels of Total Chlorinated Solvents
- = Area with high levels of BTEX

GP = GEOPROBE SOIL SAMPLE



SCALE (IN FEET)

0 25

EEA, Inc.
55 Hilton Ave.,
Garden City, NY, 11530

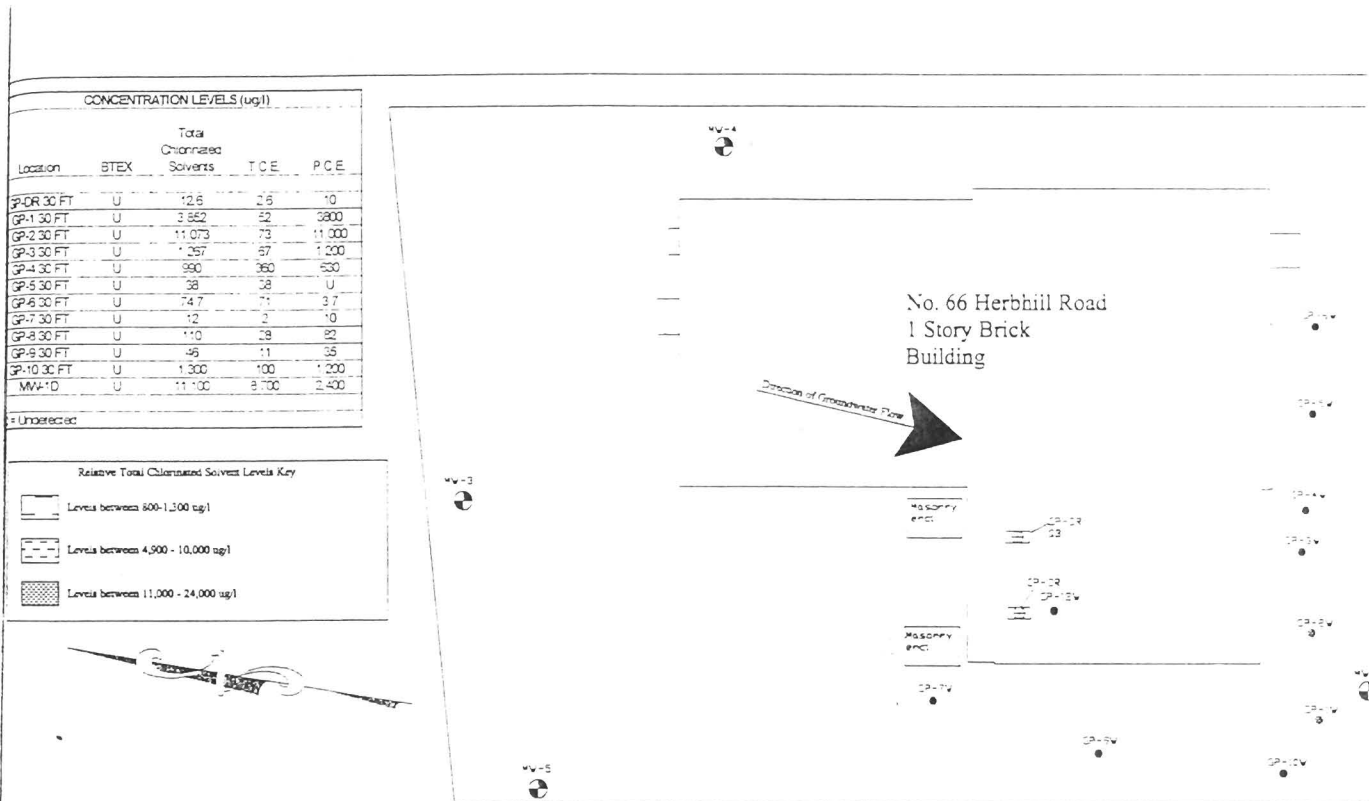
Soil Sampling Data
at Groundwater / Soil Interface

CROWN DYKMAN REMEDIAL
INVESTIGATION
GLEN COVE, NEW YORK

Project Number:

Date:
5/24/00

Figure Number:



GP-W = GEOPROBE
 MW = Monitoring Well

SCALE (IN FEET)

EEA, Inc.
 55 Hilton Ave.,
 Garden City, NY, 11530

Groundwater Sampling Data
 at 30-foot Depths

CROWN DYKMAN REMEDIAL
 INVESTIGATION
 GLEN COVE, NEW YORK

Project Number:

Date:
 5/24/00

Figure

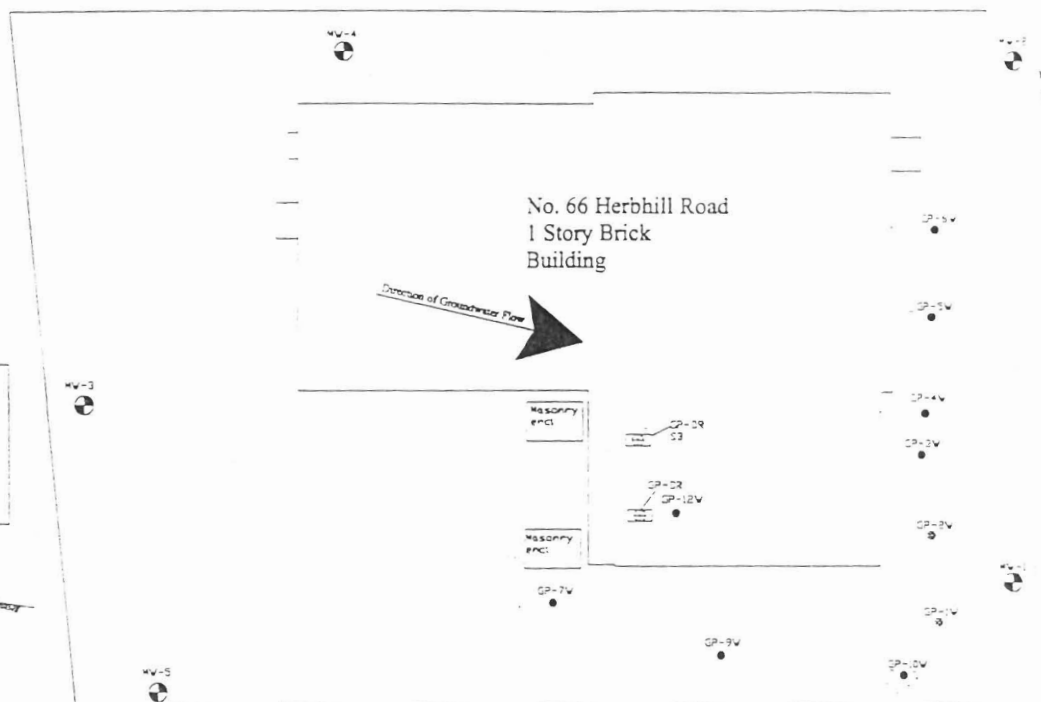
HERBHILL ROAD

CONCENTRATION LEVELS (ug/l)					
Location	BTEX	Total Chlorinated Solvents	TCE	PE	PCE
GP-1W	U	20,467	6,300	14,100	
GP-2W	U	23,596	8,100	15,400	
GP-3W	U	1,560	420	540	
GP-4W	U	1,260	110	150	
GP-5W	U	1,170	280	440	
GP-6W	U	1,170	100	180	
GP-7W	U	1,140	90	10	
GP-8W	U	3,790	800	2,500	
GP-10W	U	70	14	56	
GP-DR	8,550	9,930	U	120	
GP-DR SB	19	4,902	U	3	
MW-1	U	21,200	U	13,400	
MW-2	U	89	U	32	
MW-3	U	1	U	1	
MW-4	U	12	U	22	
MW-5	U	U	U	U	
GP-12W	2,144	30,968	U	U	

U = Undetected
= Not sampled

Relative Total Chlorinated Solvent Level Key

- Levels between 800 - 1,000 ug/l
- Levels between 4,900 - 10,000 ug/l
- Levels between 11,000 - 24,000 ug/l



GP-W = GEOPROBE
● MW = Monitoring Well

SCALE (IN FEET)

0 25 50

EEA, Inc.
55 Hilton Ave.,
Garden City, NY, 11530

Groundwater Sampling Data at the
Shallow Aquifer

CROWN DYKMAN REMEDIAL
INVESTIGATION
GLEN COVE, NEW YORK

Project Number:

Date:
5/24/00

Figure Number: 3

ENERGY AND ENVIRONMENTAL ANALYSTS

55 HILTON AVENUE, GARDEN CITY, NEW YORK

SOIL BORING AND MONITOR WELL REPORT

DATE: 2-11-92	SHEET 1 OF 1
CLIENT: Heebhill Associates	BORING NO: MW-3
PROJECT LOCATION: 66 Heebhill Rd Glen Cove NY	PROJECT NO: 91718
REMARKS: inefficient MW	

DRILLING CONTRACTOR: Big Apple Testing			LOGGED BY: MB			DRILLER: GL	
EQUIPMENT	SOIL SAMPLER	AUGER	MONITOR WELL SPECIFICATIONS			DRILL RIG DRILL METHOD	
			CASING	SCREEN	COVER		
TYPE	SPLIT SPOON	HSA	2" C	2" C	FLOST	MCC	
SIZE	20	6 1/4	20	20	20	5-40"	
SURFACE ELEVATION: N/A			SURFACE CONDITIONS: SANDY GRASS				

WATER LEVEL:						
DEPTH	CVA READINGS	SAMPLE INFORMATION			STRATA	SOIL DESCRIPTION & OBSERVATIONS
		NUMBER	DEPTH	MOISTURE		
0		S-1	0-2	DRY		2" M-C SAND, GRAVEL & COBBLES
						Gravel
5		S-2	6-8			2" M-C SAND & GRAVEL
						Gravel
10						MOIST ZONE
15		S-3	15-17	WET	15	2" M-C SAND & GRAVEL
						Gravel
20						Screen 10-20"
						Drill 6-8"
						Gravel

ENERGY AND ENVIRONMENTAL ANALYSTS

55 HILTON AVENUE, GARDEN CITY, NEW YORK

SOIL BORING AND MONITOR WELL REPORT

DATE 2-11-92 SHEET 1 OF 1
 CLIENT: Herbhill Associates BORING NO: MW-1
 PROJECT LOCATION: 66 Herndon Rd Glen Cove NY PROJECT NO: 9719
 REMARKS: down gradient MW

DRILLING CONTRACTOR: Big Apple Testing LOGGED BY: EC DRILLER: EC

EQUIPMENT	SOIL SAMPLER	AUGER	MONITOR WELL SPECIFICATIONS			DRILL RIG DRILL METHOD
			CASING	SCREEN	COVER	
TYPE	SPLIT SPOON	ASH	2" C 40	2" C 40	FLUSH	1" 1/2
SIZE	20	6" 1/2	20	20	40	3-40- -52
SURFACE ELEVATION: <u>NA</u>		SURFACE CONDITIONS: <u>GRAVEL & DIRT</u>				
WATER LEVEL: <u>4.7</u>						

DEPTH	CVA READINGS	SAMPLE INFORMATION			STRATA	SOIL DESCRIPTION & OBSERVATIONS
		NUMBER	DEPTH	MOISTURE		
0		S-1	0-2	WET		SEN. SILT SAND SILT
		S-2	2-4	WET	3.5	SEN. SILT SAND SILT
5		S-3	4-6	WET	4.7	SEN SILT little clay
		S-4	6-8	WET		SEN SAND, SILT SAND SILT
10		S-5	8-10	WET		
		S-6	10-12	WET		
15						
20						

55 HILTON AVENUE, GARDEN CITY, NEW YORK

SOIL BORING AND MONITOR WELL REPORT

DATE 2-11-92	SHEET OF 1
CLIENT: HEZONAL Associates	BOHRING NO: MW-2
PROJECT LOCATION: 166 Stearns Rd Glen Cove NY	PROJECT NO: 7172
REMARKS: Investigation MW	

DRILLING CONTRACTOR: <i>Big Apple Testing</i>			LOGGED BY: <i>AE</i>		DRILLER: <i>EC</i>	
EQUIPMENT	SOIL SAMPLER	AUGER	MONITOR WELL SPECIFICATIONS			DRILL RIG DRILL METHOD
			CASING	SCREEN	COVER	
TYPE	SPLIT SPOON	<i>12"</i>	<i>EC</i>	<i>EC</i>	<i>EC</i>	<i>EC</i>
SIZE	<i>2"</i>	<i>6 1/2"</i>	<i>2"</i>	<i>2"</i>	<i>2"</i>	<i>EC</i>
SURFACE ELEVATION: <i>2'</i>		SURFACE CONDITIONS: <i>Asphalt on concrete</i>				<i>EC</i>
WATER LEVEL: <i>4.1</i>						

DEPTH	SAMPLE INFORMATION				STRATA	SOIL DESCRIPTION & OBSERVATIONS
	OVA READINGS	NUMBER	DEPTH	MOISTURE		
0		S-1	0-2	MOIST		100 A.T. 100 100 100 100
		S-2	3-5	WET	4.1	50-120 100 100 100 100
5						
		S-3	5-7	WET		
10						
		S-4	11-13	WET		
15						
20						

TABLE 4

SOIL SAMPLING RESULTS
VOLATILE ORGANIC CHEMICAL COMPOUNDS
USEPA METHOD 8260

Analytical Parameters (µg/kg)	Sample Collection Location and Depth						NYSDEC ¹ Soil Cleanup Objectives (TAGM)
	GP-DR- SB 0.5 FT	GP- DR- SB 5 FT	GP- DR-SB 10 FT	GP-DR .05 FT	GP-DR 5 FT	GP-DR 10 FT	
Chloromethane	5300 U	4.0 U	4.2 U	3.9 Y	510 U	9600 U	NA
Vinyl Chloride	3000 U	66	2.3 U	17	290 U	5400 U	200
Bromomethane	6000 U	4.5 U	4.7 U	4.4 U	580 U	10900 U	NA
Chloroethane	7900 U	6.0 U	6.3 U	5.8 U	760 U	14400 U	1,900
Trichlorofluoromethane	1800 U	1.4 U	1.4 U	1.3 U	180 U	3300 U	NA
1,1 Dichloroethene	3000 U	2.3 U	2.4 U	2.2 U	290 U	5500 U	NA
Methylene Chloride	1600 U	1.2 U	1.3 U	1.2 U	150 U	2900 U	NA
t-1,2-Dichloroethene	6700 U	5.0 U	5.3 U	4.9 U	650 U	12200 U	300
1,1 Dichloroethane	2100 U	1.5 U	1.6 U	1.5 U	200 U	3700 U	200
Chloroform	1900 U	1.4 U	1.5 U	1.4 U	180 U	3400 U	300
111 Trichloroethane	1400 U	1.1 U	1.1 U	1.0 U	140 U	2600 U	800
Carbon Tetrachloride	6300 U	4.8 U	5.0 U	4.7 U	610 U	11500 U	600
Benzene	1600 U	1.2 U	1.3 U	1.2 U	150 U	2900 U	60
1,2 Dichloroethane	1600 U	1.2 U	1.3 U	1.2 U	150 U	2900 U	NA
Trichloroethene	4100 U	3.1 U	3.2 U	3.0 U	390 U	7400 U	700
1,2 Dichloropropane	5400 U	4.0 U	4.3 U	4.0 U	520 U	9800 U	NA
Bromodichloromethane	1600 U	1.2 U	1.3 U	1.2 U	150 U	2900 U	NA
2 chloroethvinylether	7900 U	6.0 U	6.3 U	5.8 U	760 U	14400 U	NA
t-1,3Dichloropropene	1600 U	1.2 U	1.3 U	1.2 U	150 U	2900 U	NA
Toluene	2000 U	1.5 U	1.6 U	1.4 U	190 U	3600 U	3400
c-1,3Dichloropropene	1600 U	1.2 U	1.3 U	1.2 U	150 U	2900 U	NA
112 Trichloroethane	2200 U	1.6 U	1.7 U	1.6 U	210 U	3900 U	NA
Tetrachloroethene	7100 U	5.1	1.4 U	4.8	170 U	3100 U	1400
Chlorobenzene	1700 U	1.3 U	1.4 U	1.3 U	170 U	3100 U	1700
Ethyl Benzene	1700 U	13	1.4 U	3.5	170 U	3100 U	5500
m + p Xylene	3600 U	2.7 U	2.9 U	20	740	6600 U	1200
o Xylene	1900 U	1.4 U	1.5 U	23	180 U	8400	1,200
Bromoform	780	0.6 U	0.6 U	0.6 U	76 U	1400 U	NA
1122 Tetrachloroethane	2500 U	1.9 U	2.0 U	1.9 U	240 U	4600 U	600
1,2 Dichlorobenzene	1600 U	1.2 U	1.3 U	1.2 U	150 U	2900 U	7,900
1,3 Dichlorobenzene	1900 U	1.4 U	1.5 U	1.4 U	180 U	3400 U	1,600
1,4 Dichlorobenzene	1900 U	1.4 U	1.5 U	1.4 U	180 U	3400 U	8,500

µg/kg – presented in parts per billion, micrograms per kilogram

NA – Not available, no guideline has been established

U – Not detected above method detection limits

J – Indicates an estimated value

1 New York State Department of Environmental Conservation
 Technical and Administrative Guidance Memorandum (TAGM) – Revised 1/94

TABLE 4 - Continued

SOIL SAMPLING RESULTS
VOLATILE ORGANIC CHEMICAL COMPOUNDS
USEPA METHOD 8260

Analytical Parameters ($\mu\text{g/kg}$)	Sample Collection Location and Depth (feet)						
	GP-17 8 ft	GP-18 8 ft	GP-19 2 ft	GP-19 8 ft	GP-20 8 ft	GP-21 8 ft	GP-21 4 ft
Choloromethane	U	U	U	U	U	U	U
Bromomethane	U	U	U	U	U	U	U
Vinyl Chloride	U	U	U	U	U	U	U
Chloroethane	U	U	U	U	U	U	U
Methylene Chloride	U	U	U	U	U	17.7	9.6
Acetone	U	U	U	U	U	U	405
Carbon Disulfide	U	U	U	U	U	U	U
1,1-Dichloroethene	U	U	U	U	U	U	U
1,1-Dichloroethane	U	U	U	U	U	U	U
t-1,2-Dichloroethene	U	U	156	U	U	U	U
c-1,2-Dichloroethene	U	U	17900	U	U	U	U
Chloroform	U	U	U	U	U	U	U
1,2-Dichloroethane	U	U	U	U	U	U	U
2-Butanone	U	U	U	U	U	U	34.5
1,1,1-Trichloroethane	U	U	U	U	U	U	U
Carbon Tetrachloride	U	U	U	U	U	U	U
Bromochloromethane	U	U	U	U	U	U	U
1,2-Dichloropropane	U	U	U	U	U	U	U
cis-1,3-Dichloropropane	U	U	U	U	U	U	U
Trichloroethene	U	U	385	U	U	U	U
Dibromochloromethane	U	U	U	U	U	U	U
1,1,2-Trichloroethane	U	U	U	U	U	U	U
Benzene	U	U	U	U	U	U	U
trans-1,3-Dichloropropene	U	U	U	U	U	U	U
Bromoform	U	U	U	U	U	U	U
4-Methy-2-pentanone	U	U	U	U	U	U	U
2-Hexanone	U	U	U	U	U	U	U
Tetrachloroethene	U	U	2660	U	U	U	5.2
Toluene	U	3140	U	U	241	U	4.4
1,1,2,2-Tetrachloroethane	U	U	U	U	U	U	U
Chlorobenzene	U	U	U	U	U	U	U
Ethylbenzene	4400	12100	322	U	3340	U	6.7
Styrene	U	U	U	U	U	U	U
m,p-xylene	22000	55200	914	U	4810	U	16.8
o-xylene	14700	30800	337	U	3670	U	U

TABLE 4 - Continued

SOIL SAMPLING RESULTS
VOLATILE ORGANIC CHEMICAL COMPOUNDS
USEPA METHOD 8260

Analytical Parameters ($\mu\text{g/kg}$)	Sample Collection Location and Depth (feet)						
	GP-22 8 ft	GP-23 2 ft	GP-23 8 ft	GP-25 8 ft	GP-27 8 ft	GP-29 8ft	GP-30 4 ft
Choloromethane	U	U	U	U	U	U	U
Bromomethane	U	U	U	U	U	U	U
Vinyl Chloride	U	U	U	U	U	U	U
Chloroethane	U	U	U	U	U	U	U
Methylene Chloride	U	U	U	U	U	U	U
Acetone	U	U	U	U	U	U	U
Carbon Disulfide	U	U	U	U	U	U	U
1,1-Dichloroethene	U	U	U	U	U	U	U
1,1-Dichloroethane	U	U	U	U	U	U	U
t-1,2-Dichloroethene	U	U	U	U	U	U	U
c-1,2-Dichloroethene	U	6270	28200	20200	2880	U	U
Chloroform	U	U	U	U	U	U	U
1,2-Dichlorethane	U	U	U	U	U	U	U
2-Butanone	U	U	U	U	U	U	U
1,1,1-Trichlorethane	U	U	U	U	U	U	U
Carbon Tetrachloride	U	U	U	U	U	U	U
Bromochloromethane	U	U	U	U	U	U	U
1,2-Dichloropropane	U	U	U	U	U	U	U
cis-1,3-Dichloropropane	U	U	U	U	U	U	U
Trichloroethene	244	U	37000	96000	7590	U	U
Dibromochloromethane	U	U	U	U	U	U	U
1,1,2-Trichloroethane	U	U	U	U	U	U	U
Benzene	U	U	U	U	U	U	U
trans-1,3-Dichloropropene	U	U	U	U	U	U	U
Bromoform	U	U	U	U	U	U	U
4-Methy-2-pentanone	U	U	U	U	U	U	U
2-Hexanone	U	U	U	U	U	U	U
Tetrachloroethene	6420	U	325000	2540000	210000	2270	554
Toluene	U	U	U	U	U	U	U
1,1,2,2-Tetrachloroethane	U	U	U	U	U	U	U
Chlorobenzene	U	U	U	U	U	U	U
Ethylbenzene	U	U	322	U	U	U	U
Styrene	U	U	U	U	U	U	U
m,p-xylene	U	U	2210	U	468	U	212
o-xylene	U	U	1880	U	511	U	425

APPENDIX C

SITE-RELATED LOGS/FORMS

NEW WELL SAMPLING LOG

CLIENT/PROJECT NO.				
WELL NO./OWNER				
SAMPLING POINT				
SAMPLE ID NO.				
SAMPLED BY				
DATE SAMPLED			TIME	
WELL USE				
TOP OF CASING ELEVATION				
TOTAL WELL DEPTH				
WELL DIAMETER				
DEPTH TO WATER				
WATER TABLE ELEV (MSL)				
FEET OF SUBMERGENCE				
VOLUME OF STANDING WATER IN WELL				
PURGING METHOD				
PURGING RATE (GAL/MIN)				
PURGING TIME (MIN)				
NO. CASINGS REMOVED			GALLONS	
SAMPLE APPEARANCE				
ODORS OBSERVED				
	1ST Vol.	2nd Vol.	3rd Vol.	4th Vol.
Ph				
TEMPERATURE (C)				
CONDUCTIVITY				
SAMPLES ANALYZED FOR				
LABORATORY	DATE SHIPPED			
COMMENTS, LOCATION SKETCH.				
WELL-HEAD SKETCH, ETC.				

Environmental Consultants

[illegible]

WALDEN ASSOCIATES

DAILY SUMMARY		
DATE:	TIME COMMENCED WORK:	TIME COMPLETED WORK:
FACILITY		
CONTRACTOR(S):		
TYPE OF PERSONNEL:		
EQUIPMENT UTILIZED:		
SCOPE OF WORK COMPLETED:		
COMMENTS:		
FUTURE PLANS:		

[illegible]

SHEET 2 OF 2

PREPARED BY:

[illegible]

APPENDIX D

PROJECT HEALTH AND SAFETY PLAN (HASP)

HEALTH AND SAFETY PLAN
FOR
66 HERBHILL ROAD SITE PROJECT WORK

Walden Associates, Inc., Environmental Consultants
Corporate Health and Safety Director

Name: Joseph M. Heaney III, PE Date: _____

Signature: _____

Walden Associates, Inc., Environmental Consultants
Project Health and Safety Officer

Name: Samantha G. Bennett Date: _____

Signature: _____

Amendments Contained in Appendix I

Amendment 1 Date: _____

Amendment 2 Date: _____

Amendment 3 Date: _____

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STATEMENT OF COMMITMENT TO WORK HEALTH AND SAFETY

Walden Associates, Inc. (Walden) employees may be exposed to evident risks from site-related hazardous conditions while performing field activities at the 66 Herb Hill Road site. Walden's policy is to minimize the possibility of work-related injury through aware and qualified supervision, health and safety training, medical monitoring and the use of appropriate personnel protective equipment. Walden established a guidance program to implement this corporate policy in a manner that protects personnel to the maximum reasonable extent.

This site-specific health and safety plan (HASP) applies to all Walden personnel, subcontractors and the New York State Department of Environmental Conservation (NYSDEC) and/or its representatives on the job site where operations involve actual or potential physical and chemical hazards that have been identified to Walden by others. This HASP is also intended to inform and guide all personnel (Walden employees and/or owner representatives, the state representatives or subcontractors) entering the exclusion zone ensuring that each person sign and acknowledge the site hazards on the attached Acknowledgement Form provided in Appendix A. Walden and/or the owner's subcontractors are retained as independent contractors and, as such, are responsible for ensuring the safety of their employees.

Walden may require that its personnel take certain precautions in accordance with this HASP, and Walden requests that others protect their personnel in a manner that they deem necessary or sufficient.

66 HERBHILL ROAD SITE

HEALTH AND SAFETY PLAN

Site Name: 66 Herb Hill Road Site
Including all Site Investigative
and Remedial Work

HASP Preparer: Joseph M. Heaney III, PE, CSP

City/State: Glen Cove, New York

Job No.: HERB00102

PROJECT PERSONNEL (to be filed in for each specific site or task):

On-Site Coordinator: Feng H. Lu, Ph.D.

On-Site Health and

Safety Officer: Samantha G. Bennett

Phone Number: (516) 624-7200

DATE OF PLAN PREPARATION: July 1, 2002: Work to be covered under this plan includes work described within the Interim Remedial Measures Work Plan – July 15, 2002.

HAZARDOUS/SUBSTANCES: (known or suspected, contaminated media or in storage container, etc.):

In soils: Volatile organic compounds (VOCs) in the soil are PCE/breakdown-products and BTEX.

In groundwater: VOCs were identified as PCE/breakdown-products and BTEX.

HAZARD ASSESSMENT: (toxic effects, including TLVs, IDLHs, reactivity, stability, flammability, and operational hazards with sampling, decontaminating, etc.):

The major route of exposure to potential contaminants will be respiratory. Inhalation of vapors and contaminated dusts would provide the mechanism for exposure. Tetrachloroethene is the compound of highest concern both from the point of view of its suspected carcinogenicity and its high vapor pressure. Trichloroethylene (TCE) has also been identified as a compound of concern because of its abundance in groundwater and soil samples. The international Agency for Research on Cancer (IRAC) has classified PCE and TCE as a probable human carcinogen. The program will use engineering controls and personnel protective equipment to reduce the amount of potential exposure. Continuous air monitoring and personnel protection devices will serve to prevent exposure from chemicals. See Table 1.

Other Hazards: Site hazards include those that exist on all sites where heavy equipment, industrial, and construction type operations take place, e.g., dangers from falling equipment, cuts, abrasions, and contusions. Drilling operations pose special dangers from overhead lines, buried equipment and utilities,

flying debris from air pressure during air rotary operations, and danger from tools and accessory equipment.

The drill rig presents a hazard with its moving parts and overhead equipment. All field personnel except for the rig operators must remain away from the rig at a minimum distance equal to the height of the mast. All field personnel including drill rig operators must wear steel-toe workboots, hard hats and safety glasses. All persons unrelated to the project must remain outside the exclusion zone defined as a minimum as the shadow of the drill rig mast. If persons have business in the exclusion area other than Walden personnel or Herhill Associates contractors, they must remain at a safe distance away from the rig as determined by the site health and safety officer.

During typical activities surface can be expected to become uneven and slippery, causing unsure footings and requiring additional care by personnel engaged in operations. Additional site hazards are presented by the possibility of airborne and waterborne transport of hazardous materials and presence of contaminated soils, vessels and equipment.

SITE WORK ZONES: (designate exclusion zone, contamination reduction zone and support zone). The work zone will be divided into three areas: a support zone, a contaminant reduction zone, and an exclusion zone. To the extent possible, the support and contaminant reduction zones will be established upwind of the exclusion zone. The areas will be defined and marked with safety tape or equivalent prior to each day activities.

Support Zone: The support zone will be located upwind of the exclusion zone. Personnel allowed in this area include all site personnel, visitors, and representatives of regulatory agencies and observers. No particular training or personal protection devices are needed in the support zone/clean area.

Contaminant Reduction Zone: The contaminant reduction zone will be located between the support zone and the designated exclusion zone. In this area authorized personnel will don protective equipment, as necessary, needed in the exclusion zone. Also when exiting the restricted area, personnel will remove contaminated PPE.

Exclusion Zone: The exclusion zone is in the immediate work area and that adjacent area defined by the safety coordinator. Attempts will be made so that equipment and site activities taking place in the exclusion zone are situated so that personnel are upwind of sources. Fans or blowers will be used, as necessary, to disperse gases released during site-related activities.

SITE ACCESS:

The site is not heavily developed with extensive buildings and pavement with a lot of open space in the west side. The building has multiple exits from both Cleaner and Auto Shop. In the event of an emergency, the project personnel and subcontractors should assemble at the predetermined assembly area, designated by the site safety officer.

The predetermined assembly area for this site or task is:

The predetermined assembly area will be at the corner of Herb hill and Dickson Street. The project manager or on-site health and safety officer may relocate it if necessary.

MONITORING PROCEDURES:

Monitoring the site for identity and concentration of contamination in all media:

Direct reading instruments will be used in active work areas in order to enable rapid field decisions regarding levels of respiratory protection, as well as, indicate the need for increased monitoring frequency at the edge of the exclusion zone. Walden staff will conduct all air monitoring during boring installation.

Site Work Zones

A Photovac Mircotip or equivalent photoionization detector (PID), which is calibrated daily and adjusted to give maximum sensitivity to the contaminants of concern will be used to monitor the air on a continuous basis while intrusive and/or groundwater-sampling activities are performed.

DECONTAMINATION AND DISPOSAL

Decontamination Procedures (contaminated personnel, surfaces, materials, instruments, equipment, etc.):

Personnel protection equipment will be removed prior to removing any respiratory protection. All personnel will thoroughly wash their hands and face before leaving the site. Subsurface tools will be steam-cleaned or washed with water and Alconox followed by a DI rinse and air-drying.

Disposal Procedures (contaminated equipment, supplies, disposable, wash water):

Any personnel protective equipment will be bagged and contained in a drum designated for PPE disposal. All decontamination water and materials will be drummed and disposed of off-site.

EMERGENCY PROCEDURES

Site topography is relatively open. Rapid escape from the work areas may be restricted by building. Preparatory meetings will be held to insure that procedures for reporting and responding to emergency incidents are compatible with emergency response of local, state, and federal agencies. The emergency response plan will be rehearsed prior to start-up of site activities.

In event of personnel exposure (skin contact, inhalation, ingestion, specific procedures for specific chemicals):

Skin Contact	-	Wash with soap and water.
Inhalation	-	Remove to fresh air, monitor for ABCs (Airway, Breathing and Circulation).
Ingestion	-	Call Poison Control Center and monitor ABCs.
Eye Exposure	-	Repeated eye flush, monitor ABCs transport to hospital.

In the event of personnel injury:

Check ABCs (Airway, Breathing and Circulation). Perform first aid, if required. Contact local ambulance if professional help is needed.

In event of potential or actual fire or explosion:

If a fire or explosion occurs leave the site and contact the appropriate emergency team, i.e. fire or police.

In event of environmental accident (spread of contamination outside SITE):

Stop spread of chemical as best as possible and notify Walden, NYSDEC, Herhill Associates contractors and Nassau County Health Department at first opportunity.

EMERGENCY SERVICES

Emergency Medical Facility

<u>Location</u>	<u>Telephone</u>
North Shore University Hospital	(516) 674-7300

North Shore University Hospital at Glen Cove
101 St. Andrews Lane, Glen Cove, N.Y. 11542
Phone: (516) 674-7300, Fax: (516) 674-7588

Directions to hospital from site:

SEE FIGURE 1 – Start from Herb Hill Road toward northwest onto Brewster Street after a left turn, after 0.5 mile, the road changes to Forest Avenue, after 0.5 miles take Hempstead Turnpike/NY-24 by turning left, after 0.2 mile make a left turn and end at the Nassau Medical Center, East Meadow.

Ambulance Service	-	911	National Response Center	-	(800) 424-8802
Fire Department	-	(516) 334-7924	NCMC (Non-emergency)	-	(516) 572-0123
Police Department	-	911			
Poison Control Center-		(516) 542-2323			
NYSDEC Spills Hotline-		(800) 457-7362			

ALTERNATIVE WORK PRACTICES

Underground utilities must be identified prior to commencement of drilling. Blowers may be employed to reduce and disperse any releases of toxic gases. If items proposed within the work plan are modified based on change field conditions, they would be evaluated and an addendum to cover these alternative work practices.

TASK-SPECIFIC LEVEL OF PROTECTION AND ACTION LEVELS

See Table 1 for levels of personal protective equipment. See Table 2 for health and safety training records with Walden's personnel. See Table 3 for action levels.

SITE MAP

See Figure 1.

TRAINING

All site-related workers entering the exclusion zone must be trained in accordance with 29 CFR 1910.120 E3 and E4, and all others must have at least 29 CFR 1910.120 E3. One-person on-site will have standard Red Cross first aid training and adult CPR.

Documentation of Walden personnel training is maintained on files and each Walden employee will have copies of his/her applicable 40-Hour OSHA Training, 8-Hour Refresher and Supervision Training Certificates on-site (maintained by the job health and safety officer or designee). A summary of Walden personnel training status is shown in Table 2. Each subcontractor working on the job must provide the site safety officer with training documentation for its personnel.

COMMUNICATIONS

In the event that either Level C or Level B respiratory protection is used, hand signals will be developed for communication. At this point, all site-related work would be conducted in level D PPE.

AFFIDAVIT

All Walden personnel and subcontractors who enter site-related exclusion zones must sign the attached Safety Plan Acknowledgment form. Walden personnel and site-related subcontractors must also read and comply with Walden generic HASP.

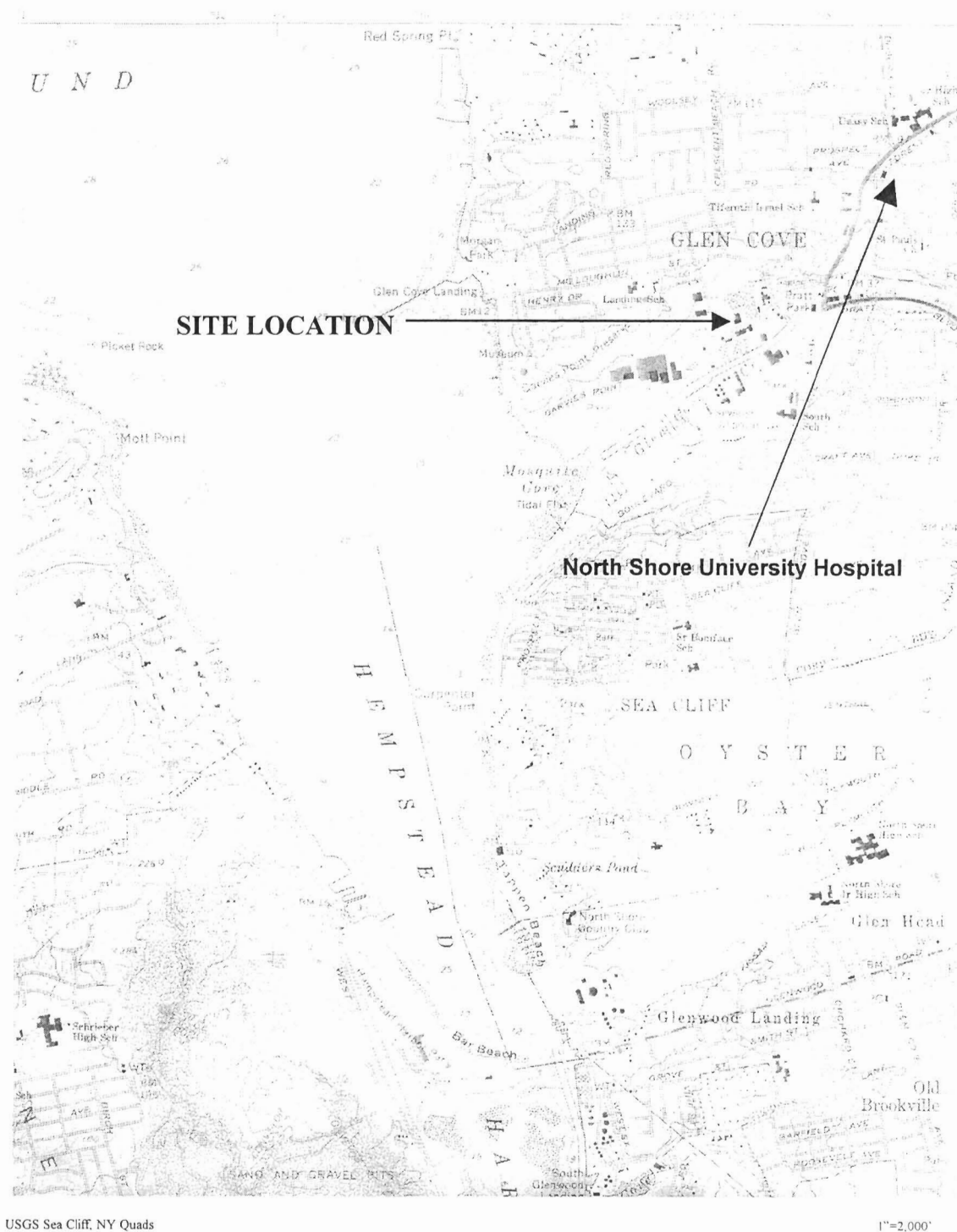


FIGURE 1. SITE LOCATION MAP

HERBHILL ASSOCIATES
GLEN COVE, NEW YORK

TABLE 1

PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS

66 HERB HILL ROAD

LOCATION	LEVEL OF PROTECTION/TASKS	DESCRIPTION
Support Zone	D	Steel toe boots and work clothes
Exclusion Zone and Contamination Reduction Zone	To be determined by the site safety officer based on contamination present	
	D (modified)	Steel toe boots, nitrile or latex gloves, hard hat, safety glasses
	C	Full face respirator fitted with organic vapor cartridge and Level D
	B	Positive pressure, pressure demand self-contained breathing apparatus or positive pressure, pressure demand supplied air and Level C.

HERBHILL ASSOCIATES
GLEN COVE, NEW YORK

TABLE 2

HEALTH AND SAFETY TRAINING RECORDS

66 HERBHILL ROAD SITE

EMPLOYEE	DATE OF 40-HOURS	LAST 8-HOUR REFRESHER(2)	SUPERVISION	LAST PHYSICAL	LAST FIT TEST
Joseph M. Heaney III, PE, ESP	6/19/87	08/30/01	2/27/93	8/3/97 (1)	11/21/97
Robert Keane	4/25/91	08/31/01	N/A	8/8/97 (1)	11/21/97
Samantha Bennett	9/25/95	08/31/01	N/A	(1)	9/12/00
Karen Savo-Matthews	3/13/93	08/31/01	N/A	(1)	11/21/97
Stephen Byatt	10/29/98	08/31/01	N/A	10/22/98 (1)	9/12/00
Feng Lu	12/21/00	08/31/01	N/A	(1)	(1)
Sheref Fathi, PE	12/21/00	08/31/01	N/A	10/15/00	(1)

Notes:

- (1) Walden employees are in need of (current HASP training/testing) physicals and would be completed prior to start of site work.
- (2) An 8-Hour Refresher Course including respirator fit testing will be conducted before site work begins.
- (3) Subcontractors to be working in the exclusion zone will have 40-Hour Training and relevant records covering this project available at the time they work on-site.

HERBHILL ASSOCIATES
GLEN COVE, NEW YORK

TABLE 3
AIR MONITORING ACTION LEVELS

66 HERB HILL ROADSITE

INSTRUMENT	HAZARD MONITORED	INSTRUMENT READING	ACTION REQUIRED
PID	Organic Vapors	0.5 ppm or greater above background in the breathing zone for 1 minute and the source of the reading is unknown.	PPE will be upgraded to Level C.
		5 ppm or greater above background in the breathing zone for 30 continuous seconds	Stop work. Evaluate the source and upgrade Level C to Level B.
Combustible Gas Indicator	Explosive Vapors	>10% LEL	Explosion hazard! Withdraw from the area immediately until LEL <10%.
Oxygen Meter	Oxygen	<19.5%O ₂	Stop work and withdraw from area until oxygen levels increase.

APPENDIX I

SITE SAFETY PLAN AMENDMENTS

66 HERBHILL ROAD SITE
SITE SAFETY PLAN AMENDMENT FORM

SITE SAFETY PLAN AMENDMENT #____: _____

SITE NAME: _____

REASON FOR AMENDMENT: _____

ALTERNATE PROCEDURES: _____

REQUIRED CHANGES IN PPE: _____

PROJECT SUPERINTENDENT (DATE)

HEALTH AND SAFETY CONSULTANT (DATE)

SITE SAFETY OFFICER (DATE)

APPENDIX II

SITE SAFETY ACKNOWLEDGEMENT FORM

AND

DAILY SITE SAFETY MEETING SIGN-IN SHEET

SITE SAFETY PLAN ACKNOWLEDGEMENT FORM

Printed Name

Representing

Date[illegible]

DAILY SIGN IN SHEET

_____ - Project Manager present TIME: _____

[illegible]

APPENDIX III

HEAT STRESS

HEAT STRESS

1. Heart rate (HR) should be monitored by the radial pulse for 30 seconds as soon as possible in the resting period.

If at the beginning of the rest period a worker's radial pulse is measure and his heart rate exceeds 100 beats per minute, the worker's next work period should be reduced by 33%. Therefore, if the original work period was one hour, the following work cycle should be reduced to 40 minutes.

2. Heat Stroke is a true medical emergency. First aid should be directed toward immediate measures to cool the body quickly, as well as seeing that the victim receives medical attention as soon as possible.

Prior to medical treatment, remove as much clothing as possible and proceed to cool the victim's body, taking care not to overchill the victim once his temperature falls below 102°F. One of the following cooling measures should be taken: (a) sponge the bare skin with cool water; (b) apply cold packs continuously; (c) wrap the victim in a sheet soaked with water; or (d) immerse the victim in a tub of cold water, while closely monitoring the victim's level of consciousness.

3. Prior to site activity, the Site Safety Officer may make arrangements for heat stress monitoring (i.e., monitoring heart rate, body temperature and body water loss) during actual site work if conditions warrant these measures. In addition, he would want to ensure that the team members have been acclimatized to the particular environmental conditions and that personnel are aware of the signs and symptoms of heat sickness and have been adequately trained in first aid procedures. As Site Safety Officer, one could also make sure there is sufficient personnel on-site, so as to rotate work assignments, schedule work during hours of reduced temperatures, and ensure personnel do not consume alcoholic or caffeinated beverages but rather drink moderate levels of an electrolyte solution and eat well prior to commencing site work.
4. The worker could be experiencing a condition of heat rash. Allow workers to rest and relieve the itching associated with heat rash rather than return to work too soon. Itching workers may not follow stringent decon procedures or scratch where it itches on-site and risk cross contamination.

Keeping the skin clean and dry will reduce the incidence of heat rash. This can be accomplished by wearing cotton garments (or other materials that absorb perspiration) underneath protective clothing. Upon removal of the protective clothing, the worker should wash and dry his skin

thoroughly.

5. The sense of thirst is not an adequate regulator of water replacement during heat exposure. Therefore, as a general rule, the amount of water administered should replace the amount of water lost, and it should be administered at regular intervals throughout the day. For every 1/2 pound of water loss, 8 ounces of water should be ingested. Water should be replaced by drinking 2-4 ounce servings during every rest period. A recommended alternative to water is an electrolyte drink split 50/50 with water.
6. Although there is no specific test given during a baseline physical that would identify a person's intolerance to heat, there are physical factors and personal habits which may indicate possible intolerance to heat, such as, whether or not an individual smokes, one's dietary habit, body weight, as well as predisposed physical conditions such as high blood pressure, heavier conditions, diabetes, or one's medication, that may influence an individual's ability to tolerate excessive heat.
7. Heat cramps are caused by profuse perspiration with inadequate fluid intake and salt replacement. Heat cramps most often afflict people in good physical condition who overwork in conditions of high temperature and humidity. Heat cramps usually come on suddenly during vigorous activity. Untreated, heat cramps may progress directly to heat exhaustion or heat stroke. First aid treatment: remove victim to a cool place and give sips of salted water (1 teaspoon of salt to 1 quart of water) - 4 ounces every 15 minutes over a period of one hour. A commercial preparation, e.g., Gatorade, may be used if split 50/50 with water.

The salted water or solution should mitigate the cramps. Manual pressure should not be applied to the cramped muscles.

TABLE III-1

REQUIRED FREQUENCY OF HEAT STRESS MONITORING
FOR WORKERS IN IMPERMEABLE CLOTHING

Adjusted ⁽²⁾ Temperature (°F)	Work Time Allowed Before Monitoring Break (min.)
90 or above	15
87.5-90	30
82.5-87.5	60
77.5-82.5	90
72.5-77.5	120

- (1) Adapted from Eastern Research Group and National Institute for Occupational Safety and Health, Occupational Safety and Health Guidance Manual for Super Activities. September 26, 1984, pp. 8-75.
- (2) Calculate the adjusted air temperature (Ta adj) by using this equation:

$$Ta \text{ adj } ^\circ F = Ta ^\circ F + (13 \times \% \text{ sunshine})$$

Measure air temperature (Ta) with a standard thermometer, with the bulb shielded from radiant heat. Then estimate percent sunshine (100 percent sunshine = no cloud cover and a sharp, distinct shadow; 0 percent sunshine = no shadows).

TABLE III-2

HEAT STRESS SIGNS AND SYMPTOMS

Heat Stress Indicator	When to Measure	If Exceeds . . .	Action
heart rate (pulse)	beginning of rest period	110 beats per minute	shorten next work period by 33%
oral temperature	beginning of rest period	99 °F (after thermometer is under tongue for 3 minutes) 100.6 °F or greater	shorten next work period by 33% prohibit work in impermeable clothing and shorten next work period by 33%
body weight	1. before workday begins (a.m.) 2. after workday ends (p.m.)	Decreases more than 5%	increase fluid intake

APPENDIX IV

COLD STRESS

Cold Stress (Hypothermia)

Cold stress is a function of cold, wetness and wind. A worker's susceptibility to cold stress can vary according to his/her physical fitness, degree of acclimatization to cold weather, age and diet.

Prevention

Institute the following steps to prevent or overexposure of workers to cold:

1. Maintain body core temperature at 96.8° F or above by encouraging workers to drink warm liquids during breaks (preferably not coffee) and wear several layers of clothing. Wool is recommended since it can keep the body warm even when the wool is wet.
2. Avoid frostbite by adequately covering hands, feet, and other extremities. Clothing such as insulated gloves or mittens, earmuffs, and hat liners should be worn. To prevent contact frostbite (from touching metal and cold surfaces below 20° F) workers should wear anti-contact gloves. Tool handles and control bars should be covered with insulating material.
3. Adjust work schedules if necessary, providing adequate rest periods. When feasible, rotate personnel and perform work during the warmer hours of the day.
4. Provide a heated enclosure for workers close to their work area. Workers should remove their outer layer(s) of clothing while in the shelter to allow for sweat evaporation.
5. In the event that wind barriers are constructed around an intrusive operation (such as drilling), the enclosure must be properly vented to prevent the build-up of toxic or explosive gases or vapors. Care must be taken to keep any heat source away from flammable substances.
6. Using a wind chill chart such as the attached one, obtain the equivalent chill temperature (ECT) based on actual wind speed and temperature. Refer to the ECT when setting up work warm-up schedules, planning appropriate clothing, etc. Workers should use warming shelters at regular intervals at or below an ECT or 20° F. For exposure skin, continuous exposure should not be permitted at or below an ECT of -35° F.
7. Workers who become immersed in water or who's clothing becomes wet (from perspiration, rain, etc.) must immediately be provided a change of dry clothing whenever the air temperature is 25.6° F or below.
8. Maintain an optimal level of worker fitness by encouraging regular exercise, proper diet, etc. If possible, acclimatize workers to site conditions for several days before work begins.

Monitoring

Personnel should be aware of the symptoms of cold stress. If the following symptoms of systemic hypothermia are noticed in any worker, he/she should immediately go to the warm shelter:

Heavy, uncontrollable shivering;
Excessive fatigue or drowsiness;
Loss of coordination;
Difficulty in speaking; and,
Frostbite (see below).

Frostbite is the generic term for local injury resulting from cold. The stages of frostbite and their symptoms are as follows:

1. Frostbite or incipient frostbite: sudden blanching or whitening of the skin.
2. Superficial frostbite: waxy or white skin which is firm to the touch (tissue underneath is still resilient).
3. Deep frostbite: tissues are cold, pale and solid.

TABLE IV-1

WINDCHILL CHART

Wind Speed (mph)	Actual thermometer Reading (°F)									
	50	40	30	20	10	0	-10	-20	-30	-40
	Equivalent Temperature (°F)									
calm	50	40	30	20	10	0	-10	-20	-30	-40
5	48	37	27	16	6	-5	-15	-26	-36	-47
10	40	28	16	4	-9	-21	-33	-46	-58	-70
15	36	22	9	-5	-18	-36	-45	-58	-72	-85
20	32	18	4	-10	-25	-39	-53	-67	-82	-96
25	30	16	0	-15	-29	-44	-59	-74	-88	-104
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109
35	27	11	-4	-20	-35	-49	-67	-82	-98	-113
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116
>40	Little Danger				Increasing Danger			Great Danger		
(Little added effect)	(for properly clothed person)				(Danger from freezing of exposed flesh)					

APPENDIX V

CHEMICAL HAZARDS

TETRACHLOROETHENE or PERCHLOROETHENE (PCE)

Introduction

Tetrachloroethylene is a man-made substance widely used for dry cleaning fabrics and textiles and for metal-degreasing operations. It is also used as a starting material (building block) for the production of other man-made chemicals. Other names that may be used for tetrachloroethylene include perchloroethylene, perc, PCE, perclene, and perchlor. Although tetrachloroethylene is a liquid at room temperature, some of the liquid can be expected to evaporate into the air producing an ether-like odor; evaporation increases as temperature increases.

Exposure Pathways

Humans can be exposed to tetrachloroethylene from environmental, consumer product, and occupational sources. Common environmental levels of tetrachloroethylene (often called background levels) are usually several thousand times lower than levels found in some workplaces. Background levels found in the air we breathe and in the food and water we consume probably result from evaporation from industrial or dry-cleaning operations or from releases from areas where chemical wastes are stored. Tetrachloroethylene has been found in at least 330 of the 1117 National Priorities List (NPL) hazardous waste sites.

In general, tetrachloroethylene levels in air are higher in urban and industrialized areas than in more rural or remote areas. Higher-than-background concentrations of tetrachloroethylene have occasionally been measured in air close to chemical waste sites and in water taken from nearby wells.

Exposure to tetrachloroethylene may also occur from some consumer products. Products that may contain tetrachloroethylene include auto brake quieters and cleaners, suede protectors, water repellants, silicone lubricants, belt lubricants and dressings, specialized aerosol cleaners, ignition wire driers, fabric finishers, spot removers, adhesives, and wood cleaners. Although uncommon, small amounts of tetrachloroethylene have been found in food.

The levels of tetrachloroethylene in air in dry-cleaning shops, textile and chemical processing operations, and degreasing operations can result in exposures that are much higher than those found in the outside environment. Levels of tetrachloroethylene in the workplace are usually measured in parts of tetrachloroethylene per million parts of air (ppm), while common environmental levels are usually measured in parts per billion (ppb) or parts per trillion (ppt).

Metabolism

Because tetrachloroethylene evaporates quickly, the most common exposure to tetrachloroethylene comes from breathing air containing it. This is certainly true for individuals who work with the chemical, but it is probably also true for those who live in industrial and commercial areas where large amounts of the compound are used or disposed of. Tetrachloroethylene may also enter the body through drinking contaminated water or eating contaminated food. Because tetrachloroethylene does not pass through the skin to any significant extent, entry into the body by this path is of minimal concern, although skin irritation may result from repeated or prolonged contact with the undiluted liquid. Scientific reports indicate that tetrachloroethylene is present (and may in fact be concentrated) in the breast milk of mothers who have been exposed to the chemical.

Health Effects

In high concentrations in air, particularly in closed, poorly ventilated areas, single exposures to tetrachloroethylene can cause central nervous system (CNS) effects leading to dizziness, headache, sleepiness, confusion, nausea, difficulty in speaking and walking, and possibly unconsciousness and death. As might be expected, these symptoms occur almost entirely in work (or hobby) environments. The potential long-term health effects that might occur in humans from breathing lower levels of tetrachloroethylene than those that produce CNS effects or from ingesting very low levels of the chemical found in some water supplies have not been identified. The effects of exposing infants to tetrachloroethylene through breast milk are unknown.

Animal studies, conducted with amounts much higher than typical environmental levels, have shown that tetrachloroethylene can cause liver and kidney damage, liver and kidney cancers, and leukemia (cancer of the tissues that form the white blood cells). Developmental effects in fetuses have been observed but only at tetrachloroethylene exposure levels that also produce toxicity in the maternal animal.

The U.S. Department of Health and Human Services has determined that tetrachloroethylene may reasonably be anticipated to be a carcinogen. Based on evidence from animal studies, tetrachloroethylene is thought to be capable of causing cancer in humans. It should be emphasized, however, that currently available information is not sufficient to determine whether tetrachloroethylene causes cancer in humans.

Short-term exposures to air containing more than 100 ppm of tetrachloroethylene have produced harmful effects in both humans and animals, and more prolonged exposures to approximately 9 ppm caused harmful liver effects in mice. It should be pointed out that some of the highest environmental levels of tetrachloroethylene ever recorded (at waste disposal sites, for example) were still 150 times smaller than the concentrations shown to produce symptoms of toxicity in animals after repeated exposure. Drinking (or eating) the equivalent of approximately 60 to 80 mg (less than a spoonful) of undiluted tetrachloroethylene per kg of body weight (1 kg = 2.2 pounds) has produced effects similar to drinking alcohol. Tetrachloroethylene was used in the past as a medicine to eliminate worms in humans, but safer and more effective drugs are now available. More prolonged exposures in animals have produced harm to the liver at doses of approximately 100 mg/kg/day. These levels of exposure are more than 1,000 times higher than would be expected even if humans ingested the most contaminated drinking water ever reported.

Cancer: From data in animals, EPA has estimated that if people breathe air containing 1 ppm tetrachloroethylene all day every day for 70 years, there would be an added risk of 66 additional cases of cancer in a population of 10,000 people (or 65,500 additional cases in a population of 10,000,000) over the number of cases that would be observed in a population not exposed to tetrachloroethylene. If people consume 1.0 mg tetrachloroethylene/kg/day in food and water every day for 70 years, there would be at the most a risk of 510 additional cases of cancer in a population of 10,000, or 510,000 additional cases in a population of 10,000,000. It should be noted that these risk values are plausible upper-limit estimates. Actual risk levels are unlikely to be higher and may be lower.

Regulations

The government has made recommendations to limit the exposure of the general public to tetrachloroethylene in drinking water and the exposure of workers to tetrachloroethylene in the workplace.

The Environmental Protection Agency (EPA) has developed the following health advisories to describe concentrations of tetrachloroethylene in drinking water at which no adverse effects are anticipated to occur: 2.0 milligrams per liter of water (mg/L) for short-term exposure of children, 1.4 mg/L for longer term exposure of children, and 5.0 mg/L for long-term exposure of adults. In addition, a drinking water equivalent level (DWEL) of 0.5 mg/L has been established.

The Occupational Safety and Health Administration (OSHA) has a legally enforceable exposure limit of 25 ppm tetrachloroethylene in air for an 8-hour workday, 40-hour workweek based on noncancer health considerations. The National Institute for Occupational Safety and Health (NIOSH) has classified tetrachloroethylene as a potential occupational carcinogen and recommends that workplace exposure be limited to the lowest possible level.

TETRACHLOROETHENE or PERCHLOROETHENE (PCE)

Chemical name, structure / formula a, CAS and RTECS Nos., and DOT 10 and guide Nos.		Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical Properties		Incompatibilities and reactivity	Measurement method (See Table 1)
						MW, SP, SOL FLIP, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Tetrachloroethylene		Perchloroethylene. Perchloroethylene, Perk. Tetrachloroethylene	NOSH Ca See Appendix A Minimize workplace odor exposure concentrations limit number of orkers exposed OSHA 100PPM C 200 ppm 300 ppm (5-min max peak in any 3 hr)	Ca (150 ppm)	Colorless quid with a mild chloroform-like	MW 165.8 BP 250°F Sol: 0.02% FIP NA IP 9. 32 eV	VP 14mm FRZ -2°F UEL NA LEL NA	Strong oxidizers chemically-active metals such as lithium beryllium & barium, caustic soda sodium hydroxide potash	Char CS GC/FID III [#1C03 Halogenated Hydrocarbons]
C12C=CC12									
127-18-4 KX3850000									
1897 74		1 ppm = 6.89 mg/m ³				Sp Gr 1.62 Noncombustible liquid but decomposes in a fire to hydrogen chloride and phosgene.			
Personal protection And sanitation		Recommendations for respirator selection-maximum concentration for use (MLIC)			Route	Symptoms	Health hazards First aid		Target organs
Skin: Eyes Washskin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contain When wet or contain N.R. Eyewash, Quick drench	NIOSH SCBAF PD,PPISAF PID,PP ASCBA Escape GMFOVISCBAE		Inh Abs Ing Con	Jmt eyes nose :threat nau, flush face, neck, verti. dizz, inco head som, skin eryl, liver damage, (carc)	Eye Skin breath Swallow	immed Soap wash prompt Resp support Medical attention immed	eyes, skin liver, kidneys, CNS (in animals: liver tumors)	

perchloroethylene. (tetrachloroethylene). CAS: 127-18-4. C12C:CC12.

Properties:

Colorless liquid, ether-like odor, extremely stable, resists hydrolysis, d 1.625 (20/20C), bp 121C, fp -22AC, bulk d 13.46 lb/gal (26C), refr index 1.5029 (25C), flash p none. Miscible with alcohol, ether, and oils; insoluble in water. Non-flammable.

Derivation:

- (1) By chlorination of hydrocarbons and pyrolysis of the carbon tetrachloride also formed,
- (2) from acetylene and chlorine via trichloroethylene.

Method of purification: Distillation.

Grade: Purified, technical, USP, as tetrachloroethylene, spectrophotometric.

Hazard: Irritant to eyes and skin. TLV: 50 ppm in air.

Use: Dry-cleaning solvent, vapor -degreasing solvent, drying agent for metals and certain other solids, vermifuge, heat transfer medium, manufacture of fluorocarbons.

TRICHLOROETHENE (TCE)

Introduction

Trichloroethene is also known as Triclene and Vitran and by other trade names in industry. It is a nonflammable, colorless liquid at room temperature with a somewhat sweet odor and a sweet, burning taste. This manmade chemical does not occur naturally in the environment. Trichloroethene is now mainly used as a solvent to remove grease from metal parts. It is also used as a solvent in other ways and is used to make other chemicals. Trichloroethene can also be found in some household products, including typewriter correction fluid, paint removers, adhesives, and spot removers. Most people begin to smell trichloroethene in air when there are around 100 parts of trichloroethene per a million parts of air (ppm).

Fate & Transport

By far, the biggest source of trichloroethene in the environment is evaporation from factories that use it to remove grease from metals. It can also enter the air and water when it is disposed of at chemical waste sites. It evaporates easily but can stay in the soil and in groundwater. Once it is in the air, about half will be broken down within a week. When trichloroethene is broken down in the air, phosgene, a lung irritant, can be formed. Under certain conditions found in the workplace, trichloroethene can break down into chemicals such as dichloroacetylene and phosgene. In the body, trichloroethene may break down into dichloroacetic acid (DCA), trichloroacetic acid (TCA), chloral hydrate, and 2-chloroacetaldehyde. These chemical products have been shown to be toxic to animals and are probably toxic to humans. Once trichloroethene is in water, much will evaporate into the air; again, about half will break down within a week. It will take days to weeks to break down in surface water; in groundwater the breakdown is much slower because of the much slower evaporation rate. Very little trichloroethene breaks down in the soil, and it can pass through the soil into underground water. It is found in some foods; the trichloroethene found in foods is believed to come from contamination of the water used in food processing, or from the food processing equipment cleaned with trichloroethene. It does not build up in fish, but it has been found at low levels in them. It is not likely to build up in your body.

Exposure Pathways

Trichloroethene is found in the outdoor air at levels far less than 1 ppm. When measured several years ago, some of the water supplies in the United States were found to have trichloroethene. The most recent monitoring study found mean levels in surface water ranging from 0.0001 to 0.001 parts of trichloroethene per million parts (ppm) of water and a mean level of 0.007 ppm in groundwater. About 400,000 workers are exposed to trichloroethene in the United States on a full-time (i.e., a 40-hour workweek) basis. The chemical can also get into the air or water in many ways, for example, at waste treatment facilities; by evaporation from paints, glues, and other products; or by release from factories where it is made. Another way you may be exposed is by breathing the air around factories that use the chemical. People living near hazardous waste sites may be exposed to it in the air or in their drinking water, or in the water used for bathing or cooking. Products that may contain trichloroethene are some types of typewriter correction fluids, paints and paint removers, glues, spot removers, rug cleaning fluids, and metal cleaners.

Metabolism

Trichloroethene enters your body when you breathe air or drink water containing it. It can also enter your body if you get it on your skin. You could be exposed to contaminated water or air if you live near or work in a factory that uses trichloroethene or if you live near a waste disposal site that contains trichloroethene. If you breathe the chemical, about half the amount you breathe in will get into your bloodstream and organs; you will exhale the rest. If you drink trichloroethene, most of it will be absorbed into your blood. If trichloroethene comes in contact with your skin, some of it can enter your body, although not as easily as when you breathe or swallow it.

Once in your blood, your liver changes much of the trichloroethene into other chemicals. The majority of these breakdown products leave your body in the urine within a day. You will also quickly breathe out much of the trichloroethene that is in your bloodstream. Some of the trichloroethene or its breakdown products can be stored in body fat for a brief period, and thus may build up in your body if exposure continues.

Health Effects

Trichloroethene was once used as an anesthetic for surgery. People who are exposed to large amounts of trichloroethene can become dizzy or sleepy and may become unconscious when exposed to very high levels. Death may occur from inhalation of large amounts. Many people have jobs where they work with trichloroethene and can breathe it or get it on their skin. Some people who get concentrated solutions of trichloroethene on their skin develop rashes. People who breathe moderate levels of trichloroethene may have headaches or dizziness. Some people who breathe high levels of trichloroethene may develop damage to some of the nerves in the face. Humans have reported health effects when exposed to the level of trichloroethene at which its odor is noticeable. Effects have also occurred at much higher levels. Animals that were exposed to moderate levels of trichloroethene had enlarged livers, and high-level exposure caused liver and kidney damage. However, we do not know if these changes would occur in humans.

It is uncertain whether people who breathe air or drink water containing trichloroethene are at higher risk of cancer or if their children have more birth defects. People who used water for several years from two wells that had high levels of trichloroethene may have had a higher incidence of childhood leukemia than other people. Increased numbers of children were reported to be born with cardiac abnormalities, a finding which is supported by data from some animal studies showing developmental effects of trichloroethene on the heart. However, other chemicals were also in the water from this well. We do not have any clear evidence that trichloroethene alone can cause leukemia or any other type of cancer in humans. As part of the National Exposure Registry, the Agency for Toxic Substances and Disease Registry (ATSDR) compiled data on 4,280 residents of three states (Michigan, Illinois, and Indiana) who had environmental exposure to trichloroethene. It found no definitive evidence for an excess of cancers from trichloroethene exposure. In studies using high doses of trichloroethene in rats and mice, tumors in the lung, liver, and testes were found, providing some evidence that high doses of trichloroethene can cause cancer in experimental animals. We do not know if trichloroethene affects human reproduction.

TRICHLOROETHENE (TCE)

1,1,2-trichloroethane. (vinyl trichloride; β-trichloroethane). CAS: 79-00-5. CHCl₂CH₂Cl.

Properties: Clear, colorless liquid, characteristic sweet odor, bp 113.7C, d 1.4432 (20C/4C), refr index 1.4458, vap press 16.7 mm Hg (20C), bulk d 12.0 lb/gal (20C), fp -36.4C, flash p none. Miscible with alcohols, ethers, esters and ketones; insoluble in water. Non-flammable.

Grade: Technical.

Hazard: Irritant, absorbed by skin. TLV: 10 ppm in air.

Use: Solvent for fats, oils, waxes, resins, other products; organic synthesis.

Chemical name, structure formula, CAS and RTECS Nos., and DOT id and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limit (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
1,1,2-Trichloroethane CHCl ₂ CH ₂ Cl 79-00-5 KJ3150000	Ethane trichloride. 1,1-Trichloroethylene. Vinyl trichloride	NIOSH Ca See Appendix A See Appendix C (Chloroethanes) 10 ppm (45 mg/m ³) Iskinj OSHA 10 ppm (45 mg/m ³) [skin] Recommendations	Ca [100ppm]	Colorless liquid with a sweet, chloroform-like odor.	MW, 133.4 BP, 237°F Sol 0.4% FIY ? IP, 11.00 eV	VP, 19mm FR, 7.34°F UEL 11151% LEL 6%	Strong oxidizers Alkalies: chemically-active metals (such as aluminum, magnesium powders, sodium & potassium)	char. CS, Cl-ID, [if 101003, Halogenated Hydrocarbons]
2831 74	1 ppm 5.55 mg/ml				Sp.Gr 1.44 Combustible Liquid, forms dense soot.			
Personal protection and sanitation		for respirator selection-maximum concentration for use (MLIC)		Route	Symptoms	Health hazards		Target organs
Skin:	Prevent skin contact	NIOSH		Inn	Irritation eyes, nose	Eye	Irritation	Eyes, resp sys. CNS,
Eyes:	Prevent eye contact	V SCBAF PD, PPISAF PD, PP ASC3A		Abs	depression: liver, kidney	skin	Soap wash prompt	liver, kidneys
Washskin:	When contaminated	Escape GMFOVISCBAE		Ing	damage, derm:	Breath	Resp support	(in animals: liver cancer)
Remedie:	When water contact			Con		Swallow	Medical attention immediate	
Change:	N.R.							
Provide:	Eyewash. Quick drench							

[1,1,2-Trichloroethane]

XYLENE

It is also known as xylol or dimethylbenzene. Primarily man-made from petroleum and coal tar, it is a colorless, flammable liquid with a sweet odor and used as a cleaning agent and as a thinner for paints and varnishes. It is found in small amounts in airplane fuel and gasoline. It is also used as raw material in the chemical, plastics and synthetic fiber industries and as an ingredient in the coating of fabrics and papers.

Exposure to Xylene

As a solvent, xylene evaporates rapidly. It lasts for some days in the air and is broken down by sunlight. As a liquid it can leak into the soil, surface water (creeks, streams, rivers), or groundwater where it may remain for months before it breaks down into other chemicals. Xylene can enter the environment and result in exposure when it is made, packaged, shipped or used. Primarily however, exposure to xylene occurs from industrial sources, automobile exhaust and during its use as a solvent. Other sources include hazardous waste disposal sites and spills and drinking or eating xylene-contaminated water or food. Xylene has been found in chicken eggs and in the polystyrene packaging that is used for retail sale. Exposures also occur from cigarette smoke, gasoline, paint, varnish, shellac, and rust preventives. Indoor levels of xylene can be higher than outdoor levels, especially in buildings with poor ventilation. People who are most at risk include workers who routinely come in contact with xylene-contaminated solvents such as painters and paint industry workers, biomedical laboratory workers, distillers of xylene, wood processing plant workers, automobile garage workers, metal workers and furniture refinishers.

Health effects

Short-term exposure to high levels of xylene can cause irritation of the skin, eyes, nose, and throat; difficulty in breathing; impaired function of the lungs; stomach discomfort; and possible damage to the liver and kidneys. Direct skin contact with liquid xylene causes reddening and burning, and a prickling feeling of the skin within a few minutes. Short-term exposures, especially by inhalation, to high concentrations of xylene can also cause a number of effects on the nervous system, such as headaches, lack of muscle coordination, dizziness, confusion, and changes in one's sense of balance. Some people who have been exposed to very high levels of xylene for a short period of time have died. People exposed to long-term mixtures of xylene and other solvents like benzene, can suffer certain neurological problems like chronic headaches, insomnia, bronchitis and irritability. A severe form of this affliction is called chronic toxic encephalopathy. Exposure of female industrial workers to high levels of xylene have led to infertility or disorders during pregnancy such as hemorrhage.

1,1,1-TRICHLOROETHANE

1,1,1-TCA is a colorless liquid that evaporates quickly at room temperature. It's used as a metal degreasing and dry-cleaning solvent. It's also used to make other organic chemicals. 1,1,1-TCA can also be found in aerosol spray products found in the home. When 1,1,1-TCA enters the environment, it can seep into soil and groundwater or evaporate into the air.

EXPOSURE to 1,1,1-TRICHLOROETHANE

Breathing: People can be exposed to 1,1,1-TCA when they inhale contaminated air. This is the most common type of exposure that occurs in the workplace. If people have contaminated drinking water in their home, they may be exposed to vapors when using water to cook, bathe, or do laundry.

Drinking/Eating: 1,1,1-TCA can enter the body when people drink contaminated water. Vegetables do not take up the chemical when they are grown in contaminated soil.

Touching: 1,1,1-TCA can be absorbed through the skin when people use products that contain the chemical, handle contaminated soil, or bathe in contaminated water.

HEALTH EFFECTS

The following health effects can occur after several years of exposure to 1,1,1-TCA:

Organ Systems: Liver, lung, and brain damage can result from long-term or high-level exposures.

Cancer: Animal studies show that exposure to 1,1,1-TCA is not likely to cause cancer.

Reproductive Effects: Laboratory studies show no effect on reproductive systems or the developing fetus.

In general, chemicals affect the same organ systems in all people who are exposed. However, the seriousness of the effects may vary from person to person. A person's reaction depends on several things, including individual health, heredity, previous exposure to chemicals including medicines, and personal habits such as smoking or drinking. It is also important to consider the length of exposure to the chemical; the amount of chemical exposure; and whether the chemical was inhaled, touched, or eaten.

APPENDIX VI

DAILY AIR MONITORING RECORD FORM

66 HERB HILL ROADSITE

DAILY AIR MONITORING RECORD FORM

Date: _____ Site Safety Officer: _____

Time: _____ Air Monitor: _____

Tasks of Day: _____

Weather Condition - Wind Direction: _____ Sky Cover: _____

Perimeter Monitoring Points: Station 1

(Selected by the Site Station 2

Safety Officer as the Station 3

Work site changes) Station 4

Last Calibration (Date) _____ and Time _____ Instruments Used _____

Dust Suppressant necessary Yes or No

Air Monitoring Action Levels:

1. Oxygen readings between 19.5% and 23.5%: continue.
Oxygen readings <19.5%: SCBA required, CGI not reliable.
Oxygen readings >23.5%: exit.
2. CGI readings of <10% LEL: continue.
CGI readings of >10% LEL: exit.
3. PID readings sustained at background in breathing zone: continue.
PID readings sustained between background to 5 ppm in breathing zone: Level C PPE.
PID readings >5 ppm in breathing zone: stop work evaluate source of contaminants.
4. Total Dust at background in breathing zone: continue.
Total Dust at 150 ug/m³ in breathing zone: Level C PPE - HEPA filters.
Site Safety Officer can call for upgrades based on visual dust without metering total respirable dust.

Hydrogen Sulfide of less than 5 ppm: continue

Hydrogen Sulfide of 5 – 10 ppm: proceed with caution
Hydrogen Sulfide of greater than 10 ppm: stop work – exit.

If work zone volatile organic vapors (PID readings) persistently exceed 5 ppm, then downward reading must be collected either 200 feet from the work zone or on the property line, whichever is less. If readings at this location are over 25 ppm over background, then work activities will be stopped.

APPENDIX VII

GENERIC COMMUNITY AIR MONITORING PLAN

NYSDOH (1/2001)

COMMUNITY AIR MONITORING PLAN

Depending upon the nature or known or potential contaminants at each site, real-time air monitoring for volatile organic compounds (VOCs) and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate NYSDEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching mid the installation of soil borings or monitoring wells.

Periodic monitoring for VOCS will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. "Periodic" monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels-and-Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.
- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

All 15-minute readings must be recorded and be available for State (DEC and DOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 (mcg/m^3) above the upwind level and provided that no visible dust is migrating from the work area.
- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 (mcg/m^3) above the upwind level, work must be stopped and a reevaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 (mcg/m^3) of the upwind level and in preventing visible dust migration.

All readings must be recorded and be available for State (DEC and DOH) personnel to review.

APPENDIX E

PROJECT QUALITY ASSURANCE PROJECT PLAN (QAPP)

QUALITY ASSURANCE PROJECT PLAN (QAPP)

1. PROJECT ORGANIZATION AND RESPONSIBILITIES

Walden maintains company policies and procedures to ensure that samples collected and any analytical analyses performed are completed with a high degree of quality. These policies and procedures ensure confidence that the resulting data represent the matrix being sampled. Quality Assurance/Quality Control (QA/QC) starts with the design of the sampling program and ends with the summarized analytical data submitted in the final report. This Quality Assurance Project Plan (QAPP) describes all of these policies and procedures.

Specific details of the Interim Soil Remedial Measures Work Plan (IRM) call out the specifics of site-related work. The project Quality Assurance Officer (QAO) shall be Dr. Feng H. Lu.

The project Quality Assurance Officer (QAO) is responsible for ongoing surveillance of project activities, for ensuring conformance to this QAPP, and for evaluating the effectiveness of its requirements. The QAO has access to any personnel or subcontractors, as necessary, to resolve technical problems and take corrective action as appropriate and has the authority to recommend that work be stopped when that work appears to jeopardize quality. The QAO will be available to respond to immediate QA/QC problems. The primary responsibilities of the QAO are as follows:

- Monitor the correction of QC problems and alert task leaders to where similar problems might occur.
- Develop and maintain project QA files for sampling, monitoring, and field QA records.
- Participate in QA audits.
- Recommend changes to the project manager to improve the effectiveness of the project in attaining its QA objectives for field sampling and monitoring activities.
- Review proposed additions and changes to this QAPP.

Project QA will be maintained under the direction of Ms. Savo-Matthews, in accordance with this QAPP.

QC for specific tasks will be the responsibility of Walden and its subcontractors, which shall be selected at the time the work is required under the direction of Ms. Savo-Matthews.

2.0 QUALITY ASSUAANCE PROJECT PLAN OBJECTIVES

2.1 OVERVIEW

Overall project goals are defined through the development of Data Quality Objectives (DQOs), which are qualitative and quantitative statements that specify the quality of the data required to support decisions. Data quality is measured by how well the data met the QA/QC goals of the project. In this plan, "Quality Assurance" and "Quality Control" are defined as follows:

- Quality Assurance - The total integrated program for assuring reliability of monitoring and measurement data.
- Quality Control - The routine application of procedures for obtaining prescribed standards of performance in the monitoring and measurement process.

2.2 QA/QC REQUIREMENTS

QA elements to be evaluated include accuracy, precision, sensitivity, representatives, and completeness. Reporting of the data must be clear, concise and comprehensive. The data generated by the analytical laboratory for this project are required to be sensitive enough to achieve detection levels low enough to meet contract-required quantitation limits (CRQLs) as specified in NYSDEC Analytical Services Protocol (NYSDEC ASP, 6/00) for Superfund CLP and EPA SW-846 methods performed in accordance with NYSDEC ASP protocol. The analytical results meeting the CRQLs will provide data sensitive enough to meet the cleanup level objectives of this investigation as described in the work plan. The QC elements that are important to this project are blank contamination, instrument calibration, and completeness of field data, sample-holding times, sample preservation, and sample custody.

2.2.1 Initial Instrument Calibration

Calibration curves will be developed for each of the compounds to be analyzed. Standard concentrations and a blank will be used to produce the initial curves. The development of calibration curves and initial calibration response factors must be consistent with method requirements presented in the most recent version of NYSDEC ASP (6/00).

2.2.2 Continuing Instrument Calibration

The initial calibration curve will be verified every 12 hrs by analyzing one calibration standard. The standard concentration will be the midpoint concentration of the initial calibration curve. The calibration check compound must come within 25% relative percent difference (RPD) of the average response factor obtained during initial calibration. If the RPD is greater than 25%, then

corrective action must be taken as provided in the specific methodology.

2.2.3 Method Blanks

Method blank or preparation blank is prepared from an analyze-free matrix, which includes the same reagents, internal standards and surrogate standards as the related samples. It is carried through the entire sample preparation and analytical procedure. A method blank analysis will be performed once for each 12 hour period during the analysis of samples for volatiles and once for each batch or 20 samples (whichever is most frequent) for semi-volatiles and metals. An acceptable method blank will contain less than five (5) times the CRQL of methylene chloride, acetone, 2-butanone, and phthalate esters. For all other target compounds, the method blank must contain less than or equal to the CRQL of any single target compound. For non-target peaks in the method blank, the peak area must be less than 10% of the nearest internal standard. The method blank will be used to demonstrate the level of laboratory background and reagent contamination that might result from the analytical process itself.

2.2.4 Field Blanks

A field blank consists of two sets of identical, laboratory-cleaned sample containers. The first set is filled at the laboratory, with deionized laboratory-grade water. The water used is from the same source as that used for the laboratory method blank. In the field, this water will be passed through the field sampling equipment into an additional second set of containers that will then be taken back to the laboratory to be analyzed for the compounds of interest. The purpose of a field blank is to determine whether the field sampling equipment is cross-contaminating samples.

2.2.5 Trip Blanks

Trip blanks consist of a single set of sample containers filled at the laboratory with deionized, laboratory-grade water. The water used will be from the same source as that used for the laboratory method blank. The containers will be carried into the field and handled and transported in the same way as the samples collected that day.

Analysis of the trip blank for VOCs is used to identify contamination from the air, shipping containers, or from other items coming in contact with the sample bottles. (The bottles holding the trip blanks will be not opened during this procedure.) A complete set of trip blanks will be provided with each shipment of samples to the certified laboratory.

2.2.6 Duplicates

Duplicate samples are two or more samples considered representative sub-samples of the same source. The samples are identically processed throughout the measurement system. A groundwater field duplicate (blind duplicate) will be analyzed for the appropriate parameters. Laboratory duplicate analyses will be performed on liquid and solid matrices at a rate of one for every twenty field samples in a batch or one for every batch of field samples (whichever is more frequent). Duplicate samples will be analyzed for TAL constituents. Duplicate analyses for TCL compounds will be associated with matrix spike and matrix spike duplicate analyses. The results of the duplicate analyses will be used to assess the precision of the measurement systems.

2.2.7 Surrogate Spike Analysis

Surrogate standard determinations will be performed on all samples and blanks analyzed by the analytical laboratory. All samples and blanks will be spiked with the appropriate surrogate compounds (as indicated by the methodology) before purging or extraction in order to monitor preparation and analyses of samples. Surrogate spike recoveries shall fall within the advisory limits in accordance with the NYSDEC ASP protocols for samples falling within the quantitation limits without dilution.

2.2.8 Matrix Spike/Matrix Spike Duplicate/Matrix Spike Blank (MS/MSD/MSB) Analysis

MS, MSD and MSB analyses will be performed to evaluate the matrix effect of the sample upon the analytical methodology along with the precision of the instrument by measuring recoveries. The MS/MSD/MSB samples will be analyzed for each group of samples of a similar matrix, at a rate of one for every 20 field samples. The RPD will be calculated from the difference between the MS and MSD.

Matrix spike blank analysis will be performed to indicate the appropriateness of the spiking solution(s) used for the MS/MSD.

2.2.9 ACCURACY

Accuracy is defined as the nearness of a real or the mean ($\bar{x}$) of a set of results to the true value. Accuracy is assessed by means of reference samples and percent recoveries. Accuracy includes both precision and recovery and is expressed as percent recovery (% REC). The MS sample is used to determine the percent recovery. The matrix spike percent recovery (% REC) is calculated by the following equation:

$$\% \text{ REC} = \frac{SSR - SR}{SA}$$

where:

SSR = measurement from spiked sample
 SR = measurement from un-spiked sample
 SA = actual data of spike added

2.2.10 PRECISION

Precision is defined as the measurement of agreement of a set of replicate results among themselves without assumption of any prior information as to the true result. Precision is assessed by means of duplicate/replicate sample analyses.

Analytical precision is expressed in terms of RPD. The RPD is calculated using the following formula:

$$RPD = \frac{D_1 - D_2}{(D_1 + D_2) / 2}$$

where:

RPD = relative percent difference
 D₁ = larger sample value
 D₂ = smaller sample value (duplicate)

2.2.11 SENSITIVITY

The sensitivity objectives for this plan require that data generated by the analytical laboratory achieve detection levels low enough to meet the CRQLs specified by NYSDEC ASP. The method detection limits (MDL) for target compounds and target analyses will be established by the analytical laboratory to be well below the remedial objectives and submit appropriate documentation to Walden as required by the QAO.

2.2.12 REPRESENTATIVENESS

Representativeness is a measure of the relationship of an individual sample taken from a particular site to the remainder of that site and the relationship of a small aliquot of the sample (i.e., the one used in the actual analysis) to the sample remaining on site. A blind duplicate is used to accomplish this task, as well as assessing the precision of the data. Two identical groundwater samples will be collected from one monitoring well and submitted as different samples. The RPD between the two samples should be between 25% and 50%. The use of standardized techniques and statistical sampling methods influences the representativeness of an aliquot of sample to the sample at the site. The representativeness of samples is assured by adherence to sampling procedures presented in the RD Work Plan.

2.2.13 COMPLETENESS

Completeness is a measure of the quantity of data obtained from a measurement system as compared to the amount of data expected from the measurement system. Completeness is defined as the percentage of all results that are not affected by failing QC qualifiers, and should be between 70% and 100% of all analyses performed. The objective of completeness in laboratory reporting is to provide a thorough data support package. The laboratory data package provides documentation of sample analysis and results in the form of summaries, QC data, and raw analytical data. The laboratory will be required to submit data packages that follow NYSDEC ASP reporting format, which, at a minimum, will include the following components:

1. All sample chain-of custody forms.
2. The case narrative(s) presenting a discussion of any problems and/or procedural changes required during analyses. Also presented in the case narrative are sample summary forms.
3. Documentation demonstrating the laboratory's ability to attain the contract specified detection limits for all target analyses in all required matrices.
4. Tabulated target compound results and tentatively identified compounds.
5. Surrogate spike analysis results (organics).
6. Matrix spike/matrix spike duplicate/matrix spike blank results.
7. QC checks sample and standard recovery results.
9. Blank results (field, trip, and method).

10. Internal standard area and RT summary.

2.2.14 COMPARABILITY

Comparability is the degree to which analytical data generated from an individual laboratory can be compared with those from another laboratory, in terms of use of standardized industry methods and equivalent instrumentation techniques. No laboratory split samples are expected to be taken for this project.

3.0 CALIBRATION AND MAINTENANCE PROCEDURES OF FIELD EQUIPMENT

Walden follows manufacturer's recommendations and guidelines with regard to field instrument calibration procedures. The calibration of each instrument will be checked prior to each day's use. Date and time of the calibration check, serial and model number, and signature of the calibrating technician will be entered into the field logbook and within the instrument specific calibration log. If the instrument readings are incorrect, the instrument will be either recalibrated by the technician or returned to the Walden's office where it will be further evaluated and/or repaired. If field instruments require major overhauls, the instruments will be returned to the manufacturer who conducts the work.

Preventive maintenance of field equipment is performed routinely before each sampling event; more extensive maintenance is performed based on hours of use. The Walden equipment coordinator has overall responsibility for the preventive maintenance program. However, certain maintenance programs are overseen by the project manager. Routinely, manually operated sampling equipment is checked to ensure it operates properly and that excessive wear has not occurred. If necessary, equipment is taken out of service for repair or replacement.

4.0 SAMPLE CUSTODY

4.1 OVERVIEW

The handling of samples in the field and in the laboratory will conform with the sample custody procedures presented in this section. Field custody procedures involve proper sample identification, chain-of-custody forms, and packaging and shipping procedures. Laboratory custody begins with the receipt of samples at the laboratory and continues through sample storage, analysis, data reporting, and data archiving. This section provides the procedures that will be followed during the course of the project to ensure proper sample custody.

4.2 FIELD CUSTODY PROCEDURES FOR OFF-SITE LABORATORY

The following elements are important for maintaining the field custody of samples:

- Sample identification
- Sample labels
- Custody records
- Shipping records
- Packaging procedures

Sample labels will be attached to all sampling bottles before field activities begin; each label will contain an identifying number. Each number will have a suffix that identifies the site and where the sample was taken.

Approximate sampling locations will be marked on a map with a description of the sample location. The number, type of sample, and sample identification will be entered into the field logbook.

A chain-of-custody form, initiated at the analytical laboratory, will accompany the sample bottles from the laboratory into the field. Upon receipt of the bottles and cooler, the sampler will sign and date the first "Received" blank space. After each sample is collected and appropriately identified entries will be made on the chain-of-custody form that will include:

- Site name and address
- Samplers' names and signatures
- Names and signatures of persons involved in chain of possession
- Sample number
- Number of containers
- Sampling station identification
- Date and time of collection
- Type of sample and the analyses requested
- Preservatives used (if any)
- Pertinent field data (pH, temperature, turbidity, etc.)

After sampling has been completed, the samplers will return/ship the samples to the laboratory. The sampler will sign and date the next "Relinquished" blank space. One copy of the custody form will remain in the field and the remaining copies will accompany the samples to the laboratory. The laboratory will receive all samples within 24 hours of collection. Samples will be received by laboratory personnel, who will assume custody of the samples and sign and date the next "Received" blank.

4.3 LABORATORY CUSTODY PROCEDURES

Upon receipt by the analytical laboratory, samples will proceed through an orderly processing sequence specifically designed to ensure continuous integrity of both the sample and its documentation.

All samples will be received by the laboratory's sample control group and will be carefully checked for label identification and completed accurate chain-of-custody records. The sample will be tracked from storage through the laboratory system until the analytical process is completed and the sample is returned to the custody of the sample control group for disposal. Generally, access to NYSDOH ELAP certified laboratories are restricted to prevent any unauthorized contact with samples, extracts, or documentation.

5.0 SAMPLE PREPARATION/ANALYTICAL PROCEDURES

Containers, preservation and holding times of environmental samples will be applied as detailed in the NYSDEC ASP (6/00 updated). Holding time of samples for volatile organic compounds (VOC) analysis of all matrices will be seven (7) days from the verified time of sample receipt (VTSR) and five (5) days for semi-volatile organic compound analyses. Analyses of environmental samples will be performed by the protocol requirements of the NYSDEC ASP (6/00 updated).

A summary of analyses and related QA/QC samples would be performed on the samples collected at this site is presented in the RD Work Plan. Organic and inorganic contaminants will be analyzed by NYSDEC ASP Superfund CLP methods as follows:

- TCL VOCs by CLP Method 95-1 (including 6/00 version)

Soil samples of the drilling cuttings will be analyzed for VOCs by EPA Method 8260 according to ASP protocol (6/00 updated).

If any modifications or additions to the standard procedures are anticipated, and if any nonstandard sample preparation or analytical protocol is to be used, the modifications and the nonstandard protocol will be explicitly defined and documented.

Prior approval by Walden's QAO is necessary for any nonstandard analytical or sample preparation protocol used by the laboratory, i.e., dilution of samples or extracts by greater than a factor of 5.

6.0 DATA REDUCTION, VALIDATION, REVIEW, AND REPORTING

6.1 OVERVIEW

The process of data reduction, review, and reporting ensures that assessments or conclusions based on the final data accurately reflect actual site conditions. This plan presents the specific procedures, methods, and format that will be employed for data reduction, review, and reporting of each measurement parameter determined in the laboratory and field. Also described in this section is the process by which all data, reports, and work plans are proofed and checked for technical and numerical errors prior to final submission.

6.2 DATA REDUCTION

Data reduction is the process by which raw analytical data generated from the laboratory instrument systems is converted into usable mass concentrations. The raw data, which may take the form of summation of areas under the curve instrument responses, or observations, is processed by the laboratory and converted into concentrations expressed in ug/kg for soil samples and ug/l for water samples. The analytical laboratory will be required to follow ASP data reduction procedures.

Data reduction also includes the process by which raw field data are summarized in tables and graphs, from which quantitative or qualitative assessments can be derived by filter integration and evaluation.

Field data obtained during sampling is summarized on appropriate field forms. This information will be used to assess field conditions at the time of sampling and is summarized and analyzed along with the chemistry data in the final report. Occasionally, the reduction of actual field data requires correcting measurement data for the measurement system's baseline value. The data will be adjusted only after the raw data has been submitted to Walden's QAO and prior to preparation of the final report.

6.3 VALIDATION

Data validation is the systematic process by which data quality is determined with respect to data quality criteria that are defined in project and laboratory QC programs and in the referenced analytical methods. The data validation process consists of an assessment of the acceptability or validity of project data with respect to stated project goals and requirements for data usability. Ideally, data validation establishes the data quality in terms of project DQOs. Data validation consists of data editing, screening, checking, auditing, certification, review, and interpretation.

The purpose of data validation is to define and document analytical data quality and determine whether the laboratory data quality is sufficient for the intended use(s) of the data.

An approved independent data valuator will review data (submitted to the off-site laboratory for confirmatory analyses) prior to its use in reports prepared by Walden. The validator will review the data in accordance with the following document: the "Functional Guidelines for Evaluating Organic Analyses" (Technical Directive Document No. HQ-8410-01, USEPA). The validator will evaluate the analytical laboratory's ability to meet the DQOs provided in this QAPP. Non-compliant data will be flagged in accordance with NYSDEC ASP and corrective action will be undertaken to rectify any problems.

The independent data validator will review the data from compliance by performing the following tasks:

Task I: Determine Data Completeness

Each data package will be reviewed for completeness. A complete data package will at a minimum contain following components:

- All sample chain-of-custody forms.
- The case narrative(s) presenting a discussion of any problems and/or procedural changes required during analyses. Also presented in the case narrative are sample summary forms.
- QA/QC summaries.
- All relevant calibration data summaries.
- Instrument and method performance data.
- Documentation demonstrating the laboratory's ability to attain the contract specified method detection limits for all target analyses in all required matrices.

If during the review process it is found that deficiencies exist in the data package, the analytical laboratory will be contacted and given 10 calendar days to produce the documentation necessary to remove these deficiencies.

Task II: Determine Data Compliance

Each data package will be reviewed to determine compliance with those portions of this QAPP that pertain to the production of laboratory data. Compliance is defined by the following criteria:

- The data package is complete as defined in Task I above.
- The data have been produced and reported in a manner consistent with the requirements of this plan and the laboratory subcontract.

- All protocol-required QA/QC criteria have been met.
- All instrument calibration requirements have been met for the time frame during which the analyses were completed.
- All protocol required initial and continuing calibration summaries have been presented.
- All data reporting forms are complete for all samples submitted. This will include all requisite flags, all sample dilution/concentration factors, and all pre-measurement sample cleanup procedures.
- All problems encountered during the analytical process have been reported in the case narrative along with any and all actions taken by the laboratory to correct these problems.
- Verifying that calibration procedures were followed
- Verifying that data are reported in correct units
- Checking 10% of all field calculations
- Verifying that samples were properly shipped with the appropriate chain-of-custody documentation
- Verifying that QC samples were prepared and taken

The Walden's QAO prior to data integration and evaluation will perform further review of such data. All assigned data reduction or analytical procedures will be verified for accuracy and content by at least two professionals qualified and experienced in evaluating the particular technical specialty.

6.4 WALDEN DATA REVIEW

6.4.1 Laboratory Data

Prior to submission to the independent data validator, the QAO or a designee under the project manager's supervision, will review each analytical data package for completeness (i.e., *Have all the analyses requested been performed?*) and general protocol compliance, such as holding times, detection limits, spike recoveries, and surrogate recoveries. The results of this review will be summarized and submitted to the independent validator with the data package. If information is found to be missing from the data package the analytical laboratory will be contacted and requested to submit any missing information.

6.4.2 Usability Report

Upon completion of data validation, Walden's QAO will perform a data usability analysis on all analytical laboratory data. Taking into account protocols for sampling, transport, analysis,

reduction, reporting, and the data validation report, the QAO will use this information and his/her own experience to establish whether the results of each analysis can be used for the purpose intended. It will be determined whether the final results can be used as reported, qualified to indicate limitations, or rejected outright.

6.5 REPORTING

6.5.1 Field Data Reporting

All field real-time measurements and observations will be recorded in project logbooks or field data records. Field measurements will include pH, temperature, specific conductance, water flow, and PID. All data will be recorded directly and legibly into field logbooks, with all entries signed and dated. If entries are changed, the change will not obscure the original entry. The reason for the change will be stated, and the correction and explanation will be signed and dated at the time the correction is made. Field data records will be organized into standard formats whenever possible, and retained in permanent files.

6.5.2 Laboratory Data Reporting

All sample data packages submitted by the analytical laboratory will be required to be reported in conformance to the NYSDEC ASP (6/00) Superfund-CLP, Category B or Category A deliverable requirements as applicable to the method utilized for the confirmatory VOC analyses.

6.6 DATA USAGE

The data will be used to determine when soil and groundwater have been sufficiently treated on the site in regards to the regulatory levels and project cleanup objectives.

7.0 INTERNAL QUALITY CONTROL

7.1 OVERVIEW

QC checks will be performed to ensure the collection of representative and valid data. Internal QC refers to all data compilation and contaminant measurements. QC checks will be used to monitor project activities to determine whether QA objectives are being met. All specific internal QC checks to be used are identified in this section.

7.2 LABORATORY QUALITY CONTROL

The analytical laboratory is required to exercise internal control in a manner consistent with the requirements of this plan. Control checks and internal QC audits are required by the NYSDEC ASP methods. These include reference material analysis, blank analysis, MS/MSD analysis, cleanups, instrument adjustments and calibrations, standards, and internal audits.

One qualified professional will proof and check all final reports for transcription and/or calculation errors. Twenty percent of all final reports will be subsequently checked again by a qualified professional. All data tables will be checked to ensure no transcription errors have occurred. Data tables will also be checked to see that any criteria cited for comparison purposes is appropriate and correctly referenced. All calculations will be checked to ensure that they will be properly presented and that resulting values are achievable. If any results cannot be duplicated the calculations will be independently checked for accuracy.

8.0 PERFORMANCE AND SYSTEMS AUDITS

Performance audits, when performed, will be used to monitor project activities to assure compliance with project DQOs. The following text summarizes the field audits that are conducted periodically.

8.1 FIELD AUDITS

Walden periodically conducts internal audits of field activities. The Walden on-site project manager will routinely monitor all field activities to ensure that work is done correctly. All sampling and analytical work will be reviewed routinely by the project manager. All data sheets obtained in the field will be initialed and dated by project manager after review and acceptance of the services performed.

A field audit will include monitoring and evaluation of sample collection, sample holding times, preservation techniques, field QC, and equipment calibration. These audit forms will be kept on file with the Walden project manager for one year after completion of the project, then will be transferred to storage and held for an additional five years.

9.0 ANALYTICAL CORRECTIVE ACTION

9.1 LABORATORY CORRECTIVE ACTION

Corrective actions will be implemented if unsatisfactory performance and/or system audit results indicate that problems exist. Corrective action may also be implemented if the result of a data assessment or internal QC check warrants such action.

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