SUPPLEMENTAL
REMEDIAL INVESTIGATION WORK PLAN

ROSE CLEANERS
500 Lexington Avenue
Mount Kisco, New York 10549
Site No.: 3-60-059
Index No.: W3-0978-03-12

PREPARED FOR

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
625 BROADWAY
ALBANY, NEW YORK 12233-7016

PREPARED BY

BERNINGER ENVIRONMENTAL, INC.

September 2012

Professional Engineer Certification

Certification:

I, John V. Soderberg certify that I am currently a Qualified Environmental Professional as defined in 6 NYCRR Part 375 and that this Report was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation. (DER- 10)

John Soderberg, P.E

SEAL:

Signature

NYS P.E License No.: 049975

Dated: May 24, 2012

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EXECUTIVE SUMMARY

Berninger Environmental, Inc. (BEI) has developed a scope of continued off-site investigation to be performed as part of the on going Supplemental Remedial Investigation for the Rose Cleaners' facility located in Mount Kisco, Westchester, New York. (Figure-1) As detailed in the June 2006 Supplemental Investigation Work Plan previously approved by the New York State Department of Environmental Conservation, Division of Environmental Remediation (NYSDEC DER), BEI is using the Triad approach for which an initial phase of supplemental sampling was performed with a pre-planned course of action for subsequent sampling phases predicated on the interim data. This pre-planned process allows for comprehensive data collection and the time-effective completion of the site characterization.

The primary purpose of the Supplemental Remedial Investigation Work Plan (SRIWP) is to delineate the horizontal and vertical extent of tetrachloroethene (PCE) and its breakdown products specifically focusing on off-site groundwater and surface/sediment creek sampling locations down gradient from the source area, with relation to the groundwater flow direction. Although sampling data from historic sampling events is limited at this stage in the investigation, the data to be collected as part of this work plan will provide larger insight with respect to the vertical and horizontal extent of the groundwater plume.

A Conceptual Site Model (CSM) has been developed based upon historic site data. The CSM primarily focuses on PCE concentrations from the surface of the groundwater table, which is approximately four (4) feet below grade surface (bgs) (and even shallower in other locations)to ten feet (10') below grade. The collection of additional off-site data will enable BEI to expand upon the CSM portfolio with drawings depicting contaminant breakdown and transportation both vertically and horizontally

1.0 INTRODUCTION

1.1 Supplemental Remedial Investigation

A Supplemental Remedial Investigation Work Plan (SRIWP) on the Rose Cleaners' Inactive Hazardous Waste Disposal Site (IHWDS) was prepared pursuant to the requirements of an executed Order on Consent (December 22, 2003) between the New York State Department of Environmental Conservation (NYSDEC), Division of Environmental Remediation (DER), and LRB Cleaners, Inc., the Respondent.

The subject property is listed on the NYSDEC DER Registry of Inactive Hazardous Waste Disposal Sites in New York State as Site Number 3-60-059 with a Classification of 2 pursuant to ECL 27-1305. The site is located at 500 Lexington Avenue, Mt. Kisco, New York 10549, fully described at Dist. 80.64, Section 01, Lot 14. (Figure-1)

1.2 Triad Approach in Site Investigation

As encouraged by the United States Environmental Protection Agency's (USEPA's) Office of Solid Waste and Emergency Response and the NYSDEC DER, BEI proposes an integrated "triad" or pre-planned approach for the continued supplemental investigation of this site. The triad approach includes systematic planning such as the development of dynamic work plans and real time data collection strategies to implement data collection and make technical decisions at hazardous waste sites.

Future investigation work is being proposed based upon the development of a Conceptual Site Model (CSM) (Figure-8) constructed from previously implemented and conclusive dynamic work strategies (DWS). In addition to the CSM an essential component to guide systematic project planning will include the interpretation of the site specific groundwater flow model developed and presented as Figure-7.

The CSM developed for the supplemental investigation work includes a multi-tiered sampling approach which extends north of the primary source area with a series of horizontal transects formed within. Delineation of groundwater contamination will extend to the west of the stream and as far east as required to obtain samples with acceptable Volatile Organic Compounds (VOCs) levels. The vertical depth of contamination will also be delineated by collecting samples from three (3) different depths that have been chosen based upon previous site investigations and the CSM. During previous investigations bedrock has caused multiple refusals at a depth of approximately 30' bgs. In the past BEI obtained the deepest groundwater sample before bedrock or refusal was encountered. Areas that warrant groundwater sampling to be conducted within the bedrock (beyond refusal) will require a specified drill rig. The need for bedrock drilling will be based upon site data collected at the proposed sampling locations and the revised CSM.

Summary reports can be issued and CSM models can be updated upon receipt of validated lab data in order to systematically plan for future investigational needs.

1.3. Site Background and History of Use

Site Name:	Rose Cleaners
Owner:	LRB Cleaners, Inc.
Operator:	Hwa-Young Kim
Location:	500 Lexington Avenue, Mount Kisco, New York 10549
	Latitude 41º 12' 16.914 N, Longitude 73º 43' 42.489" W
Remedial Investigation Agreement:	IHWDS Site No.: 3-60-059
	Index No.: W3-0978-03-12

The current site development consists of a one-story concrete block/masonry slab-on-grade approximately 5,810 ft^2 building. The building possesses a built-up metal flat roof. The building was remodeled in 1955 and 1962. A 100-ft^2 fur vault was added in addition to

partitioned office spaces. Approximately 10,900 ft^2 of asphalt paving (installed circa 1955 and maintained thereafter) is present exterior to the building. The property has always been used as a cleaning plant/facility. A tenant is located at the rear of the building; the date of occupancy by the tenant is unknown. The tenant is a plumbing company that uses the building space primarily as a warehouse for plumbing supplies.

1.4 Summary of Previous Site Investigations

Records available to Berninger Environmental, Inc. (BEI) indicated that on December 21, 2001, Tyree Brothers Environmental Services, Inc. (TBES) performed a limited subsurface investigation at the Rose Cleaners' facility. Two soil borings were manually drilled at the site with the locations chosen based on the presence of any exhaust piping and/or any location that would have the potential for chemical dumping.

Soil samples were collected at two (2) locations, one directly adjacent to the stoop by the back door, (SB-1) at a depth of 2.5 to 3 feet and one on the side of the building (SB-2) near the exhaust discharge piping at a depth of 3 to 4 feet. The increment with the highest Photoionization Detector (PID) reading was selected for laboratory analysis. PID readings ranged from 1.1 to 36.7 ppm PID response units. The samples were also analyzed for volatile organic compounds via EPA method 8260.

The results of the laboratory analysis were compared to New York State Department of Environmental Conservation (NYSDEC) 6 NYCRR Part 375-6. Laboratory results indicated that volatile organic compounds were detected in both of the soil samples. All concentrations in SB-1 were within NYSDEC acceptable levels; tetrachloroethene was present at a concentration of 591 *u*g/kg. Sample SB-2 contained a concentration of one (1) compound (tetrachloroethene at 12,400 *u*g/kg) that exceeded NYSDEC soil guidelines (currently 6 NYCRR Part 375) of 1,300 *u*g/kg.

A surface water grab sample was also collected from a downstream location, between the dry cleaners and the adjacent commercial property, during the soil sampling program. This sample was hand delivered under chain of custody documentation to a New York State certified laboratory. The stream is located in the back (west) of the dry cleaners. This sample was analyzed for volatile organic compounds via EPA Method 8260. The results of the laboratory analysis were compared to the Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1, Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, April 2000.

Volatile organic compounds were detected in the surface water sample taken from the stream. The stream sample contained concentrations of VOCs that exceeded NYSDEC surface water standards for two (2) compounds (cis-1 ,2-dichloroethene at 5.1 *u*g/L and tetrachloroethene at 9.3 *u*g/L). Due to the presence of volatiles that exceeded NYSDEC standards for soil and surface water, Spill Number 01-09709 was assigned to this site. Ultimately the site became listed as an Inactive Hazardous Waste Site No. 3-60-059 with a Classification of "2" pursuant to ECL 27-1305 as further investigation was required to determine the nature of the contamination, the extent of waste disposed and the contamination source(s).

In July of 2005 a Remedial Investigation Work Plan (RI Work Plan) was developed pursuant to the requirements of an executed Order on Consent (December 22, 2003) between the New York State Department of Environmental Conservation (NYSDEC), Division of Environmental Remediation (DER), and LRB Cleaners, Inc., the Respondent.

BEI proposed and conducted a series of tasks which included; soil gas sampling, indoor air quality testing, soil sampling, groundwater sampling and surface/sediment sampling of the adjacent creek. Multiple source areas were discovered as a result of this investigation, which prompted considerations for further investigation and remedial action.

Sampling results collected during 2005 indicated the presence of PCE above NYSDEC water quality SGVs in one of the surface water samples collected from the creek adjacent to the dry-cleaner. Groundwater samples were also collected during this phase of investigation in close proximity to the creek (east of creek) which exhibited elevated concentrations of PCE from 5 to 27' bgs. Most of the soil and groundwater sampling conducted during this time focused on the rear of the building near the exhaust fan and the old dumpster area. At this point in time only limited investigation data for the northern portion of the property was obtained but, future investigation activities were proposed to be performed that would solely focus on this area. Tabulated results and sampling locations of this investigation are depicted on Figure-2.

In September of 2006 supplemental investigation activities performed by BEI continued with additional surface water/sediment sampling of the creek and off-site groundwater sampling. Off-site groundwater samples were collected down gradient from the site on either side of the creek as well as down creek surface water and sediment samples. PCE was detected in most of the samples collected, which confirmed the need for supplemental off-site investigation. Please refer to the tables provided on the scaled Figure-3, which identifies supplemental groundwater, surface water and sediment results as well as their locations.

In February of 2008 three main locations of shallow PCE contamination were delineated: the north side of the building, the dumpster area and the rear of the building, exterior to the door and exhaust vents. Supplemental RI activities performed in February 2008 included the installation of thirty (30) soil borings at which fifty (50) soil samples were collected. This supplemental work was performed to allow for a complete delineation of the vertical and lateral extent of PCE contamination in the largest source area at the subject property. A series of isoconcentration maps were developed based upon this data set for purposes of directing the IRM efforts. Figure-4 shows shallow PCE impacted soils with concentrations as high as 15,000,000 ppb in the most significantly impacted areas. Figure-5 shows the migration of PCE to deeper depths where it is carried in the direction of groundwater flow. Since PCE is

a (DNAPL) it tends to travel vertically to deeper depths in groundwater as evident in Figure-6 . Future off-site investigation locations and sampling intervals have been adjusted to reflect this data in order to further delineate the migrating plume as depicted in the CSM.

In August of 2009 an Interim Remedial Measure (IRM) was executed in accordance with the August 2008 approved IRMWP. Remedial activities included the removal of source material via excavation of contaminated soil to the surface of the water table. Post excavation activities included the application of RegenOx to the open excavation in order to enhance the natural degradation of impacted soil and groundwater. Clean soil was backfilled into the excavation pit upon the completion of the ISCO application.

2.0 PROPOSED SUPPLEMENTAL INVESTIGATION

Based upon the data developed from the June 2006 Supplemental Remedial Investigation Work Plan, which guided the development of the CSM, BEI has identified off-site supplemental investigatory data needs as follows:

2.1 Off-site Groundwater Sampling

Based upon the CSM and previously generated data, supplemental off-site groundwater data to the north of the subject site (down gradient) is necessary to delineate the PCE plume. These locations are depicted in Figure-9. In order to identify the lateral and vertical extent of PCE and other dry-cleaning related compounds, off-site sampling locations were selected to allow for further delineation of groundwater conditions on either side of the creek (downstream).

A total of 63 groundwater samples will be collected from temporary monitoring wells for analysis by TCL VOCs by EPA Method 8260 and TICs with an NYSDEC ASP B deliverable package. Temporary monitoring wells will be installed via the direct push method with the

use of a 6610 track mounted portable geo-probe. The sampling locations are detailed on the attached Figures-9 and 10 and include supplemental sampling intervals of 5-9 ft bgs, 15-19 ft bgs and 27-31 ft bgs (or until refusal is encountered due to bedrock) down gradient from the source area located north of the property. Deeper supplemental groundwater sampling is proposed at 45-49 ft bgs and 55-59 ft bgs at prior sampling locations that exhibited concentrations of VOCs in groundwater above RCO's for groundwater. Areas that warrant groundwater sampling to be conducted within the bedrock (beyond refusal) will require a specified drill rig. Access agreements will be required for off-site locations, thus arrangements will be made as required. Supplemental depths will be sampled within the aquifer as necessary to vertically define the PCE and related VOC impacts. In the event that the testing data indicates that concentrations of PCE and VOCs extend either laterally or vertically beyond the area identified on Figure-9 or Figure-10, subsequent sampling locations will be selected based upon projected groundwater flow direction, surface water effects and source areas identified on-site. The information gained from all proposed sampling locations will provide data used to confirm and refine the CSM as the project progresses, allowing for a comprehensive and detailed delineation program. Each data set will be documented in a limited summary report for transmission to the NYSDEC/NYSDOH on a timely basis as interim deliverables. All groundwater sampling will be performed in accordance with the NYSDEC DER-10 Guidance document and under the specifications already approved in the RI work plan.

2.2 Surface Water and Sediment Sampling

Based upon the data generated to date, supplemental off-site surface water and sediment data down-stream to the north (along the creek, past the prior sampling locations) is necessary to complete the site conceptual model and migration pathways. These locations have been designated on Figure-9. Additional sampling locations include samples to be collected at the confluence of the Lexington Creek and the Kensico river.(see Figure- 10) Surface water and sediment samples will be collected for analysis by TCL VOCs EPA Method 8260 and TICs with an NYSDEC ASP B deliverable package. Samples will be collected in accordance with

the procedures established in the NYSDEC, DER-10 Technical Guidance for Site Investigation and Remediation, May 2010 for surface water bodies. Surface water samples will be collected for laboratory analysis using a dedicated disposable polyethylene bailer. The bottom sediment samples will be collected along the linear path of the stream channel using a decontaminated stainless steel bucket auger or dredge sampler. Sediment samples will be collected at multiple depths which include 0-6 inches, 6-12 inches and 12-24 inches below the river bed. Sample collection procedure, quality assurance/quality control and equipment decontamination procedures will adhere to the protocol established in Section 3.0.

2.3 Installation of Monitoring Well Inside/Outside Dry Cleaning Building

One (1) permanent groundwater monitoring well is proposed (MW-L) to be installed within the dry cleaner building or immediately outside the building wall (north wall near source/excavation area) in order to monitor for a potential source area under the building. Soil screening will be conducted continuously down to the groundwater table for which 2.5' sampling intervals will be screened with a PID meter for the presence of elevated VOC's. If no elevated VOC's are detected than BEI will submit the two deepest, dry soil samples for laboratory analysis by EPA method 8260 plus TIC's. Since the primary COC is considered a DNAPL(PCE), BEI will attempt to install a monitoring well to the deepest obtainable depth until bedrock or refusal is encountered. The monitoring well construction will consist of multiple screened intervals in order to gauge concentration levels at three different depths.(2-7'; 17-22'; 27-32') Five (5) feet of two inch diameter, schedule 40, PVC, 0.02 inch slot screen will be installed at a depth of two (2) feet below the ground surface extending to seven (7) feet bgs. Ten (10) feet of two (2) inch, schedule 40, PVC riser pipe will continue down to 17 feet where five (5) feet of 2" diameter, 0.02 inch slotted screen will continue from 17' to 22' for access to the second sampling depth. At 22' bgs. 5 feet of 2" solid riser pipe will continue down to 27' bgs where the final sampling interval will be installed from 27' to 32' bgs using 2" diameter, schedule 40 PVC, 0.02 inch slot screen. The final depth of the monitoring well will be 32' feet below grade surface. The monitoring well will be secured and sealed in place with a flush mounted 5" cast iron manhole cover. Please refer to Figure-11 for well construction details provided as a well log and Figure - 12 for well location.

2.4 Sensitive Receptor Analysis & Exposure Assessment

An updated evaluation of the sensitive receptors in the area will be generated based upon the development of the supplemental off-site data. Furthermore, the off-site groundwater data will be used to further evaluate potential impacts and exposure assessment relative to surface water, sediment and other media. A complete municipal water well study was conducted by BEI in 2005 identifying possible receptors for residents in the village of Mt. Kisco. The data derived from this study will be reevaluated based on the supplemental off-site findings.

2.5 Project Schedule and Reporting

Within 30 days of the approved Supplemental Remedial Investigation Work Plan BEI will prepare to mobilize the necessary sampling equipment needed to perform all supplemental activities. The owner of the Rose Cleaners' property will be notified as well as the NYS-DEC when an official work start date is confirmed. Off-site access agreements will also be taken into consideration when confirming the initial start date.

BEI will request access agreements for the proposed sampling locations prior to the approval of this work plan in order to avoid interference with field work/sampling activities. Note that there may be delays due to potential difficulty in securing these access agreements, which in the past, have taken several months to resolve. Once all access agreements have been granted, the anticipated time frame for the completion of the investigation work will be 3-7 days.

Following the completion of the investigation work, the following tasks have estimated time frames of:

- 4-6 weeks for Lab Data Category -B results
- 4-6 weeks for third party data validation
- 2-4 weeks to review data and tabulate into summary report
- 2-4 weeks to report proposed continued investigation (if needed) and update CSM

3.0 QUALITY ASSURANCE / QUALITY CONTROL PROCEDURES

Quality Assurance /Quality Control (QA/QC) procedures were developed to ensure that suitable and verifiable data results from sampling and analyses are maintained during the field collection. The prior approved Investigation Work Plan provided detailed quality assurance procedures to be followed for sampling and laboratory analysis activities. These procedures were implemented during the initial RI Investigation and have been updated to reflect the current project personnel, materials and equipment. An updated description of the quality assurance procedures followed is provided below.

3.1 Sampling Personnel

The activities associated with the field sampling and analysis program will be performed under the supervision of a Quality Assurance Officer, in accordance with the NYSDEC, DER "Technical Guidance for Site Investigation and Remediation", effective June 18, 2010.

All field personnel possess a minimum of two or more years experience in environmental/geological field work. Additionally, all field personnel have received mandatory forty-hour Occupational Safety and Health Administration (OSHA) training on working with potentially hazardous materials and appropriate Hazard Communication Program and Right-To-Know' training. Field personnel will wear personal protective equipment (PPE) 100% of the time they are in the work zone.

3.2 Soil Sample Collection

Soil sampling will be conducted using a Geoprobe direct push sampling rig using a Discreet® sampling device. A new PVC liner is installed into the sampling barrel between each sampling event. The equipment (drive point, barrel, subs and adaptors) is decontaminated before each sample collection following NYSDEC, Sampling Guidelines & Protocols, 1991. The cleaning procedure will include the use of a standard laboratory grade phosphate-free detergent (Alconox) followed by a municipal-supplied tap water rinse. The retrieved samples

will be placed in laboratory-supplied analyte-free containers. The samples will be stored in a cooler containing ice to maintain a temperature of 4º Celsius and delivered under strict chain-of-custody to a New York State Department of Health (NYSDOH) ELAP-certified laboratory providing Category B deliverables. All generated soil cuttings will be maintained in a DOT approved 55 gallon drum. Upon completion of the project a soil sample from the drum(s) will be analyzed for disposal by an NYSDOH-ELAP certified laboratory; disposition will be based upon these sample results.

To ensure quality control, one (1) field blank will be collected per 20 samples by rinsing the field equipment with organic-free water and submitting the rinse water in standard sample containers to a certified laboratory for analysis by EPA Method 8260. A Matrix Spike/Matrix Spike Duplicate (MS/MSD) will also be collected at a rate of one per 20 soil samples. The MS/MSD serves as a duplicate soil sample for NYSDEC ASP-B deliverables. No trip blanks are required to be collected for soil samples for NYSDEC ASP-B deliverables.

3.3 Groundwater Sample Collection

Groundwater sampling will be conducted using a Geoprobe direct push sampling rig equipped with a mill-slotted well and/or a screen point 15 sampling tool. Once the desired depth is reached, new polyethylene tubing fitted with a Tubing Check Valve System is inserted down into the rod to the depth of the slotted or screened point. For temporary well sampling EPA low flow procedures will be executed. Low flow procedures help to isolate the screened interval water from the overlying stagnant casing water allowing for most of the sample water to be drawn directly from the adjacent formation. Typical flow rates consist of collecting groundwater at a flow rate of 0.5- 1.0 Liters per minute Since tetrachloroethene is a dense non-aqueous fluid, groundwater grab samples will be collected from the bottom of the mill slotted screen. BEI will lower a new poly tube through the probe rods (very slowly) to the bottom of the slotted screen in order to purge and sample groundwater using a peristaltic pump with the flow rate mentioned above. The groundwater is then extracted through the polyethylene tubing by a peristaltic pump until 3 to 5 times the approximate

volume in the probe rod has been purged. The retrieved samples will be placed in a laboratory supplied analyte free 40 (ml vials. The samples will be stored in a cooler containing ice to maintain a temperature of 4º Celsius and delivered under strict chain-of-custody to a NYSDOH ELAP-certified laboratory providing Category B deliverables. Purged development water will be contained in a DOT approved 55 gallon drum. Upon completion of the project a liquid sample from the drum(s) will be analyzed for disposal by an NYSDOH ELAP-certified laboratory.

To ensure quality control, one (1) field blank will be collected per 20 samples by rinsing the field equipment with organic-free water and submitting the rinse water in standard sample containers to a certified laboratory for analysis by TCL VOCs by EPA Method 8260 and TICs. One trip blank sample will be collected per sampling day and will be analyzed for the same parameters as the field blank sample. A Matrix Spike/Matrix Spike Duplicate (MS/MSD) will also be collected at a rate of one per 20 water samples.

3.4 Surface Water and Sediment Sample Collection

Surface water within the stream channel has been observed to flow to the north. Three surface water samples will be collected at the southern, upstream portion of the stream channel, one at the confluence of the Lexington Creek and the Kensico river, one near the confluence of the Lexington Creek and Mt. Kisco river and one before the Mt. Kisco and Lexington confluence.(6 total surface samples) A dedicated disposable polyethylene bailer and polyethylene rope will be used to collect the samples. The retrieved samples will be placed in laboratory-supplied analyte-free containers. The samples will be stored in a cooler containing ice to maintain a temperature of 4º Celsius and delivered under strict chain-of-custody to a New York State Department of Health (NYSDOH) ELAP-certified laboratory providing Category B deliverables. Surface water samples will not be collected for at least 24 hours after a large rain event.

Sediment sampling will be conducted using a discrete sampling device such as a decontaminated stainless steel sludge sampler or dredge sampler. The cleaning procedure will include the use of a standard laboratory grade phosphate-free detergent (Alconox)

followed by a municipal-supplied tap water rinse. The retrieved samples will be placed in laboratory-supplied analyte-free containers. The samples will be stored in a cooler containing ice to maintain a temperature of 4º Celsius and delivered under strict chain-of-custody to a New York State Department of Health (NYSDOH) ELAP-certified laboratory providing Category B deliverables.

To ensure quality control, one (1) field blank will be collected per 20 samples by rinsing the field equipment with organic-free water and submitting the rinse water in standard sample containers to a certified laboratory for analysis by EPA Method 8260. A Matrix Spike/Matrix Spike Duplicate (MS/MSD) will also be collected at a rate of one per 20 soil samples. The MS/MSD serves as a duplicate soil sample for NYSDEC ASP-B deliverables. No trip blanks are required to be collected for soil samples for NYSDEC ASP-B deliverables.

3.5 Sampling Equipment

Individual QA/QC measures will be implemented for each of the types of equipment, field screening instruments, sample containers, etc. used in the performance of the sampling program.

3.5.1 Geoprobe

Prior to arrival on the subject property and between sample locations, the probes will be decontaminated by washing them with a detergent (Alconox) and potable water solution and rinsing them with distilled water.

3.5.2 Glassware

All sample glassware is "level A" certified decontaminated containers supplied by a NYSDOH-Certified Commercial Laboratory. Samples analyzed for media potentially containing VOCs will be placed in Teflon-lined containers. All samples will be preserved by cooling them to a temperature of approximately 4° degrees Celsius.

3.6 Sample Documentation

To establish and maintain proper sample documentation control, the following sample identification and chain-of custody procedures will be followed.

3.*6.1* *Sample Identification*

Sample identification will be executed by use of a sample tag, log book and chain-of-custody form. Said documentation provides the following information: 1) the project code; 2) the sample laboratory number; 3) the sample preservation; 4) the date the sample was secured from the source media; 5) the time the sample was secured from the source media; and 6) the person who secured the sample from the source media.

3.6.2 Chain-of Custody Procedures

Due to the evidential nature of samples, possession will be traceable from the time the samples are collected until they are received by the testing laboratory. A sample will be considered under custody if it: was in a person's possession; it was in a person's view, after being in possession; if it was in a person's possession and they locked it up; or, it was in a designated secure area. When transferring custody, the individuals relinquishing and receiving the samples will sign, date and note the time on the Chain-of-Custody Form.

3.6.3 Laboratory-Custody Procedures

A designated sample custodian will accept custody of the delivered samples and verify that the information on the sample tags match that on the Chain-of-Custody Records. Pertinent information as to delivery, pick-up, courier, etc., will be entered in the "remarks" section. The custodian will enter the sample tag data into a bound logbook. The laboratory custodian uses the sample tag number, or assigns a unique laboratory number to each sample tag, and assures that all samples are transferred to the proper analyst or stored in the appropriate source area. The laboratory custodian distributes samples to the appropriate analysts.

Laboratory personnel are responsible for the care and custody of samples, from the time they are received, until the sample was exhausted or returned to the sample custodian. All identifying data sheets and laboratory records will be retained as part of the permanent documentation. Samples received by the laboratory will be retained until after analysis and quality assurance checks are completed.

4.0 COMMUNITY AIR MONITORING PLAN

A Community Air Monitoring Plan (CAMP) provides for real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

4.1 Continuous Monitoring

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 and the installation of soil borings or monitoring wells.

4.2 Periodic Monitoring

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 bailing/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 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.

4.3 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 groundwater 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.

4.4 Particulate Monitoring, Response Levels and Actions

Particulate concentrations should be monitored continuously at the downwind perimeter of the exclusion zone at temporary particulate monitoring stations. The upwind perimeter will be monitored periodically, in tandem with the downwind perimeter. 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 required during sampling activities. Examples of such situations include 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 re-evaluation 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 New York State (DEC and DOH) personnel to review.

5.0 HEALTH AND SAFETY PLAN (HASP)

The Site Specific Health and Safety Plan has been updated and is attached as Appendix-A.

FIGURES

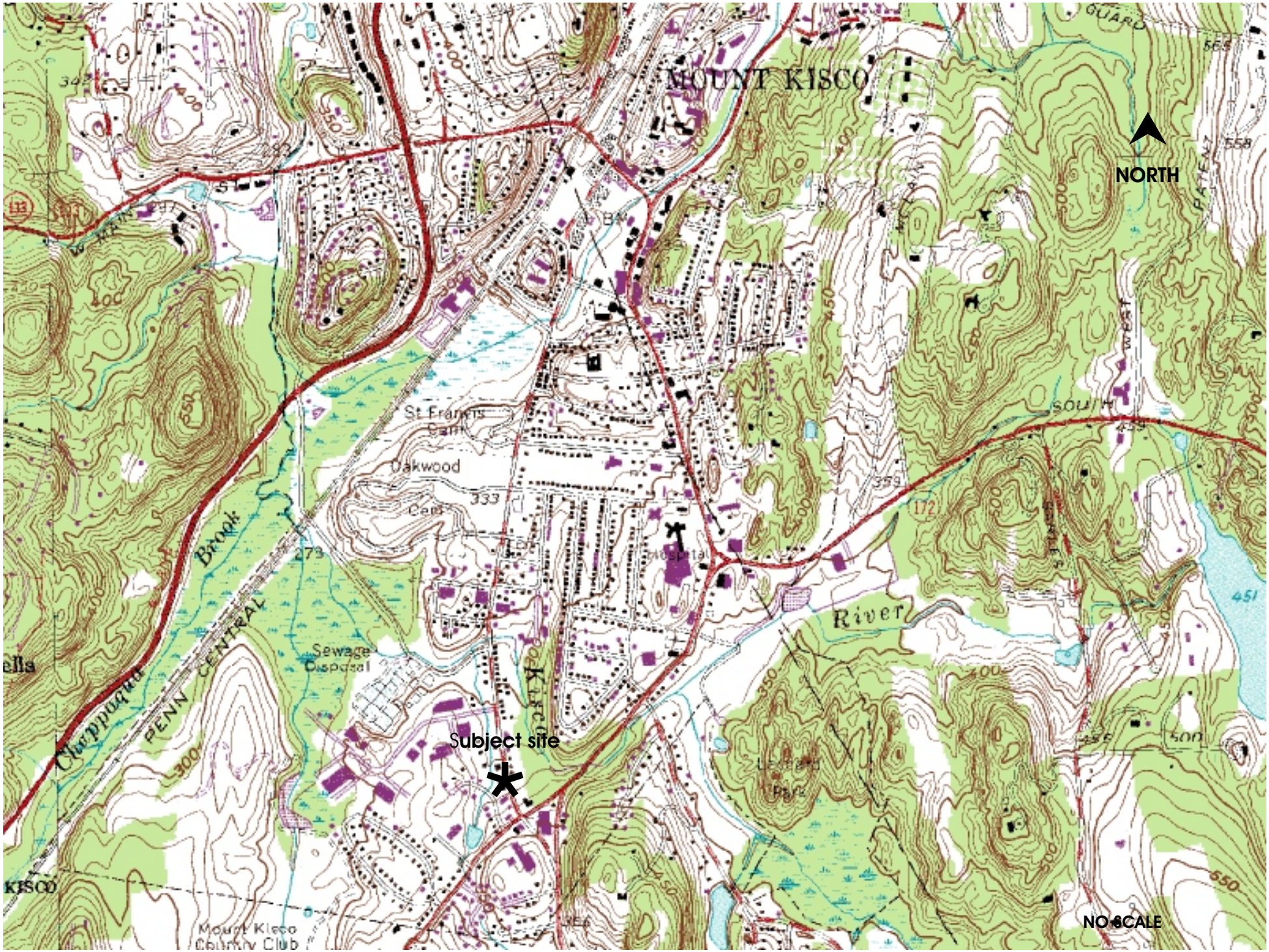
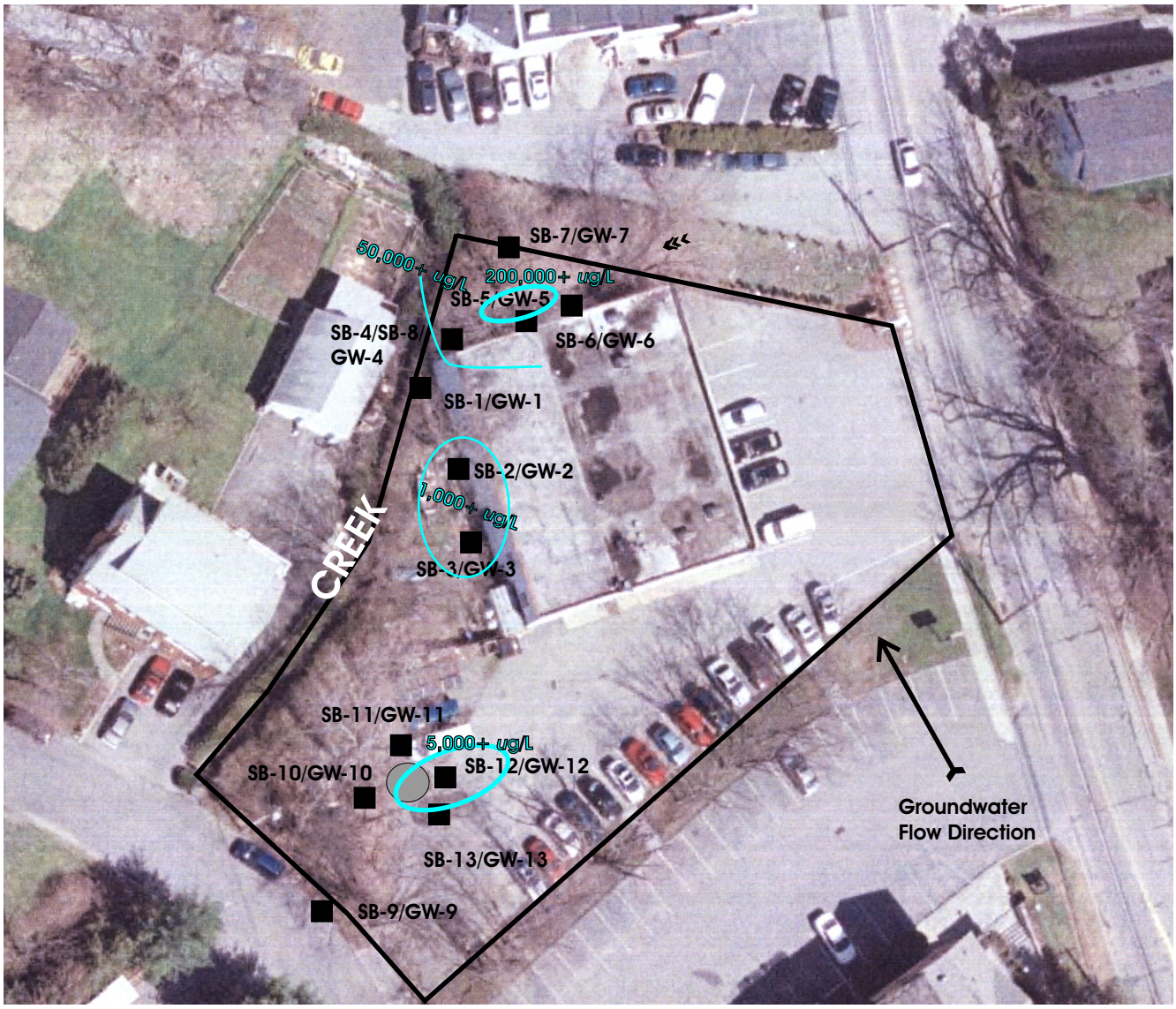


FIGURE 1 - SITE LOCATION AND TOPOGRAPHY



Notes:

SB-9/GW-9 — Soil & Groundwater Sampling Locations

Historic Dumpster Location

Areas of Highest Groundwater Impacts

Groundwater Sample	Depth, bgs	PCE	TCE	1,2-DCE	VC	TVOCS
GW-1	4-6 ft	**14 J**	ND	**13,000**	**6,900**	19,936
	14-16 ft	**14,000**	ND	**110**	**42**	14,152
	24-26 ft	**2,300**	ND	**45**	**16 J**	2,361
GW-2	5-7 ft	**1,200**	**230**	**2,800**	**85**	4,315
	15-17 ft	**140**	**8**	**14**	ND	162
	25-27 ft	**220**	**8**	**32**	ND	268
GW-3	5-7 ft	**1,500**	**560**	**3,500**	**80 J**	5,640
	15-17 ft	**150**	**20**	**55**	ND	225
GW-4	5-7 ft	**55,000**	**10,000**	**11,000**	**400**	76,400
	15-17 ft	**57,000**	**590**	**480**	ND	58,070
	25-27 ft	**12,000**	**430**	**440**	ND	12,870
GW-5	5-7 ft	**240,000**	ND	ND	ND	240,000
	15-17 ft	**300,000**	**2,200**	**1,100 J**	ND	303,300
	25-27 ft	**300,000**	**1,800**	**660 J**	ND	302,460
GW-6	5-7 ft	**34,000**	**860**	**360**	**6 J**	35,226
	15-17 ft	**2,500**	**50 J**	**22 J**	ND	2,572
	25-27 ft	**1,400**	**48 J**	**34 J**	ND	1,482

Groundwater Sample	Depth, bgs	PCE	TCE	1,2-DCE	VC
GW-7	5-7 ft	**1,200**	**32 J**	**81 J**	ND
	15-17 ft	**150,000**	**480**	**360**	**26**
	25-27 ft	**140,000**	**420**	**160**	**8J**
GW-9	5-7 ft	2 J	ND	ND	ND
	15-17 ft	2 J	ND	ND	ND
GW-10	5-7 ft	**380**	**47 J**	**15**	ND
	15-17 ft	**120**	**17 J**	**7**	ND
GW-11	5-7 ft	**26**	4 J	2 J	ND
	15-17 ft	**17**	ND	3 J	ND
GW-12	5-7 ft	**5,800**	**1200 J**	**220**	ND
	15-17 ft	**5,400**	**910 J**	**120**	ND
GW-13	5-7 ft	**3,500**	**640 J**	**210**	ND
	15-17 ft	**1,900**	**560 J**	**330**	ND

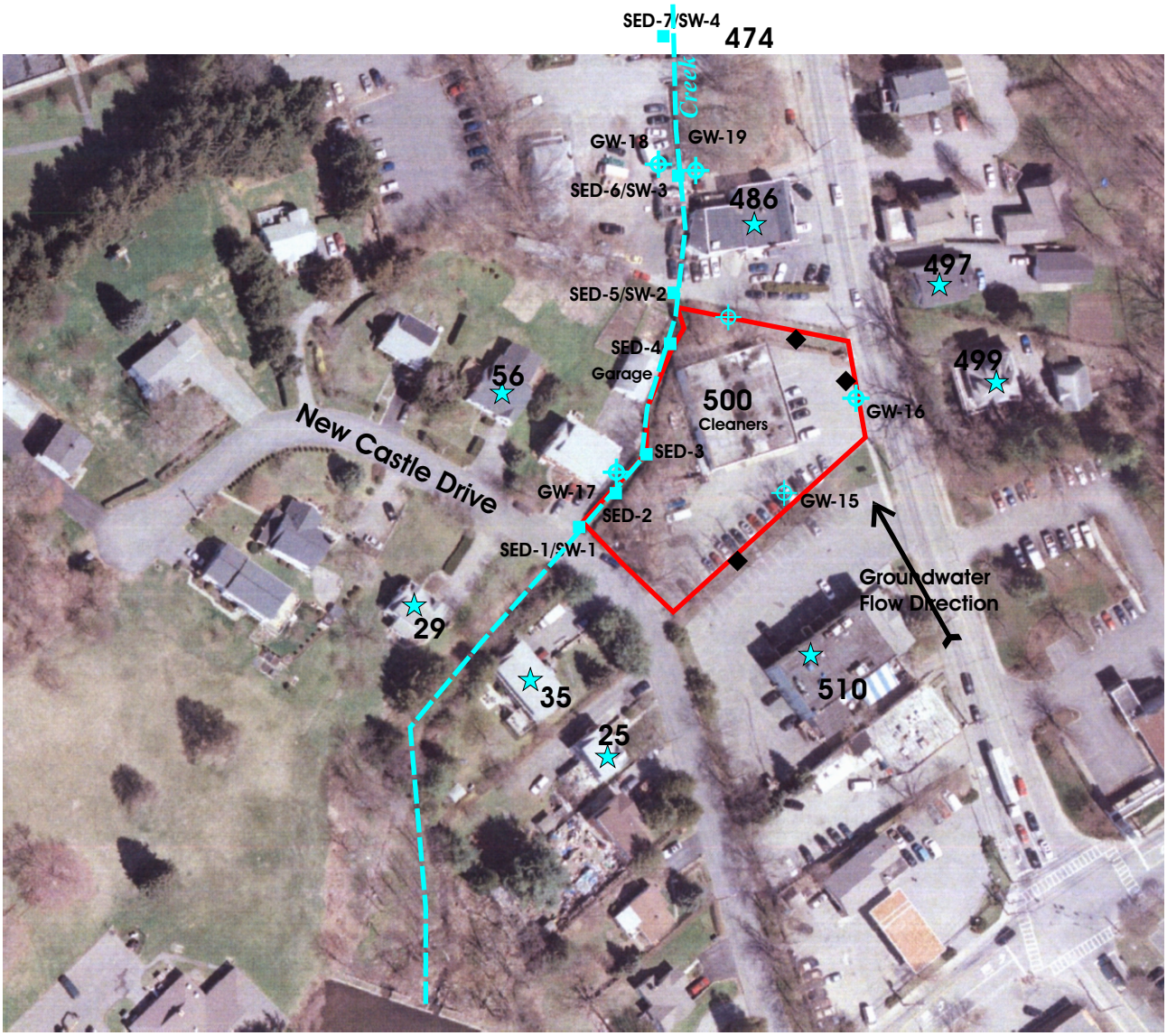
Scale
1" = 50'

PCE - Tetrachloroethene; TCE - Trichloroethene; 1,2-DCE - Dichloroethene; VC- Vinyl Chloride;
TVOCs - Total Volatile Organic Compounds. Bold # = Exceedance of NYSDEC Potable Groundwater SGVs or Surface Water SGVs

Figure 2 -Groundwater Analytical Testing Results (*ug*/L)/(ppb)

Rose Cleaners
500 Lexington Avenue
Mt. Kisco, New York

Berninger Environmental, Inc.
90 Knickerbocker Avenue
Bohemia, New York 11716
(631) 589 - 6521



Creek Sediment Samples

Sample #	Depth, bgs	PCE	TCE	1,2-DCE	VC	TVOCs
SED-1	0-6"	ND	ND	ND	ND	664
SED-2	0-6"	ND	ND	ND	ND	ND
SED-3	0-6"	ND	ND	ND	ND	127
SED-4	0-6"	ND	5 J	81	ND	86
SED-5	0-6"	43	5J	4 J	ND	52
SED-6	0-6"	**5,100 J**	**4,600 J**	**24,000**	150	33,869
SED-7	0-6"	130 J	ND	15 J	ND	145

Sample #	Depth, bgs	PCE	TCE	1,2-DCE	VC
GW-15	5-9 ft	**46**	ND	ND	ND
	15-19 ft	**560**	ND	ND	ND
GW-16	5-9 ft	**94**	ND	ND	ND
	15-19 ft	**32**	ND	ND	ND
GW-17	6-8 ft	**2,600**	**6**	ND	ND
	16-18 ft	**190**	ND	ND	ND
GW-18	8-10 ft	**280**	**22 J**	ND	ND
	14-16 ft	**68**	ND	ND	ND
GW-19	5-7 ft	**130,000**	**1,400**	ND	ND
	15 - 17 ft	**44,000**	**4,300 J**	ND	ND

Surface Water Samples

Sample #	Depth, bgs	PCE	TCE	1,2-DCE	VC
SW-1	0-1 ft	ND	ND	ND	ND
SW-2	0.5 -1ft	**11**	2 J	4 J	ND
SW-3	0.5 -1ft	**230**	**22 J**	**41**	ND
SW-4	0.5 -1ft	**220**	23 J	53	ND
Culvert		ND	ND	ND	ND

Scale

1" = 140'

Prior Groundwater Sampling Locations

Supplemental Surface Water/Sediment Sampling Locations

Supplemental Groundwater Sampling Location

PCE - Tetrachloroethene; TCE - Trichloroethene; 1,2-DCE - Dichloroethene; VC- Vinyl Chloride;
TVOCs - Total Volatile Organic Compounds. Bold # = Exceedance of NYSDEC Potable Groundwater SGVs or Surface Water SGVs

Figure 3 - Supplemental Groundwater Sampling Results - September 2006

Rose Cleaners
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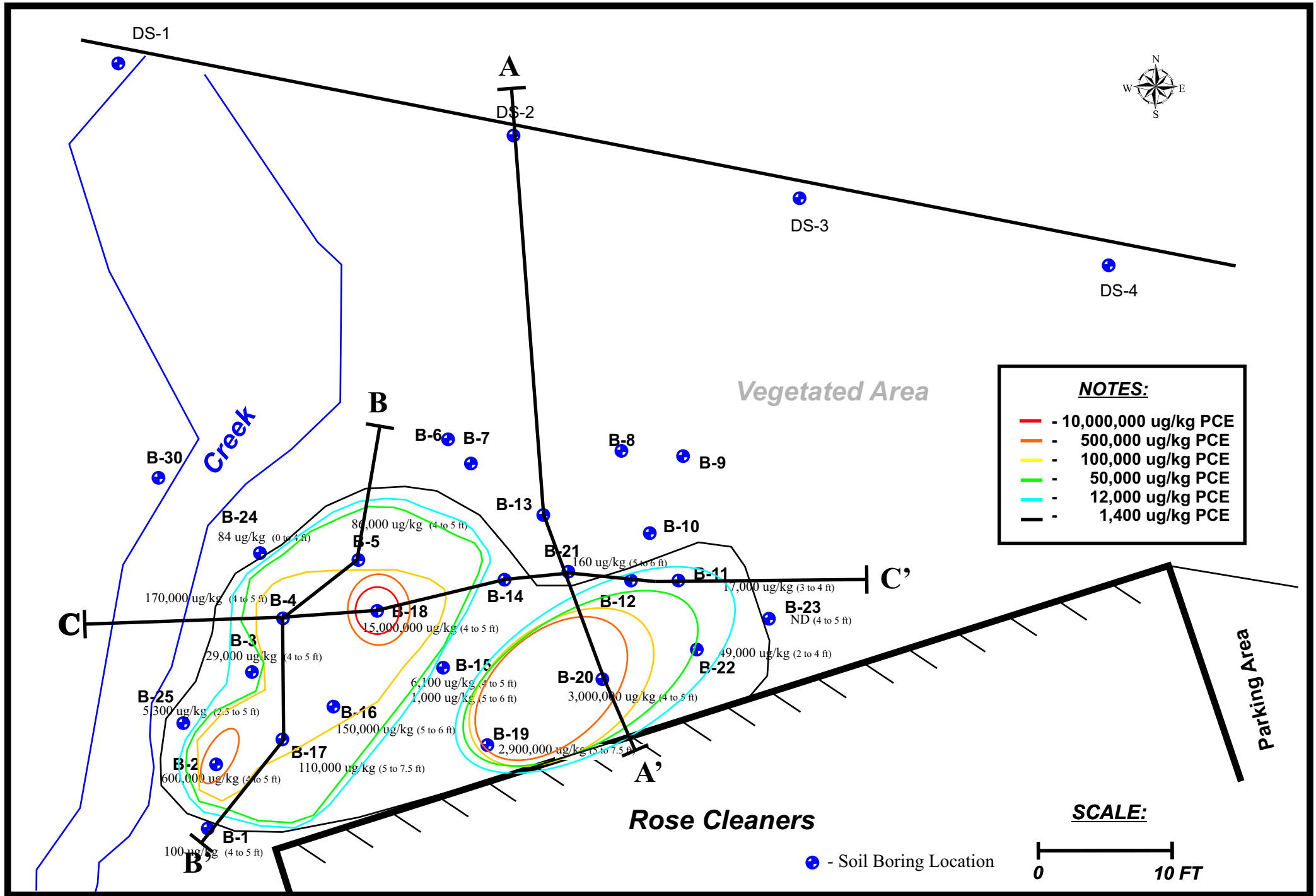

Figure - 4 - PCE Concentrations in Soil Samples from 0 to 6 ft bgs with isoconcentration contours

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Mount Kisco, New York

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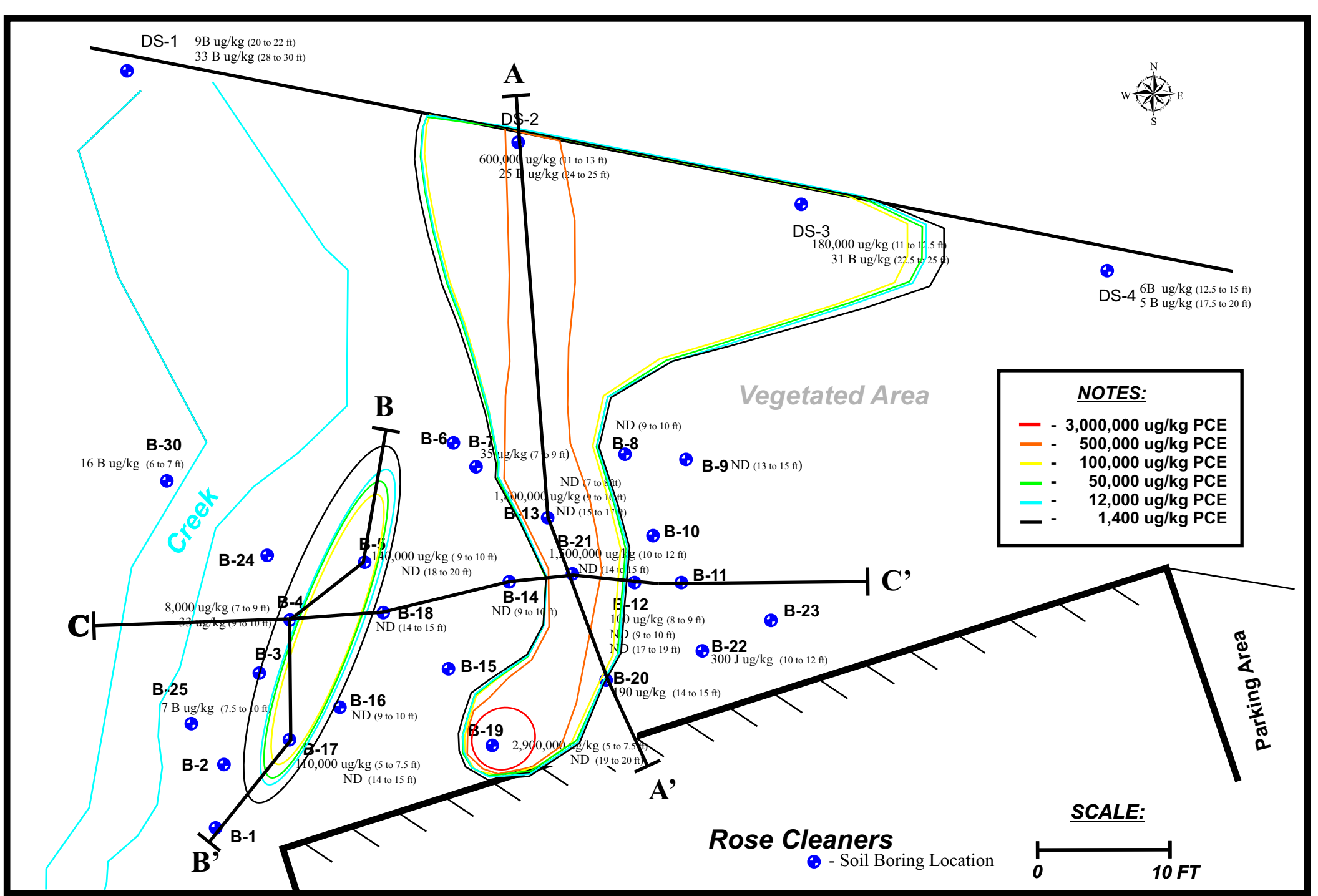

Figure - 5 - PCE Concentrations in Soil Samples from 7 to 30 ft bgs with isoconcentration contours

Rose Cleaners
500 Lexington Avenue
Mount Kisco, New York

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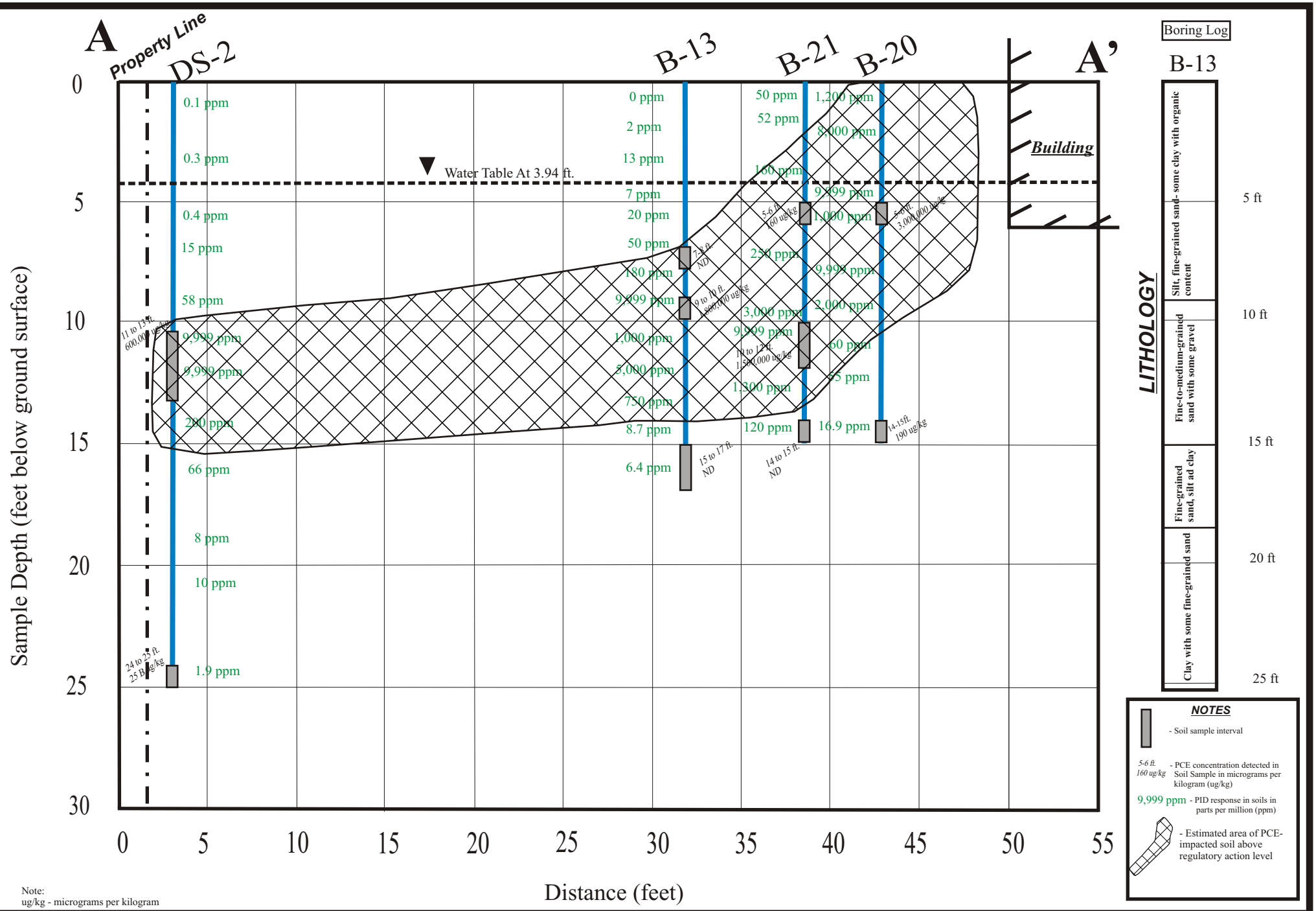

Note:
ug/kg - micrograms per kilogram

Figure 6 - North -South cross-section A to A'
PCE concentrations (ug/kg) detected in samples

Rose Cleaners
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Mount Kisco, New York

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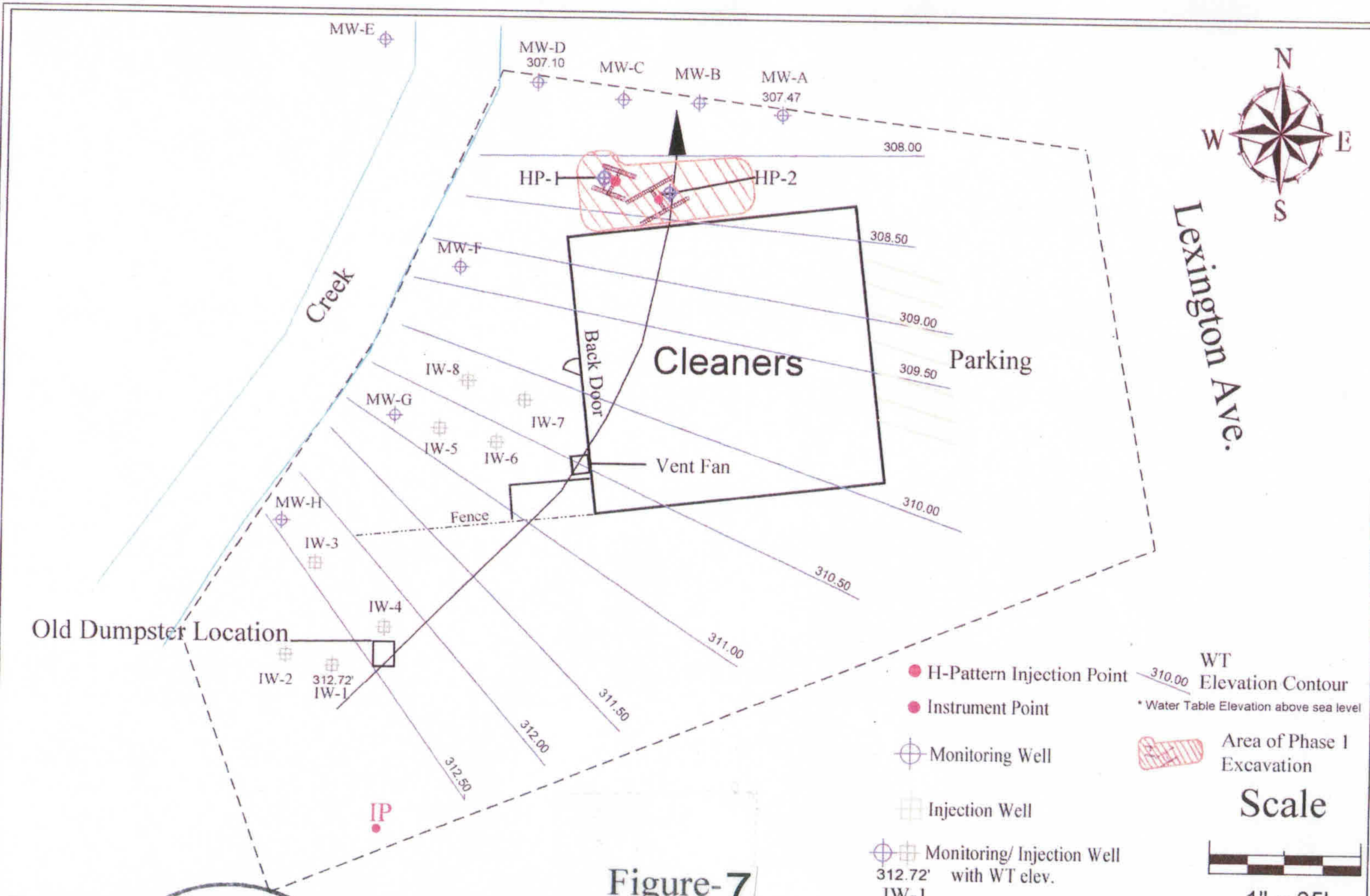

Figure-7

P.E Certification

Rose Cleaners
500 Lexington Ave.
Mt. Kisco, NY
Groundwater
Gradient
Map

BEi Berninger Environmental, Inc.
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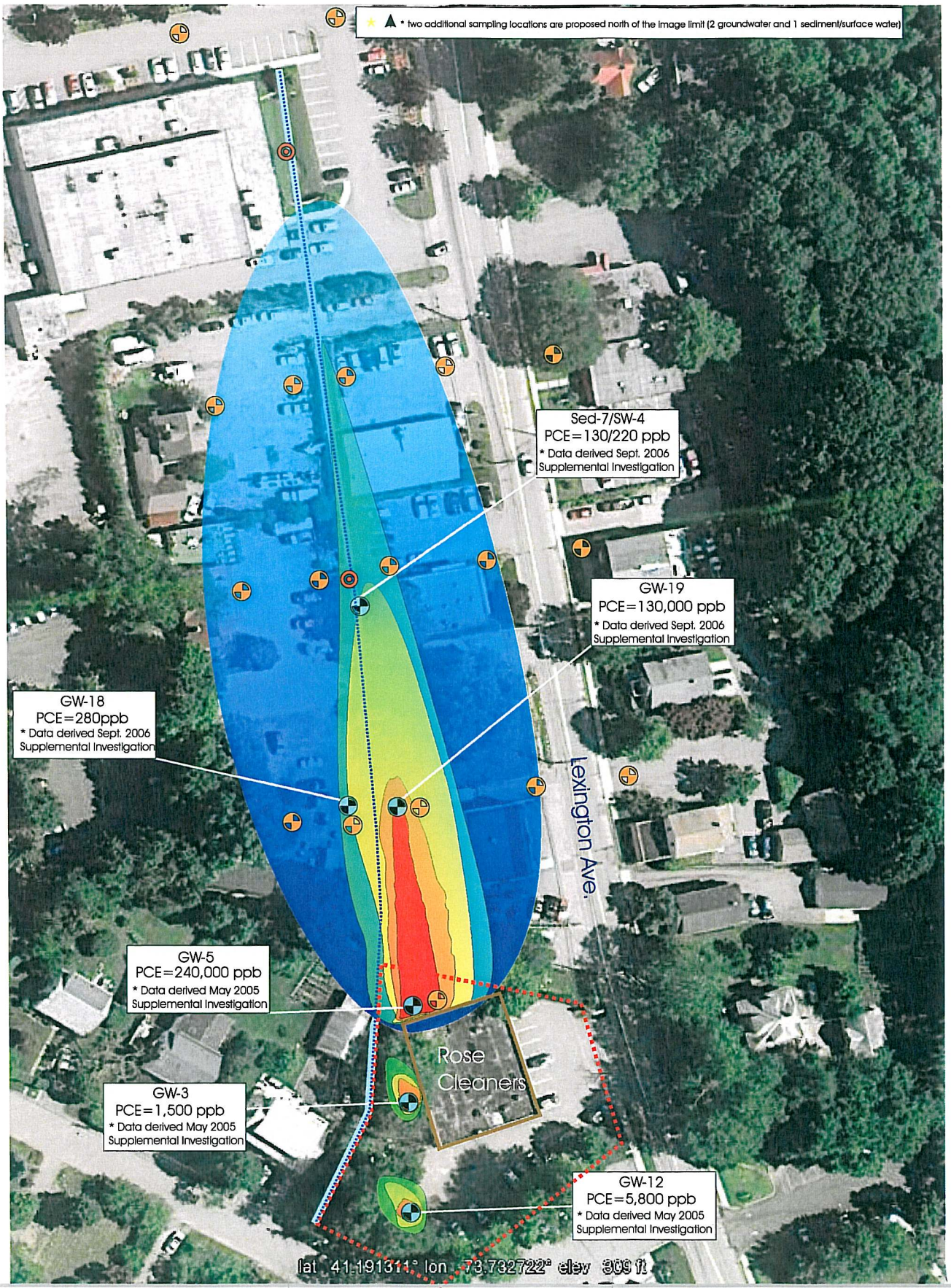

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groundwater consultants and geologists
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90-B Knickerbocker Ave. Bohemina ,NY 11716

Conseptual Site Model

Groundwater 5-10'

PCE Parts per billion

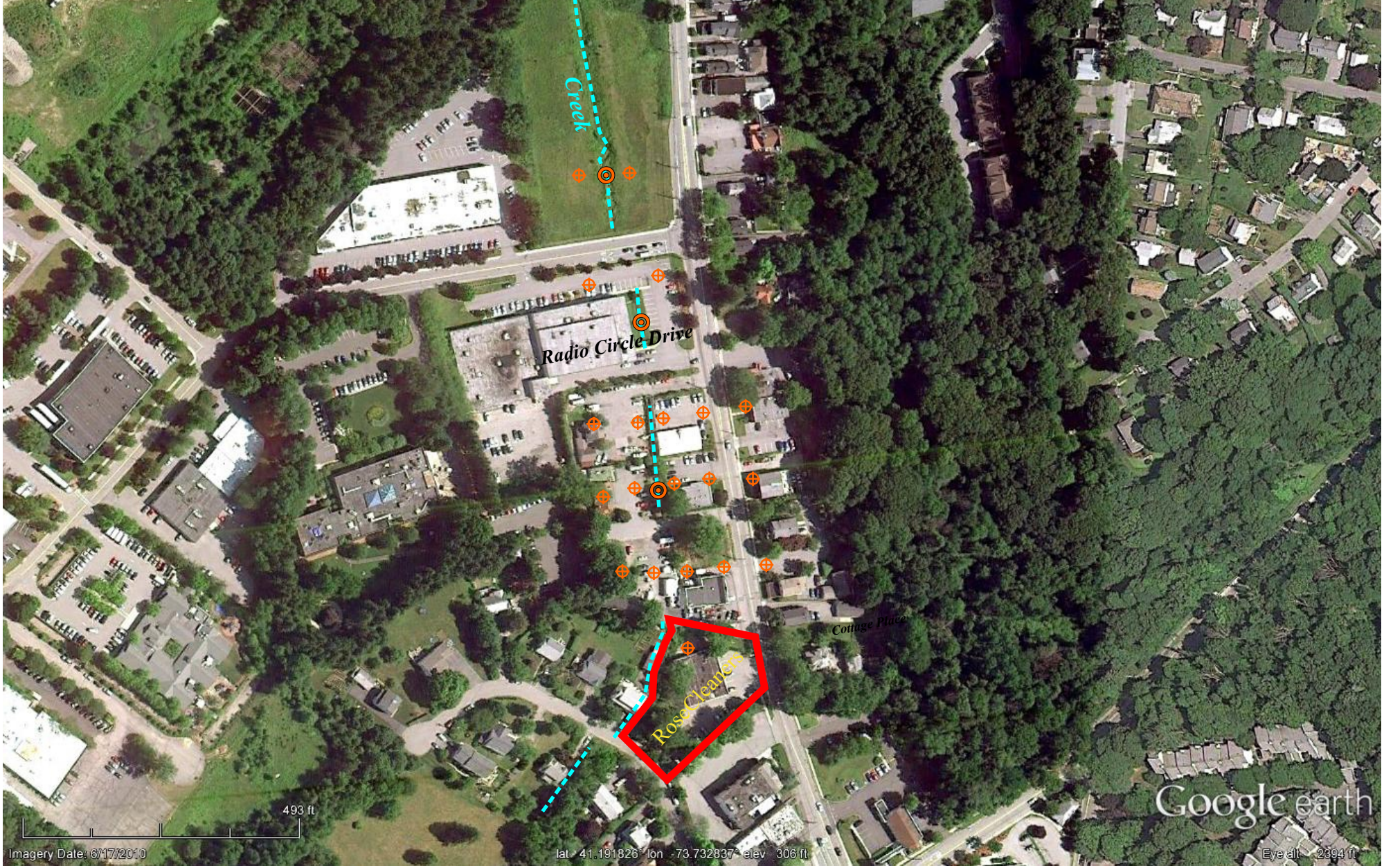
Site: Rose Cleaners
Location: 500 Lexington Ave. Mt. Kisco, NY
Site #: 3-60-059
Index #: W3-0978-03-12

Figure-8

Color Scale estimated using limited historic GW data

>100,000ppb	> 1,000ppb	> 100ppb	≤ 100ppb	≥5 ppb

Prior GW Data
Proposed GW Sampling Locations Sampling Depths: 5-9'; 15-19'; 27-31'
Creek
SW/Sed Sample
Property Boundary
Scale 1"= 95'
N
W
E
S



Sample Method: EPA 624/8260 plus TICs

Supplemental Sampling Depths bgs: 5-9', 15-19', 27-31'

Matrix: Water and Soil (Sediment)

Sampling Rational: Northerly GW flow and prior down hydro gradient data

- Proposed Surface Water/Sediment Sampling Locations 5-9'
- Proposed Groundwater Sampling Locations 15-19' 27-31'

1"=246' Scale 493'

Figure-9 Off-Site Groundwater, Sediment and Surface Water Sampling

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groundwater consultants and geologists
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90-B Knickerbocker Ave. Bohemina ,NY 11716

Site: Rose Cleaners

Location: 500 Lexington Ave. Mt. Kisco, NY

Site #: 3-60-059

Index #: W3-0978-03-12

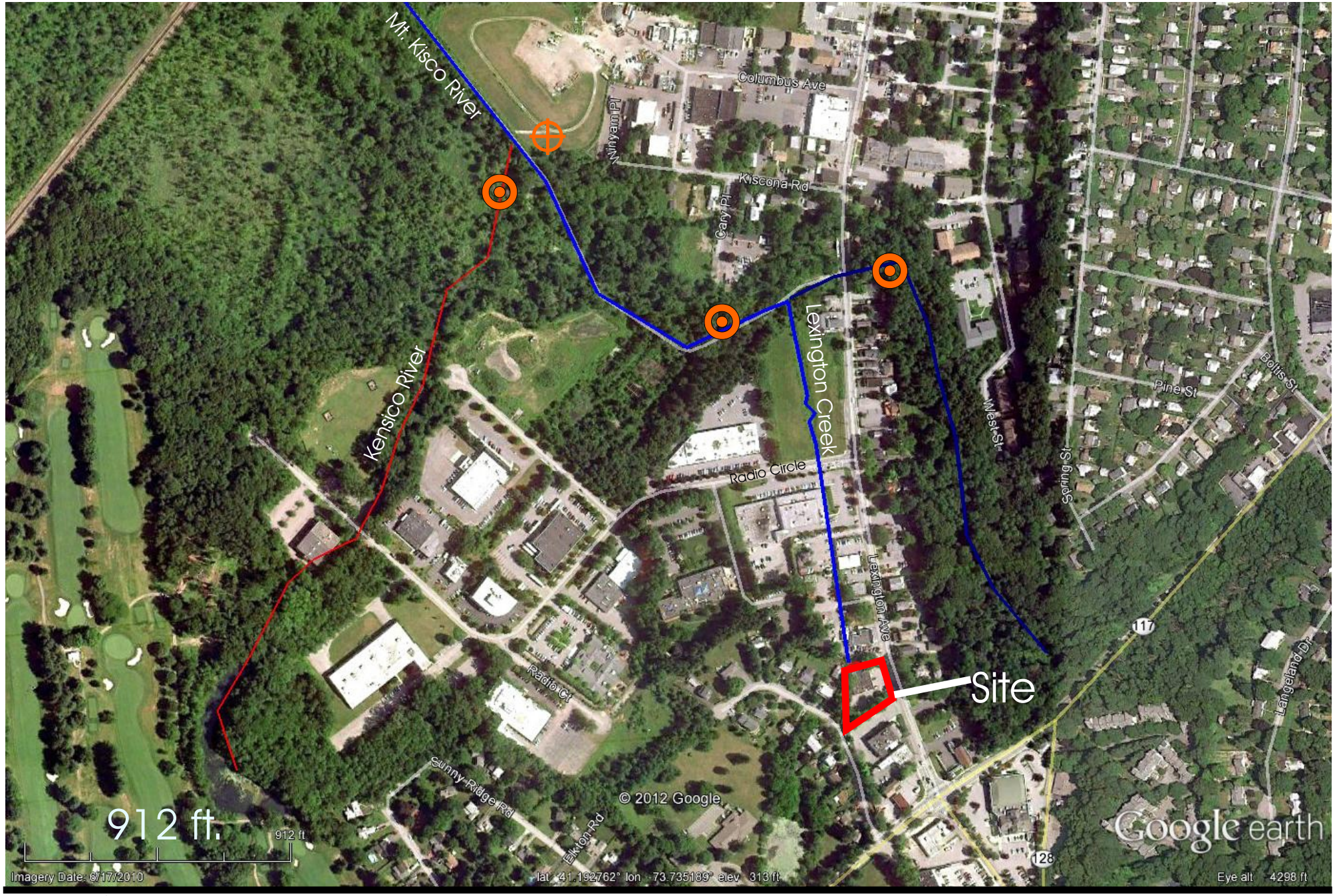

Figure-10

Additional Down Gradient Groundwater, Surface/Sediment Sample Locations

- Proposed Surface Water/Sediment Sampling Locations
- Proposed Groundwater Sampling Locations

Sample Method: EPA 624/8260 plus TICs

Supplemental Sampling Depths bgs: 5-9', 15-19', 27-31'

Matrix: Water and Soil (Sediment)

BEi **Berninger Environmental, Inc.**

groundwater consultants and geologists

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90-B Knickerbocker Ave. Bohemina ,NY 11716

Site: Rose Cleaners

Location: 500 Lexington Ave. Mt. Kisco, NY

Index #: W3-0978-03-12

Site #: 3-60-059

Berninger Environmental, Inc.

groundwater consultants and geologists

Phone:631-589-6521

90-B Knickerbocker Ave. Bohemina ,NY 11716

Drawn By: JGH

Well Log

Figure-11

Project: Rose Cleaners
Client: Leonard Rose
Location: Mt. Kisco, NY
Well No: MW-L **Use:** Monitoring
Drilling Method: Geoprobe direct push
Casing Type: PVC **Casing Dia:** 2" **Casing Length:** (1) 10' and (1) 5'
Screen Type: PVC **Screen Dia:** 2" **Screen Length:** (3) 5' sections
Screen Slot: .02" **Gravel Pack:** #2 Fil-pro
Casing Seal: Cement **Finish:** Cement flush

Date: TBA
Be Job No:
Driller: Butch
Bore Hole Dia: 3.5"
Sample Method: N/A
Depth to Water: 4'
Total Depth: 32'
Security: 5" Manhole

Depth Below Grade	Sample Information	Well Design	Identification/Remarks
0			5" Manhole cemented flush to grade
	Hydraulic Cement Seal		
			DTW
5			
			5' of 0.02" slot PVC screen
10			
	10' of 2" dia. PVC Sched. 40 Riser		
15			
20			5' of 0.02" slot PVC screen
			# 2Fil-Pro Gravel Pack Material
25			
	5' of 2" dia. PVC Sched. 40 Riser		
30			5' of 0.02" slot PVC screen
	Depth to bottom 32'		

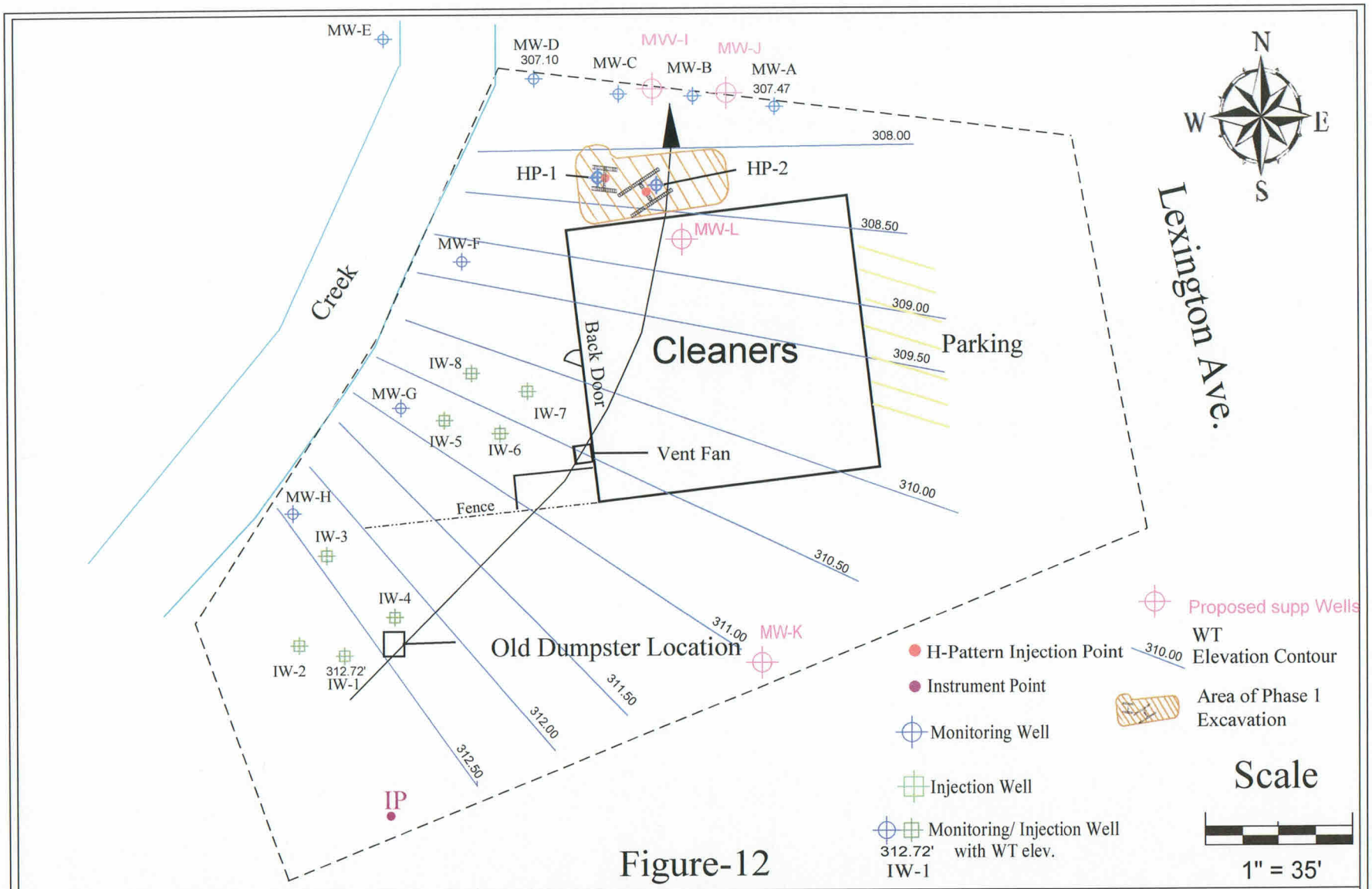


Figure-12

Groundwater Gradient Map	Rose Cleaners 500 Lexington Ave. Mt. Kisco, NY	BEi Berninger Environmental, Inc. groundwater consultants and geologists Phone:631-589-6521 90-B Knickerbocker Ave. Bohemina ,NY 11716

JGH

Appendix A

Site-Specific Health and Safety Plan for Work Activities

at

ROSE CLEANERS
500 Lexington Avenue
Mount Kisco, New York 10549
Site No.: 3-60-059
Index No.: W3-0978-03-12

PREPARED FOR

NEW YORK STATE DEPARTMENT OF
ENVIRONMENTAL CONSERVATION
625 BROADWAY
ALBANY, NEW YORK

PREPARED BY

BERNINGER ENVIRONMENTAL, INC.

February 2012

TABLE OF CONTENTS

FOREWORD

The Occupational Safety and Health Act (OSHA) implementing regulations of 29 CFR 1910.120 govern hazardous waste operations and emergency response. These regulations require that employers of employees involved in certain specific hazardous waste operations 1) develop and implement a written health and safety PROGRAM for employees involved in hazardous waste operations and 2) that the PROGRAM incorporate a site-specific health and safety plan.

Berninger Environmental, Inc. (BEI) has employees conducting activities which fall within the scope of these regulations, and thus, has in place a written health and safety PROGRAM as required. Its contents are contained in the BEI HAZWOPER Program Manual. Some activities conducted at the contaminated portion of the Rose Cleaners' facility may fall within the scope of these OSHA regulations. Thus, to assure regulatory compliance, this site-specific health and safety plan covering activities conducted at the contaminated portion of the Rose Cleaners' facility has been prepared. The Integrated Safety Management System (ISMS) and Environmental Safety, Health and Quality check lists will be used to define safe work procedures for work conducted in uncontaminated areas of the Rose Cleaners' facility.

The regulatory requirements for site-specific health and safety plans are found at 29 CFR 1910.120 (b)(4) and include ten specific elements which are designated with the letters A through J. Each of these elements is addressed in this health and safety plan for the Rose Cleaners' facility. Each element is listed below along with the section number where it is addressed in this health and safety plan.

	Health and safety plan ELEMENT	**SECTION NO. IN THIS PLAN**
A)	Health and safety risk hazard analysis	4.0
B)	Employee training assignments and requirements	6.1
C)	Personal protective equipment requirements	4.0, 5.4
D)	Medical surveillance requirements	6.2
E)	Frequency and types of monitoring required	4.0, 5.2
F)	Site control measures	5.3
G)	Decontamination procedures	4.0, 5.6
H)	Emergency response plan	5.7
I)	Confined space entry procedures	none (no confined space entry)
J)	Spill containment program	5.3

1.0 INTRODUCTION AND PROJECT DESCRIPTION

An Inactive Hazardous Waste Disposal Site (IHWDS) Investigation Work Plan (Work Plan) has been developed pursuant to the requirements of an executed Order of Consent (December 22, 2003) between the New York State Department of Environmental Conservation (NYSDEC), Division of Environmental Remediation (DER), and LRB Cleaners, Inc., the Respondent. The subject property is listed on the NYSDEC DER Registry of Inactive Hazardous Waste Disposal Sites in New York State as Site Number 3-60-059 with a Classification of "2" pursuant to ECL 27-1305. The site is located at 500 Lexington Avenue, Mt Kisco, New York, 10549, fully described as Dist. 80.64, Section 01, Lot 14. An IHWDS Investigation Work Plan was directed as part of the Order of Consent to determine the nature and extent of site contamination and off-site migration pathways in order to allow a decision by the NYSDEC DER regarding remedial action required to be undertaken at said site and/or off-site areas.

1.1 Purpose

The purpose of an IHWDS investigation is to:

- Determine the nature and delineate the areal and vertical extent of contamination in all media for each area of concern or emanating from the site;
- Delineate the surface and subsurface environmental media, including topography and depth to groundwater;
- Identify the source(s) of contamination, migration paths and actual or potential receptors of contamination on or through air, soil, sediment, groundwater, surface water, utilities and structures at the site without regard to property boundaries;
- Collect and evaluate all necessary data to evaluate the actual and potential impact to public health and the environment;
- Collect and evaluate information for a Fish and Wildlife Resource Impact Analysis (if necessary);
- Collect data to facilitate selection and design of remedial action alternatives; and
- Identify collected data needed for monitoring natural attenuation, potential feasible cleanup technologies and presumptive remedies.

This Site-Specific Health and Safety Plan (HASP) addresses the safety aspects of the spectrum of work activities to be conducted at the contaminated area(s). Activities at the contaminated area (but not the uncontaminated background area) fall under the scope of Code of Federal Regulations, 29 CFR 1910.120, *Hazardous Waste Operations and Emergency Response (HAZWOPER*). The purpose of this document is to establish overall site-specific health and safety guidelines to be followed by

all personnel conducting work at this site regardless of organizational affiliation. Work will be performed in accordance with requirements, as stipulated.

The levels of protection and procedures specified in this HASP are based on the best information available from historical data and recent evaluations of the area. Therefore, these recommendations represent the minimum health and safety requirements to be observed by all personnel engaged in work at the site. Unforeseeable site conditions, changes in scope of work or hazardous conditions not previously considered will warrant a reassessment of the protection levels and controls stated. Refer to Section 5.1 for requirements pertaining to field modifications and changes to the HASP.

2.0 SITE ORGANIZATION AND COORDINATION

Subsurface Investigation activities will be performed by BEI personnel. All work is performed under the direction of the Site Supervisor and support staff, all of whom are employed by BEI.

The following section describes the organizational structure for the subsurface investigation. Key personnel and their responsibilities are listed. Mr. Walter Berninger will be the Project Manager (PM), Mr. Justin Halpin will be the Site Supervisor (SS), Mr. Joel Meyers will serve as the Site Safety and Health Officer (SSHO) and Mr. Eusi Watkins will act as the Emergency Response Coordinator (ERC).

2.1 SITE SAFETY AND HEALTH OFFICER

The SSHO advises the Site Supervisor on health and safety issues and conducts briefings prior to initiation of site activities. The SSHO assesses the potential for worker exposures to hazardous agents, recommends appropriate hazard controls for protection of task site personnel and will require personnel to obtain immediate medical attention in the event of a work-related injury or illness. The SSHO ensures any necessary monitoring of potential chemical hazards is performed, reviews the effectiveness of monitoring and personal protective equipment and recommends upgrades or downgrades in protective health and safety measures. The SSHO ensures that appropriate fall protection measures are available and that needed work permits such as Radiological Work Permits (RWPs) are obtained. The SSHO notifies the Office of Radiation Protection when radiological support is required. The SSHO has stop work authority and advises emergency response personnel of an emergency. The SSHO authorizes the return to work following resolution of any health and safety hazards or other stop work issues. The SSHO ensures that this HASP is revised and approved if there are changes in site conditions or tasks. The SSHO will be available for consultation when required and will be aware of project-related work occurring on-site.

2.2 SITE SUPERVISOR

The Site Supervisor has primary responsibility for directing and managing all subsurface investigation field activities, including coordination with any support organizations. The Site Supervisor ensures that all on-site project personnel meet the required level of training, have reviewed the HASP and are instructed in safe work practices. The Site Supervisor also ensures that a qualified SSHO is designated, maintains a current copy of the HASP and documents field changes to the HASP in the project logbook. In addition, the Site Supervisor and staff perform oversight of field activities, maintain awareness of site operations and ensure that all project personnel adhere to ES&H requirements in order to prevent potential accidents from occurring.

The Site Supervisor is responsible for ensuring that the following five core functions of the Integrated Safety Management System (ISMS) are fulfilled appropriately:

- Define the work, roles and responsibilities. Allocate resources to ensure that research goals are balanced with safe work practices.

- Identify and analyze the hazards using the ESH&Q evaluation, consultation with subject

matter experts, material safety data sheet information, Work Smart Standards (WSS), lessons learned by other Principal Investigators (PIs) and staff and other resources.

- Develop and implement hazard controls tailored to the work being performed.

  - Resources include BEI staff, subject matter experts, the Hazardous Materials Inventory System, ESD Chemical Hygiene Plan, Division and project procedures, Training Needs Assessment process, Laboratory Operating Manuals, Laboratory Stewards and Lessons Learned and Alerts.
  - Examples of actions and tools include optimization of engineering controls and procedural approaches with training, HAZCOM job-specific training, job pre-briefings, compliance-based and project-specific training, ES&H permits (e.g., RWPs, Lockout/Tagout process) and protective equipment.

- Perform work within controls to ensure the work is done safely:

  - Communicate expectations to project staff.
  - Ensure that the controls identified in the ESH&Q evaluation and this HASP are carried out.
  - Ensure opportunity for procedure modification to respond to unanticipated situations.
  - Stop work if imminent danger exists.

- Provide feedback and continuous improvement:

  - Solicit feedback from project staff regarding ESH&Q issues and act on that input.
  - Communicate concerns to and seek help from supervisors and the ESH&Q group.
  - Reallocate resources to address issues that arise.
  - Ensure safety meetings and site briefings are performed.

2.3 PRINCIPAL INVESTIGATORS AND FIELD PROJECT PERSONNEL

PIs and field project personnel involved in on-site operations are responsible for understanding the intent of the principles of Integrated Safety Management and are to be knowledgeable of the processes in place to satisfy the intent of Integrated Safety Management.

Define the Scope of Work

- Understand the expectations they are to meet in their particular work assignment.
- Understand the responsibilities of the Site Supervisor and SSHO.
- Provide documentation of training to the Site Supervisor.

Identify and Analyze the Hazard

- Notify the SSHO of any special medical conditions (i.e., allergies, diabetes, etc.).
- Actively participate in identification of hazards prior to beginning work.
- Ensure that potential work hazards have been evaluated by subject matter experts and are accounted for in all work practices.

Develop and Implement Hazard Controls

- Seek the help of the SSHO and other subject matter experts, as appropriate, to analyze the hazards.
- Ensure that control strategies are developed and implemented, as appropriate, before work begins.
- Ensure safety measures are incorporated into activities (i.e., through HASP addendums or amendments, work aides or standard operating procedures).

Perform Work Within Controls

- Perform only those tasks that they believe they can do safely.
- Meet the responsibilities and safely perform the tasks that are delegated to them.
- Take all reasonable precautions to prevent injury to themselves and to their fellow employees; be alert to potentially harmful situations.
- Suspend work if unexpected concerns arise and modify plans to address concerns before resuming work.
- Comply with the work plan and HASP as well as postings and rules at the project site.

Provide Feedback and Continuous Improvement

- Keep the SSHO and Site Supervisor informed of any issues, problems or concerns regarding all aspects of their work.
- Notify appropriate Rose Cleaners' management personnel or the facility point of contact of any unsafe condition, violation, noncompliance or environmental threat discovered in a facility.
- Report to the SSHO any changes in site conditions that may affect health and safety .

- Immediately notify the SSHO of symptoms or signs of exposure potentially related to any chemical, physical or biological hazards present at the site and immediately report any accidents, injuries and/or unsafe conditions to the SSHO.
- If unsafe conditions develop, task site personnel are authorized and expected to stop work and notify the SSHO and Site Supervisor of the unsafe condition.

3.0 INTEGRATED SAFETY MANAGEMENT SYSTEM (ISMS)

The ISMS process systematically integrates safety into management and work practices at all levels so missions are accomplished while protecting the public, the worker and the environment. Direct involvement of workers during the development and implementation of safety management systems is essential for success. DOE requires that the principles of ISMS be implemented for all ORNL activities. Therefore, all BEI personnel are expected to incorporate the following basic ISMS core functions during all work activities:

- Defining the scope of work;
- Identifying and analyzing hazards associated with the work;
- Developing and implementing hazard controls;
- Performing work activities within these controls; and
- Providing feedback on the adequacy of the controls to continue improving safety management.

4.0 TASK SPECIFIC HAZARD EVALUATION AND CONTROLS

The purpose of this Subsurface Investigation hazard evaluation is to identify and assess potential hazards that personnel might encounter and to prescribe methods of hazard control. Historical site data provided in Appendix A gives the results of chemical analyses in shallow soils and adjoining surface water (creek) at the Rose Cleaners' property. Material Safety Data Sheets (MSDS) for chemicals that are likely to be handled when conducting field work are included in Attachment B.

A description of sampling procedures and the activities to be conducted at the Rose Cleaners site is described below.

4.1 WATER LEVEL MEASUREMENTS

Task Description: Manual water level measurements will be collected from any monitoring wells installed in order to determine current depth to groundwater in the area. These measurements are taken by lowering an electronic water level sounder down the well. As the sounder is brought out of the well the tip of the sounder that has been submerged is rinsed with distilled water to rinse off the groundwater. The rinse water is allowed to drip back down into the well.

Equipment and Materials: Equipment includes water level sounder.

Task Hazards and Controls:

- **Chemical and Radiological Hazards**

    - Groundwater Contact: Based on previously obtained sample data (only available for soils or surface water; no known groundwater contamination is present), the risk of chemical or radiological exposure from short-term exposure to groundwater and surface water samples is minimal. However, direct contact with contaminated materials should be avoided; therefore, disposable latex or nitrile gloves and safety glasses will be worn when conducting groundwater monitoring and during the handling of sample tubes to prevent eye and skin contact.

    - Downhole equipment: Rinse downhole equipment with distilled water as it is brought out of the well.

- **Physical Hazards**

  - Tripping/Falling: Precautions should be taken to avoid trip, slip and fall accidents when climbing irregular or slippery surfaces. Before changing location visually survey the area for slippery surfaces and tripping hazards.

  - Heat/Cold Stress: Wear clothing appropriate for environmental and weather conditions. Temperature extremes may be a hazard for consideration depending on the timing of the activity. Refer to Section 5.5 for discussion of recognition of symptoms and controls.

- **Biological/Vector Hazards**

  - Ticks/Snakes/Pathogens: Be cautious of snakes and vector carriers such as ticks. Check clothing and skin for ticks after walking in brush. Wash hands before eating and drinking.

- **Personal Protective Equipment Required to Address General Site Hazards**

  - Level of Protection: D
  - Protective Clothing: BEI-issued work clothes or disposable tyvek
  - Head Gear: Safety glasses
  - Gloves: Latex or nitrile (when conducting groundwater sampling or handling corrosive or oxidizing reagents)
  - Footwear: Sturdy work shoes

- **Monitoring Requirements**

  - None

4.2 FIELD SAMPLING AND ANALYSIS OF GROUNDWATER/SURFACE WATER

Task Description: Procedures for field sampling and analysis of groundwater and surface water are described in the Rose Cleaners' IHWDS Investigation Work Plan. Groundwater will generally be sampled with a peristaltic pump. Slow purge techniques will be used in order to reduce the disturbance caused by removal of large volumes of water from the system. Field parameters will be monitored until stable groundwater chemistry (e.g. specific conductance, pH, Eh, temperature, dissolved oxygen) readings are obtained on the Myron 6P Ultrameter among others. The purge water will be collected in DOT approved 55-gallon drums, if deemed to be necessary or discharged in proximity to the wellhead with regulatory approval. Upon completion of the project, the drum contents (if any) will be sampled and analyzed for disposal at an approved facility. Surface water will be collected via disposable dedicated polyethylene bailers and rope.

Samples will be handled and transported according to regulatory requirements and procedures outlined in the Rose Cleaners' IHWDS Investigation Work Plan. Samples will be preserved and

stored as required by the analytical protocols (e.g. cooled, preservative added). Storage on site may occur for short periods of time in ice chests containing "blue ice" but will be quickly transferred to refrigerator storage in the field laboratory or at the fixed base laboratory at the appropriate temperatures. All storage of contaminated samples will follow procedures and relevant regulations.

Equipment and Materials: Sampling equipment includes sampling tubing which is dedicated for each sample collected; peristaltic pump; filters and sample containers (for collecting samples); HACH meter and test kits (see Appendix B for reagent MSDSs). Some samples may be preserved with a few drops of nitric, hydrochloric or sulfuric acid. Calibration standards including pH and conductivity are also used.

Task Hazards and Controls:

- **Chemical and Radiological Hazards**

  - Groundwater Contact: Based on previously obtained sample data (only available for soils or surface water), the risk of chemical exposure from short-term exposure to groundwater or surface water is minimal. However, direct contact with contaminated materials should be avoided, therefore, disposable latex or nitrile gloves and safety glasses will be worn when conducting groundwater and surface water sampling to prevent eye and skin contact.

  - Reagent Contact: Corrosive or oxidizing reagents pose a contact hazard. To prevent eye and skin contact when corrosive or oxidizing reagents are used disposable latex or nitrile gloves and safety glasses will be worn.

- **Physical Hazards**

  - Tripping/Falling: Precautions should be taken to avoid trip, slip and fall accidents when climbing irregular or slippery surfaces. Before changing location visually survey the area for slippery surfaces and tripping hazards.

  - Heat/Cold Stress: Wear clothing appropriate for environmental and weather conditions. Temperature extremes may be a hazard for consideration depending on the timing of the activity. Refer to Section 5.5 for discussion of recognition of symptoms and controls.

- **Explosion Hazards**

  - Gas cylinders: Pressurized gas cylinders (if any) will be transported and handled in accordance with applicable Department of Transportation guidance and regulations. Care will be taken to secure the cylinders upright during transport to ensure they are not damaged. Cylinders will also be secured at the site so they will not tip over during the injection process.

- **Biological/Vector Hazards**

  - Ticks/Snakes/Pathogens: Be cautious of snakes and vector carriers such as ticks. Check clothing and skin for ticks after walking in brush. Wash hands before eating and drinking.

- **Personal Protective Equipment Required to Address General Site Hazards**

  - Level of Protection: D
  - Protective Clothing: BEI-issued work clothes or disposable tyvek
  - Head Gear: Safety glasses
  - Gloves: Latex or nitrile (when conducting groundwater sampling or handling corrosive or oxidizing reagents)
  - Footwear: Sturdy work shoes

- **Monitoring Requirements**

  - Air Quality: Air monitoring with an organic vapor analyzer or other suitable instrument will be performed during all groundwater or surface water sampling activities. A VOC ambient air monitoring result of 3ppm will trigger a warning response. If a detection of 5ppm VOC in ambient air is detected, the SSHO will suspend work and instruct the workers to move to a safe zone until such time the work zone is tested safe.

4.3 FIELD SAMPLING AND ANALYSIS OF SOIL/SOIL GAS/SEDIMENT

Task Description: Procedures for field sampling and analysis of subsurface soils, soil gas, vapors and sediment are described in the Rose Cleaners' IHWDS Investigation Work Plan. Soil samples and soil gas samples will generally be obtained by a discrete sampler by hand, Geoprobe direct push sampling rig or Hollow Stem Auger Drilling Rig. This method ensures dedicated, undisturbed samples protected in a PVC liner or split spoon sampler. Sediment samples will be collected via decontaminated stainless steel sludge or dredge sampler. Field testing for total volatile organic compounds (VOCs) in the breathing zone (work zone), as well as the downwind perimeter will be monitored by an HNu or Minirae portable Photoionization Detector (PID). The air monitoring action levels using PID readings cited in Section 8.0 - Community Air Monitoring Plan will be used to safeguard workers and observers during the implementation of the field investigation program.

Any discarded soil or sediments will be collected in DOT approved 55-gallon drums. Upon completion of the project, the drum contents will be sampled and analyzed for disposal at an approved facility. It may also be possible to replace the discarded soil back in the bore hole and/or sediment in the creek if approved by the regulators.

Samples will be handled and transported according to regulatory requirements and procedures outlined in the Rose Cleaners' IHWDS Investigation Work Plan. Samples will be preserved and

stored as required by the analytical protocols (e.g. cooled, preservative added). Storage on site may occur for short periods of time in ice chests containing "blue ice" but will be quickly transferred to refrigerator storage in the field laboratory or at the fixed base laboratory at the appropriate temperatures. All storage of contaminated samples will follow procedures and relevant regulations.

Equipment and Materials: Sampling equipment includes a Geoprobe direct push sampling rig for exterior sample locations and a weighted slide hammer for interior sample collection. A PVC liner is dedicated for each soil sample collected. Soil gas samples will be collected directly into and containerized in dedicated stainless steel summa canisters. A stainless steel sludge or dredge sampler will be used to collect discrete sediment samples from select areas along the adjoining creek.

Task Hazards and Controls:

- **Chemical and Radiological Hazards**

  - Soil or Sediment Contact: Based on previously obtained sample data, the risk of chemical exposure from short-term exposure to soil samples is minimal (See Appendix A); no data is available for sediment. However, direct contact with contaminated materials should be avoided, therefore, disposable latex or nitrile gloves and safety glasses will be worn when conducting soil and sediment sampling to prevent eye and skin contact.

- **Physical Hazards**

  - Tripping/Falling: Precautions should be taken to avoid trip, slip and fall accidents when climbing irregular or slippery surfaces. Before changing location visually survey the area for slippery surfaces and tripping hazards.

  - Heat/Cold Stress: Wear clothing appropriate for environmental and weather conditions. Temperature extremes may be a hazard for consideration depending on the timing of the activity. Refer to Section 5.5 for discussion of recognition of symptoms and controls.

- **Biological/Vector Hazards**

  - Ticks/Snakes/Pathogens: Be cautious of snakes and vector carriers such as ticks. Check clothing and skin for ticks after walking in brush. Wash hands before eating and drinking.

- **Personal Protective Equipment Required to Address General Site Hazards**

  - Level of Protection: D
  - Protective Clothing: BEI-issued work clothes or disposable tyvek
  - Head Gear: Safety glasses

  - Gloves: Latex or nitrile (when conducting groundwater sampling or handling

corrosive or oxidizing reagents)

- Footwear: Sturdy work shoes

- **Monitoring Requirements**

  - Air Quality: Air monitoring with an organic vapor analyzer or other suitable instrument will be performed during all soil sampling activities. A VOC ambient air monitoring result of 3ppm will trigger a warning response. If a detection of 5ppm VOC in ambient air is detected, the SSHO will suspend work and instruct the workers to move to a safe zone until such time the work zone is tested safe.

4.4 GEOPROBE BORINGS AND MONITORING WELL INSTALLATION

Task Description: Probe rods are installed by using a Geoprobe direct push rig which hydraulically pushes or hammers steel drive pipe into the ground (please refer to the Rose Cleaners' IHWDS Investigation Work Plan for a more complete description). Sections of probe rods are added (threaded attachment) until the desired depth is reached. A sampling tool is opened to obtain the soil or groundwater which then is retrieved. If desired, a small diameter well can then be constructed inside the hollow pipe as it is withdrawn from the ground or in the uncased hole after the drive pipe is removed completely. The drive point is left in the ground. Sampling equipment and probe rods are cleaned and decontaminated by detergent wash and potable water rinse. Hollow-stem augers and other drilling methods may also be used to install groundwater monitoring wells and/or to collect soil samples. These methods produce drill cuttings that will be collected in DOT approved 55-gallon drums. Upon completion of the project, the drum contents will be sampled and analyzed for disposal at an approved facility. It may also be possible to replace the discarded soil back in the bore hole if approved by the regulators.

Equipment and Materials: Equipment includes Geoprobe rig, drill rigs and associated equipment and support vehicles such as air compressors, pressure washers, generators, probe rod and well construction materials.

Task Hazards and Controls:

- **Chemical and Radiological Hazards**

  - Groundwater Contact: Based on previously obtained sample data, the risk of chemical exposure from short-term exposure to groundwater samples is minimal. However, direct contact with contaminated materials should be avoided, therefore, disposable latex or nitrile gloves and safety glasses will be worn when conducting groundwater sampling to prevent eye and skin contact.

  - Soil/cuttings Contact: Workers could be exposed to contaminated soil remaining on the probe rods as it is raised out of the ground. This hazard will be minimized by screening the drive pipe as it is raised out of the hole. Prior to removal from the site,

    all drill pipe, drill cuttings and any core samples collected will be scanned for VOC

contamination. An exclusion area will be set up around the drill rig to prevent entry by personnel that are not trained or wearing proper protection.

- **Physical Hazards**

  - Tripping/Falling: Precautions should be taken to avoid trip, slip and fall accidents when climbing irregular or slippery surfaces. Before changing location visually survey the area for slippery surfaces and tripping hazards. Operators will avoid accessing locations greater than six feet above ground. If it becomes necessary to perform work on the drill mast, the mast will be lowered prior to performing work.
  - Heat/Cold Stress: Wear clothing appropriate for environmental and weather conditions. Temperature extremes may be a hazard for consideration depending on the timing of the activity. Refer to Sect. 5.5 for discussion of recognition of symptoms and controls.
  - Abrasions, Scrapes and Sprains: Always use appropriate care when using tools and mechanical equipment. Maintain awareness of body and limb location and think ahead to probable body and object path before applying force to tools. Wear protective clothing as listed below. Drill rods, augers and tools will be properly stowed and restrained during transport. Support rails will have adequate strength to hold tools. Operators will avoid placing body parts at points of operation and/or pinch points.
  - Lifting: Use your legs to lift heavy objects, avoid awkward positions and twisting of the body and ask for assistance with awkward or heavy loads.
  - Mechanical Hazard: Working with drill rigs can result in injuries from equipment dislodging and striking unsuspecting personnel and from impacts due to flying objects or overturning vehicles. Therefore, follow these precautions:
    - ✓ Drill rig will be inspected visually before each use. If inspection reveals unsafe conditions, rig will be removed from service and repaired. Only qualified individuals shall make repairs to the drill rig.
    - ✓ Drill rig cabs will be kept free of all nonessential items and all loose items will be secured.
    - ✓ Drill rigs will be provided with necessary safety equipment.
    - ✓ Drill rig shall be properly maintained per manufacturer's recommendations. Only qualified individuals shall make repairs to the drill rig.
    - ✓ Parking brakes will be set before shutting off any heavy equipment or vehicle.
    - ✓ High pressure hoses will be secured to prevent "whipping" in the event of a failure.
    - ✓ Only competent individuals shall be allowed to operate the drill rig.
    - ✓ To minimize overhead hazards, wire cables will be inspected by the rig operator prior to use. Any frayed, kinked, marked or otherwise damaged cables will be taken out of service. Operator and other personnel in area during lifting of tools onto rig mast shall position themselves so that they are not under the load and/or between equipment.

  - Electrical Hazard: Of special concern to drilling operations is the possibility for conducting electricity through the drilling tower through either inadvertent contact with underground or overhead power lines or by lightning strikes. In addition, some

of the equipment used is operated by electricity. Unless safe work practices are observed, serious injury or death can result. Therefore, observe the following precautions:

- ✓ Treat all electrical wires and circuits as 'live" unless certain they are not.
- ✓ Always maintain a firm work base to prevent a loss of balance and potential fall onto energized busses or parts (which should be covered with a good electrical insulator such as a rubber blanket).
- ✓ All tools should have insulated handles, be electrically grounded or double insulated.
- ✓ Do not drill within 10 ft of an overhead power line that is 50 kV (or within 50 ft for > 50 kV) unless power to the line is first turned off for the duration of the drilling.
- ✓ Ground fault circuit interrupters will be used for electrical extension cords in use between a fixed electrical system (permanent outlet) and a tool.
- ✓ Prior to drilling have site representatives delineate location of underground power lines and other utilities.
- ✓ Do not drill within 25 ft of any known underground power line.
- ✓ Maintain a watch for electrical storms. If electrical activity appears to be imminent, cease drilling operations and evacuate the area around the drill rig. If time permits do not leave auger or drill string in the borehole.

- ▸ Noise: Unprotected exposure of site workers to noise from drilling activities can result in noise induced hearing loss. Hearing protection must be worn where noise levels are greater than 85 dBA. The SSHO will ensure that either ear muffs or disposable foam earplugs are made available to all personnel and are used by the personnel in the immediate vicinity of the drill rig.

- **Biological/Vector Hazard**

  - ▸ Ticks/Snakes/Pathogens: Be cautious of snakes and vector carriers such as ticks. Check clothing and skin for ticks after walking in brush. Wash hands before eating and drinking.

- **Personal Protective Equipment Required to Address General Site Hazard**

  - ▸ Level of Protection: D
  - ▸ Protective Clothing: BEI-issued work clothes or disposable tyvek
  - ▸ Head Gear
    - Hard hat required for drill rig operations; not required for steam cleaning and washing
    - Safety glasses or goggles required during drilling and decon operations
    - Ear muffs or disposable foam earplugs required in the vicinity of drill rig
  - ▸ Gloves: Leather work gloves over nitrile or latex gloves during drilling or decon operations
  - ▸ Footwear: Steel-toed work shoes

- **Monitoring Requirements**

  - ▸ Air Quality: Air monitoring with a PID or other suitable instrument will be

performed during all well installation activities. A VOC ambient air monitoring result of 3ppm will trigger a warning response. If a detection of 5 ppm VOC in ambient air is detected, the SSHO will suspend work and instruct the workers to move to a safe zone until such time the work zone is tested safe.

5.0 OTHER HEALTH AND SAFETY PLAN ELEMENTS

5.1 REVISIONS/ MODIFICATIONS TO THE HASP

The following actions will warrant revision and approval of this plan by the appropriate health and safety disciplines:

- Change in tasks (or previously unidentified tasks) that could impact employee health and safety.
- Changes in hazards (unknown or not previously addressed) which require a significant change in, or addition to, respiratory protection (as defined in exemptions to the plan modifications), physical/barrier protection features or other engineering controls.
- Occurrences as defined by DOE Order 232.1A.

5.1.1 Modifications allowed

The SSHO may upgrade PPE. These changes must be documented in the field logbook. The change and reason or evidence for the change must also be documented in the field logbook. For upgrades to include respiratory protection (including air-purifying and supplied air) for previously unidentified non-radiological issues or contaminants such as VOCs, the appropriate health and safety disciplines must be contacted. The SSHO will approve and document changes in PPE in the field logbook. Upgrades to include respiratory protection will require the SSHO to ensure workers have 40 Hour HAZWOPER Training and to assess any additional medical surveillance requirements.

5.2 MONITORING

Historical site data indicate that chemical exposure of site personnel is not a significant concern within the scope of this project. However as only limited site characterization has been performed, monitoring will be required for all field activities. Site monitoring requirements may change based on site conditions. All changes must be documented in the site logbook.

5.3 SITE AND SPILL CONTROL

Site access is available from public roads through the area and therefore will not be controlled to the general site. Based on the anticipated levels of contamination, formal barricaded work zones will not be established unless new monitoring data indicate the need for such barriers. An exclusion zone may be required for drilling operations and other field activities if required to reduce the accidental spread of hazardous substances from contaminated areas to clean areas. The SSHO will determine, as needed, the locations of the support zone, contamination reduction zone and the exclusion zone. Personnel accessing the zones must meet access requirements as stated in this plan.

5.4 PERSONAL PROTECTIVE EQUIPMENT

Level D protection is normally used when the potential for personnel contamination is low, as is the case with this project. Level D protection will include BEI-furnished clothing or disposable tyvek. Details and special requirements have been covered in the hazard control sections of the specific

tasks in Sect. 4 above. Unexpected new hazards will require a reassessment of the specified PPE.

5.5 TEMPERATURE EXTREMES AND SITE CHARACTERISTICS

The effect of temperature extremes on personnel is a primary hazard associated with the activities conducted at the site. Symptoms and controls related to temperature extremes are considered in detail in this section.

Field activities conducted during the summer or winter pose a hazard because of temperature extremes. Since the project site is located in a relatively open area, workers shall dress appropriately for environmental conditions, wearing clothing that provides reasonable protection against winter cold and summer sun. Although extreme physical exertion will not be likely within the scope of this project, during hot weather workers are encouraged to be aware of their own symptoms of heat stress (headaches, dizziness, increased heart rate), to drink plenty of water and to take breaks as needed. Heat stress symptoms, remedies and monitoring are discussed in Section 5.5.1. Cold exposure effects are discussed in Section 5.5.2.

Workers are also encouraged to apply insect repellant and/or sunscreen as needed prior to field activities. Workers should exercise caution by visually inspecting their immediate area of activity for presence of poisonous/harmful plant, insect and animal species as well as any hazard resulting from previous human activity.

5.5.1 Effects and Prevention of Heat Stress

If the body's physiological processes fail to maintain a normal body temperature because of excessive heat, a number of physical reactions can occur. They can range from mild symptoms such as fatigue, irritability, anxiety, and decreased concentration, dexterity, or movement, to death.

Heat-related health concerns can include the following:

- **Heat rash:** Caused by continuous exposure to heat and humid air and aggravated by chafing clothes. Decreases ability to tolerate heat and is a nuisance.
- **Heat cramps:** Caused by profuse perspiration combined with inadequate fluid intake and chemical replacement, particularly salts. Signs include muscle spasm and pain in the extremities and abdomen.
- **Heat exhaustion:** Caused by increased stress on various organs to meet increased demands to cool the body. Signs include shortness of breath; increased pulse rate (120-200 beats per minute); pale, cool, moist skin; profuse sweating; dizziness; and lassitude.
- **Heat stroke:** Is the most severe form of heat stress. Body must be cooled immediately to prevent severe injury and/or death. Signs include red, hot, dry skin; no perspiration; nausea; dizziness and confusion; strong, rapid pulse; and possibly coma. Medical help must be obtained immediately.

Medical attention must be obtained for the more serious symptoms of heat stress. One or more of the following methods are recommended to help reduce the potential for heat stress:

1. Provide plenty of liquids. To replace body fluids (water and electrolytes) lost due to sweating, use a 0.1 percent saltwater solution, more heavily salted foods, or commercial mixes. The commercial mixes may be preferable for those employees on a low-sodium diet.
2. Provide cooling devices to aid natural body ventilation. These devices, however, add weight, and their use should be balanced against worker efficiency.
3. Wear long cotton underwear, which acts as a wick to help absorb moisture and protect the skin from direct contact with heat-absorbing protective clothing.
4. Install mobile showers and/or hose-down facilities to reduce body temperature and cool protective clothing.
5. In extremely hot weather, conduct non-emergency response operations in the early morning or evening.
6. Ensure that adequate shelter is available to protect personnel against sun, heat, or other adverse weather conditions that decrease physical efficiency and increase the probability of accidents.
7. In hot weather, rotate workers wearing protective clothing.
8. Maintain good hygiene frequently changing clothing and showering daily. Clothing should be permitted to dry during rest periods. Workers who notice skin problems should immediately consult medical personnel.

5.5.2 Cold Exposure

Persons working outdoors in temperatures at or below freezing may suffer from cold exposure. During prolonged outdoor periods with inadequate clothing for protection, the effects of cold exposure may occur even at temperatures well above freezing. Cold exposure may cause severe injury due to freezing of exposed body surfaces (frostbite) or profound generalized cooling (hypothermia), possibly resulting in death. Areas of the body which have high surface area-to-volume ratios such as fingers, toes and ears are the most susceptible to frostbite.

Local injury resulting from cold is included in the generic term frostbite. There are several degrees of damage. Frostbite of the extremities can be categorized into:

- **Frost nip or incident frostbite:** characterized by sudden blanching or whitening of skin.
- **Superficial frostbite:** skin has a waxy or white appearance and is firm to the touch, but tissue beneath is resilient.
- **Deep frostbite:** tissues are cold, pale and solid; extremely serious injury.

Systemic hypothermia, or lowering of the core body temperature, is caused by exposure to freezing or rapidly dropping temperatures. Symptoms are usually exhibited in five stages: 1) shivering and loss of coordination; 2) apathy, listlessness, sleepiness and (sometimes) rapid cooling of the body to less than 95ºF (35ºC); 3) unconsciousness, glassy stare, slow pulse and slow respiratory rate; 4) freezing the extremities; and 5) death.

5.6 DECONTAMINATION

BEI will maintain on-site decontamination equipment such as a steam cleaner, potable water, alconox, pressure washer, water reservoir tank, and a wastewater transfer system and receiving tank. Groundwater, soil sampling and drilling equipment will be decontaminated between each boring, well installation, sampling event and prior to mobilization on or off site.

Decontamination of personnel shall be conducted only in the unexpected event that contamination is detected. At a minimum, personnel who have conducted work at the site will wash their hands prior to eating or drinking. BEI personnel shall supervise, assist and document incidents involving personnel contamination.

5.7 EMERGENCY PREPAREDNESS/RESPONSE

All emergency services can be reached by dialing 911 from any facility or mobile telephone. Access to phones and/or radios will be provided to on-site personnel. The Emergency Response Coordinator (ERC) will coordinate all emergency response operations.

Should evacuation from the site become necessary, the evacuation route to the hospital in the Village/Town of Mt. Kisco is shown in Figure 2. Emergency telephone numbers are given below.

Emergency Telephone Numbers

FIRE / POLICE 911

Town/Village of Mt. Kisco Fire Department
Union Hook & Ladder Co. No. 1
Town/Village of Mt. Kisco (914) 241-1100

Westchester County Police Department - (845)382-111
Town/Village of Mt. Kisco Water Department (914) 864-0020
Water & Sewer (914) 864-0021

Northern Westchester Hospital Center
400 East Main Street
Mount Kisco New York - (914) 666-1200

6.0 TRAINING/MEDICAL REQUIREMENTS

6.1 SITE-SPECIFIC HAZARD COMMUNICATION AND ACCESS BRIEFING

Since different training requirements may be needed based on the nature of different tasks to be performed, specific training requirements may be identified. However, generally applicable training requirements are presented here. Visitors not entering any exclusion zone or contamination reduction zone who have very limited potential for exposure to contaminants require:

- Site-specific hazard communication and access briefing.

All project personnel performing hands-on work that could potentially expose them to hazardous substances, safety, or health hazards will meet the following training requirements:

- General Employee Training (GET)
- 40 hour HAZWOPER (SARA/OSHA) training, or equivalent (Note: for certain types of low risk work, 24 hour training is acceptable)
- Current HAZWOPER 8-hour Annual Refresher (as applicable)
- Site-specific hazard communication and access briefing

In addition, the Site Safety and Health Officer requires:

- 8-hour HAZWOPER Supervisor training

Personnel involved in service or maintenance work on energized equipment require:

- Lockout/Tagout training

Prior to beginning work at the project site, all personnel will review this Health and Safety Plan and sign the training acknowledgment form (Appendix C). The site-specific hazard communication and access briefing is documented in the project logbook. If site conditions change, or other hazards are detected, the training and access requirements will be revised accordingly.

6.2 MEDICAL SURVEILLANCE

A medical surveillance program will be conducted in accordance with the requirements of 29 CFR 1910.120 for:

- All employees who are or may be exposed to hazardous substances or health hazards at or above the established permissible exposure limits or, if there is no permissible exposure limit, above the published exposure levels for these substances, without regard to the use of respirators, for 30 days or more a year.

- All employees who wear a respirator for 30 days or more a year or as required by 29 CFR 1910.134.
- All employees who are injured, become ill or develop signs or symptoms due to possible overexposure involving hazardous substances or health hazards from an emergency response or hazardous waste operation.

- Members of HAZMAT teams.

All BEI employees receive periodic medical examinations. Because of the low potential for exposure to hazardous agents, it is not expected that additional medical surveillance will be required for BEI personnel at the Rose Cleaners' facility. Non-BEI personnel will be required to acknowledge coverage by a medical surveillance program sufficient to satisfy the requirements of 29 CFR 1910.120 (Appendix C).

FIGURES

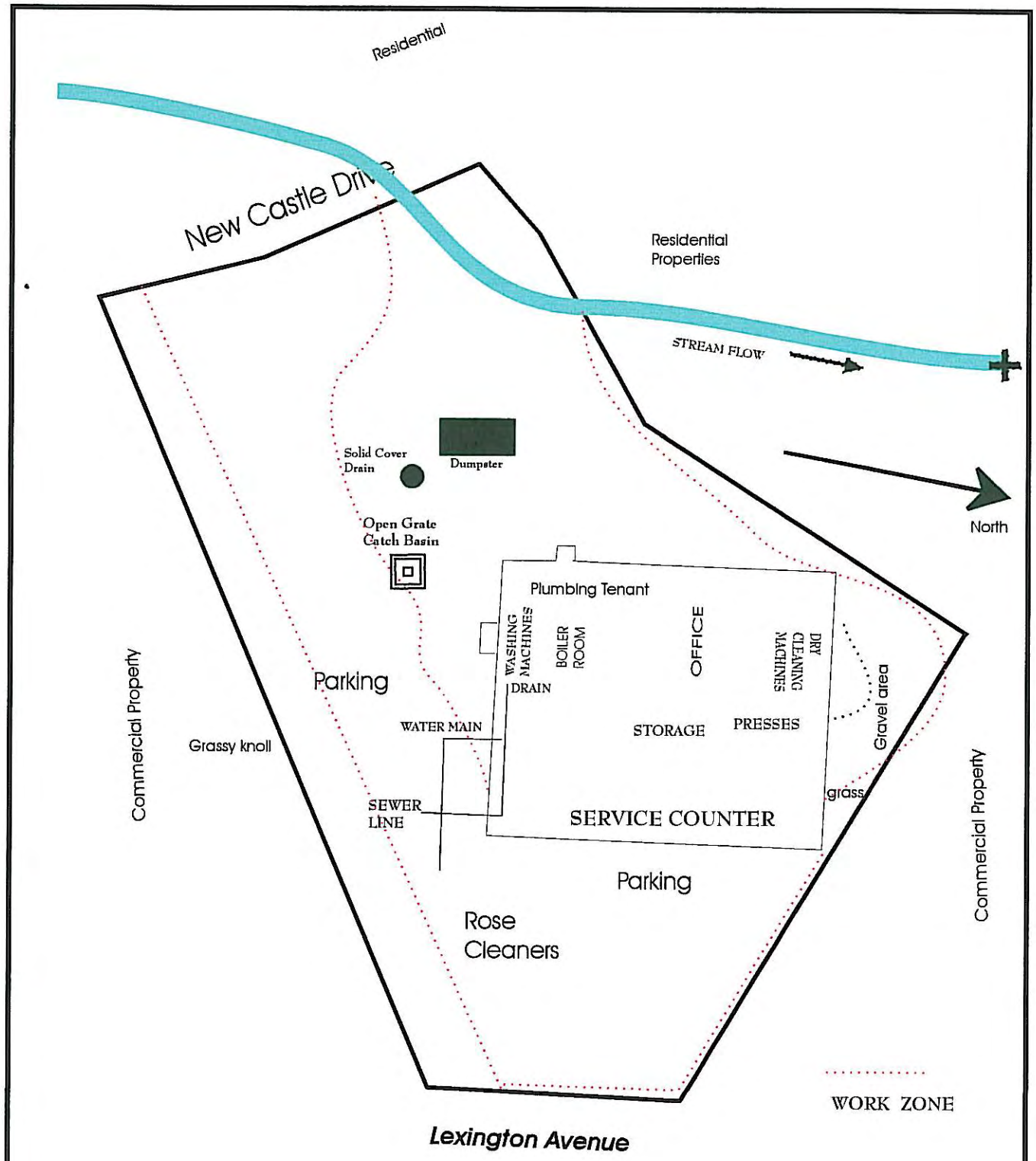


FIGURE 1 - HEALTH AND SAFETY WORK ZONES

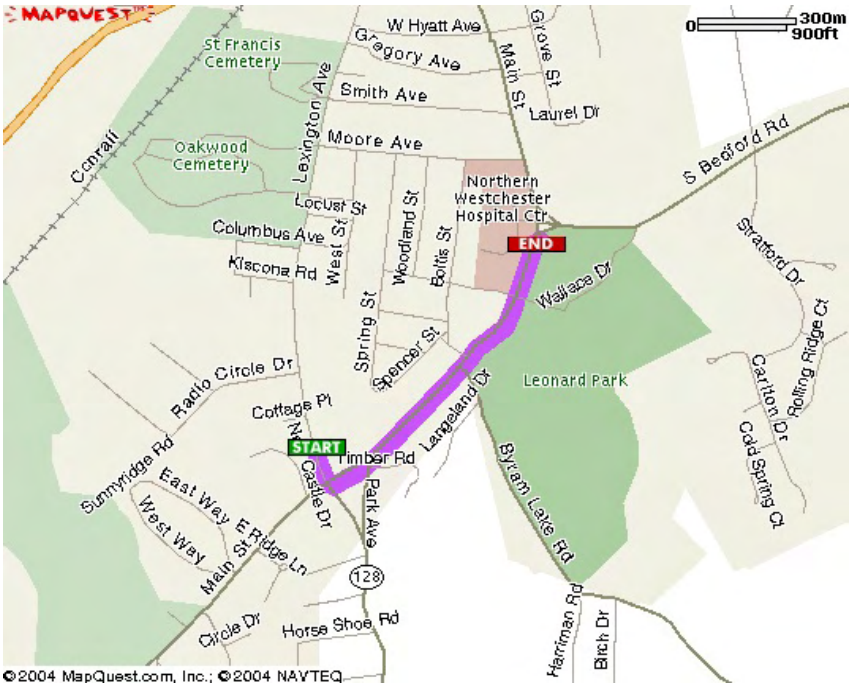


Figure 2 - EMERGENCY ROUTE TO NORTHERN WESTCHESTER HOSPITAL

1:	**: Start out going South on LEXINGTON AVE toward MAIN ST/NY-117/E MAIN ST.**	**<0.10 miles**
2:	**Turn LEFT onto MAIN ST/NY-117/E MAIN ST.**	**0.06 miles**
3:	**End at 400 E MAIN ST MOUNT KISCO NY**	
4:	**NY-32 becomes NY-32 Broadway.**	**0.30 miles**
5:	**Stay straight to go onto, Broadway.**	**0.5 miles**

TOTAL ESTIMATED TIME: 8 minutes

TOTAL DISTANCE: 2.4 miles

Appendix A

HISTORIC SITE DATA

SUMMARY OF PAST INVESTIGATIONS

Records available to Berninger Environmental, Inc. (BEI) indicate that on December 21, 2001, Tyree Brothers Environmental Services, Inc. (IBES) performed a limited subsurface investigation at the Rose Cleaners' facility. Two soil borings were manually drilled at the site with the locations chosen based on the presence of any exhaust piping and/or any location that would have the potential for chemical dumping.

Soil samples were collected at two locations; one directly adjacent to the stoop by the back door, at a depth of 2.5 to 3 feet, and one on the side of the building near the exhaust discharge piping at a depth of 3 to 4 feet. The increment with the highest photoionization detector reading was selected for laboratory analysis. PID readings ranged from 1.1 to 36.7 ppm PID response units. The samples were analyzed for volatile organic compounds via EPA method 8260.

The results of the laboratory analysis were compared to New York State Department of Environmental Conservation (NYSDEC) Determination of Soil Cleanup Objectives and Cleanup Levels, December 20, 2000.Laboratory results indicated that volatile organic compounds were detected in both of the soil samples. All concentrations in SB-I were within NYSDEC acceptable levels; tetrachloroethene was present at a concentration of 591 ug/kg. Sample SB-2 contained a concentration of one (1) compound (tetrachloroethene at 12,400 ug/kg) that exceeded NYSDEC soil guidelines of 1,400 ug/kg.

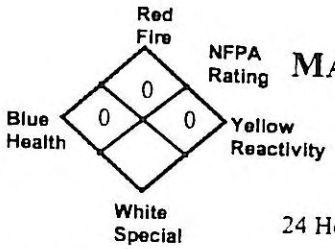
A surface water grab sample was also collected from a downstream location, between the dry cleaners and the adjacent commercial property, during the soil sampling program. This sample was hand delivered under chain of custody documentation to a New York State certified laboratory. The stream was located in back (west) of the dry cleaners. This sample was analyzed for volatile organic compounds via EPA method 8260. The results of the laboratory analysis were compared to the Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1, Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, April 2000,

Volatile organic compounds were also detected in the surface water sample taken from the stream. The stream sample contained concentrations of volatiles that exceeded NYSDEC surface water standards for two (2) compounds (cis-1,2- dichloroethene at 5.1 *u*g/L and tetrachloroethene at 9.3 *u*g/L). Due to the presence of concentrations of volatiles that exceeded NYSDEC standards for soil and surface water, Spill Number 01-09709 was assigned to this site.

Appendix B

MATERIAL SAFETY DATA SHEETS

Alconox ®



MATERIAL SAFETY DATA SHEET

Alconox, Inc.
30 Glenn Street
White Plains, NY 10603

24 Hour Emergency Number – Chem-Tel (800) 255-3924

I. IDENTIFICATION

Product Name (as appears on label)	ALCONOX
CAS Registry Number:	Not Applicable
Effective Date:	January 1, 2001
Chemical Family:	Anionic Powdered Detergent
Manufacturer Catalog Numbers for sizes	1104, 1125, 1150, 1101, 1103 and 1112

II. HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

There are no hazardous ingredients in ALCONOX as defined by the OSHA Standard and Hazardous Substance List 29 CFR 1910 Subpart Z.

III. PHYSICAL/CHEMICAL CHARACTERISTICS

Boiling Point (F):	Not Applicable
Vapor Pressure (mm Hg):	Not Applicable
Vapor Density (AIR=1):	Not Applicable
Specific Gravity (Water=1):	Not Applicable
Melting Point:	Not Applicable
Evaporation Rate (Butyl Acetate=1):	Not Applicable
Solubility in Water:	Appreciable-Soluble to 10% at ambient conditions
Appearance:	White powder interspersed with cream colored flakes.
pH:	9.5 (1%)

IV. FIRE AND EXPLOSION DATA

Flash Point (Method Used):	None
Flammable Limits:	LEL: No Data UEL: No Data
Extinguishing Media:	Water, dry chemical, CO_2, foam
Special Fire fighting Procedures:	Self-contained positive pressure breathing apparatus and protective clothing should be worn when fighting fires involving chemicals.
Unusual Fire and Explosion Hazards:	None

V. REACTIVITY DATA

Stability:	Stable
Hazardous Polymerization:	Will not occur
Incompatibility (Materials to Avoid):	None
Hazardous Decomposition or Byproducts:	May release CO_2 on burning

VI. HEALTH HAZARD DATA

Route(s) of Entry:	Inhalation? Yes Skin? No Ingestion? Yes
Health Hazards (Acute and Chronic):	Inhalation of powder may prove locally irritating to mucous membranes. Ingestion may cause discomfort and/or diarrhea. Eye contact may prove irritating.
Carcinogenicity:	NTP? No IARC Monographs? No OSHA Regulated? No
Signs and Symptoms of Exposure:	Exposure may irritate mucous membranes. May cause sneezing.
Medical Conditions Generally Aggravated by Exposure:	Not established. Unnecessary exposure to this product or any industrial chemical should be avoided. Respiratory conditions may be aggravated by powder.
Emergency and First Aid Procedures:	Eyes: Immediately flush eyes with water for at least 15 minutes. Call a physician. Skin: Flush with plenty of water. Ingestion: Drink large quantities of water or milk. Do not induce vomiting. If vomiting occurs administer fluids. See a physician for discomfort.

VII. PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to be Taken if Material is Released or Spilled:	Material foams profusely. Recover as much as possible and flush remainder to sewer. Material is biodegradable.
Waste Disposal Method:	Small quantities may be disposed of in sewer. Large quantities should be disposed of in accordance with local ordinances for detergent products.
Precautions to be Taken in Storing and Handling:	Material should be stored in a dry area to prevent caking.
Other Precautions:	No special requirements other than the good industrial hygiene and safety practices employed with any industrial chemical.

VIII. CONTROL MEASURES

Respiratory Protection (Specify Type):	Dust mask - Recommended
Ventilation:	Local Exhaust-Normal Special-Not Required Mechanical-Not Required Other-Not Required
Protective Gloves:	Impervious gloves are useful but not required.
Eye Protection:	Goggles are recommended when handling solutions.
Other Protective Clothing or Equipment:	None
Work/Hygienic Practices:	No special practices required

MSDS Number: A2052 • • • • • *Effective Date: 02/18/03* • • • • • *Supercedes: 02/21/00*

MSDS Material Safety Data Sheet

From Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300
National Response in Canada
CANUTEC: 613-996-6666
Outside U.S. And Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

ALCONOX®

1. Product Identification

Synonyms: Proprietary blend of sodium linear alkylaryl sulfonate, alcohol sulfate, phosphates, and carbonates.
CAS No.: Not applicable.
Molecular Weight: Not applicable to mixtures.
Chemical Formula: Not applicable to mixtures.
Product Codes: A461

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Alconox® proprietary detergent mixture	N/A	90 - 100%	Yes

3. Hazards Identification

Emergency Overview

CAUTION! MAY BE HARMFUL IF SWALLOWED OR INHALED. MAY CAUSE IRRITATION TO EYES AND RESPIRATORY TRACT.

J.T. Baker SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 1 - Slight
Flammability Rating: 0 - None
Reactivity Rating: 1 - Slight
Contact Rating: 2 - Moderate
Lab Protective Equip: GOGGLES; LAB COAT
Storage Color Code: Orange (General Storage)

Potential Health Effects

Inhalation:
May cause irritation to the respiratory tract. Symptoms may include coughing and shortness of breath.
Ingestion:
May cause irritation to the gastrointestinal tract. Symptoms may include nausea, vomiting and diarrhea.
Skin Contact:
No adverse effects expected.
Eye Contact:
May cause irritation, redness and pain.
Chronic Exposure:
No information found.
Aggravation of Pre-existing Conditions:
No information found.

VI. HEALTH HAZARD DATA

Route(s) of Entry:	Inhalation? Yes Skin? No Ingestion? Yes
Health Hazards (Acute and Chronic):	Inhalation of powder may prove locally irritating to mucous membranes. Ingestion may cause discomfort and/or diarrhea. Eye contact may prove irritating.
Carcinogenicity:	NTP? No IARC Monographs? No OSHA Regulated? No
Signs and Symptoms of Exposure:	Exposure may irritate mucous membranes. May cause sneezing.
Medical Conditions Generally Aggravated by Exposure:	Not established. Unnecessary exposure to this product or any industrial chemical should be avoided. Respiratory conditions may be aggravated by powder.
Emergency and First Aid Procedures:	Eyes: Immediately flush eyes with water for at least 15 minutes. Call a physician. Skin: Flush with plenty of water. Ingestion: Drink large quantities of water or milk. Do not induce vomiting. If vomiting occurs administer fluids. See a physician for discomfort.

VII. PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to be Taken if Material is Released or Spilled:	Material foams profusely. Recover as much as possible and flush remainder to sewer. Material is biodegradable.
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Precautions to be Taken in Storing and Handling:	Material should be stored in a dry area to prevent caking.
Other Precautions:	No special requirements other than the good industrial hygiene and safety practices employed with any industrial chemical.

VIII. CONTROL MEASURES

Respiratory Protection (Specify Type):	Dust mask - Recommended
Ventilation:	Local Exhaust-Normal Special-Not Required Mechanical-Not Required Other-Not Required
Protective Gloves:	Impervious gloves are useful but not required.
Eye Protection:	Goggles are recommended when handling solutions.
Other Protective Clothing or Equipment:	None
Work/Hygienic Practices:	No special practices required

Odor:
No information found.
Solubility:
Moderate (1-10%)
Specific Gravity:
No information found.
pH:
No information found.
% Volatiles by volume @ 21C (70F):
0
Boiling Point:
No information found.
Melting Point:
No information found.
Vapor Density (Air=1):
No information found.
Vapor Pressure (mm Hg):
No information found.
Evaporation Rate (BuAc=1):
No information found.

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.
Hazardous Decomposition Products:
Carbon dioxide and carbon monoxide may form when heated to decomposition.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
No information found.
Conditions to Avoid:
No information found.

11. Toxicological Information

No LD50/LC50 information found relating to normal routes of occupational exposure.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Alconox® proprietary detergent mixture	No	No	None

12. Ecological Information

Environmental Fate:
This product is biodegradable.
Environmental Toxicity:
No information found.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Not regulated.

15. Regulatory Information

--------\Chemical Inventory Status - Part 1\--------

Ingredient	TSCA	EC	Japan	Australia
Alconox® proprietary detergent mixture	Yes	No	No	No

--------\Chemical Inventory Status - Part 2\--------

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.
Alconox® proprietary detergent mixture	No	No	Yes	No

--------\Federal, State & International Regulations - Part 1\--------

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.
Alconox® proprietary detergent mixture	No	No	No	No

--------\Federal, State & International Regulations - Part 2\--------

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Alconox® proprietary detergent mixture	No	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: No Fire: No Pressure: No
Reactivity: No Pure / Solid

Australian Hazchem Code: None allocated.
Poison Schedule: None allocated.
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings: Health: **0** Flammability: **0** Reactivity: **0**
Label Hazard Warning:
CAUTION! MAY BE HARMFUL IF SWALLOWED OR INHALED. MAY CAUSE IRRITATION TO EYES AND RESPIRATORY TRACT.
Label Precautions:
Avoid contact with eyes.
Keep container closed.
Use with adequate ventilation.
Avoid breathing dust.
Wash thoroughly after handling.
Label First Aid:
If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of eye contact, immediately flush eyes with plenty of water for at least 15 minutes. In all cases, get medical attention.
Product Use:
Laboratory Reagent.
Revision Information:
MSDS Section(s) changed since last revision of document include: 8.
Disclaimer:
****
Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. MALLINCKRODT BAKER, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MALLINCKRODT BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.
****
Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

TRICHLOROETHYLENE

MSDS Number: T4940 — *Effective Date: 09/14/00*

1. Product Identification

Synonyms: Trichloroethene; TCE; acetylene trichloride; Ethinyl trichloride
CAS No.: 79-01-6
Molecular Weight: 131.39
Chemical Formula: C2HCl3
Product Codes:
J.T. Baker: 5376, 9454, 9458, 9464, 9473, 9474
Mallinckrodt: 8598, 8600, 8633

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Trichloroethylene	79-01-6	100%	Yes

3. Hazards Identification

Emergency Overview

WARNING! HARMFUL IF SWALLOWED OR INHALED. AFFECTS HEART, CENTRAL NERVOUS SYSTEM, LIVER AND KIDNEYS. CAUSES SEVERE SKIN

IRRITATION. CAUSES IRRITATION TO EYES AND RESPIRATORY TRACT. SUSPECT CANCER HAZARD. MAY CAUSE CANCER. Risk of cancer depends on level and duration of exposure.

J.T. Baker SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 3 - Severe (Cancer Causing)
Flammability Rating: 1 - Slight
Reactivity Rating: 1 - Slight
Contact Rating: 2 - Moderate
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES
Storage Color Code: Blue (Health)

Potential Health Effects

Inhalation:
Vapors can irritate the respiratory tract. Causes depression of the central nervous system with symptoms of visual disturbances and mental confusion, incoordination, headache, nausea, euphoria, and dizziness. Inhalation of high concentrations could cause unconsciousness, heart effects, liver effects, kidney effects, and death.

Ingestion:
Cases irritation to gastrointestinal tract. May also cause effects similar to inhalation. May cause coughing, abdominal pain, diarrhea, dizziness, pulmonary edema, unconsciousness. Kidney failure can result in severe cases. Estimated fatal dose is 3-5 ml/kg.

Skin Contact:
Cause irritation, redness and pain. Can cause blistering. Continued skin contact has a defatting action and can produce rough, dry, red skin resulting in secondary infection.

Eye Contact:
Vapors may cause severe irritation with redness and pain. Splashes may cause eye damage.

Chronic Exposure:
Chronic exposures may cause liver, kidney, central nervous system, and peripheral nervous system effects. Workers chronically exposed may exhibit central nervous system depression, intolerance to alcohol, and increased cardiac output. This material is linked to mutagenic effects in humans. This material is also a suspect carcinogen.

Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders, cardiovascular disorders, impaired liver or kidney or respiratory function, or central or peripheral nervous system disorders may be more susceptible to the effects of the substance.

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4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.
Ingestion:
Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Call a physician.
Skin Contact:
Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

Note to Physician:
Do not administer adrenaline or epinephrine to a victim of chlorinated solvent poisoning.

---

5. Fire Fighting Measures

Fire:
Autoignition temperature: 420C (788F)
Flammable limits in air % by volume:
lel: 8; uel: 12.5
Explosion:
A strong ignition source, e. g., a welding torch, can produce ignition. Sealed containers may rupture when heated.
Fire Extinguishing Media:
Use water spray to keep fire exposed containers cool. If substance does ignite, use CO2, dry chemical or foam.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Combustion by-products include phosgene and hydrogen chloride gases. Structural firefighters' clothing provides only limited protection to the combustion products of this material.

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6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! US Regulations (CERCLA) require reporting

spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from any source of heat or ignition. Isolate from incompatible substances. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
Trichloroethylene:
-OSHA Permissible Exposure Limit (PEL):
100 ppm (TWA), 200 ppm (Ceiling),
300 ppm/5min/2hr (Max)

-ACGIH Threshold Limit Value (TLV):
50 ppm (TWA) 100 ppm (STEL);
listed as A5, not suspected as a human carcinogen.

Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded and engineering controls are not feasible, wear a supplied air, full-facepiece respirator, airlined hood, or full-facepiece self-contained breathing apparatus. Breathing air quality must meet the requirements of the OSHA respiratory protection standard (29CFR1910.134). This substance has poor warning properties. Where respirators are required, you must have a written program covering the basic requirements in the OSHA respirator standard. These include training, fit testing, medical approval, cleaning, maintenance, cartridge change schedules, etc. See 29CFR1910.134 for details.

Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact. Neoprene is a recommended material for personal protective equipment.

Eye Protection:
Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:
Clear, colorless liquid.
Odor:
Chloroform-like odor.
Solubility:
Practically insoluble in water. Readily miscible in organic solvents.
Specific Gravity:
1.47 @ 20C/4C
pH:
No information found.
% Volatiles by volume @ 21C (70F):
100
Boiling Point:
87C (189F)
Melting Point:
-73C (-99F)
Vapor Density (Air=1):
4.5
Vapor Pressure (mm Hg):
57.8 @ 20C (68F)
Evaporation Rate (BuAc=1):
No information found.

---

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage. Will slowly decompose to hydrochloric acid when exposed to light and moisture.
Hazardous Decomposition Products:
May produce carbon monoxide, carbon dioxide, hydrogen chloride and phosgene when heated to decomposition.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Strong caustics and alkalis, strong oxidizers, chemically active metals, such as barium, lithium, sodium, magnesium, titanium and beryllium, liquid oxygen.
Conditions to Avoid:
Heat, flame, ignition sources, light, moisture, incompatibles

---

11. Toxicological Information

Toxicological Data:
Trichloroethylene: Oral rat LD50: 5650 mg/kg; investigated as a tumorigen, mutagen, reproductive effector.
Reproductive Toxicity:
This material has been linked to mutagenic effects in humans.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Trichloroethylene (79-01-6)	No	Yes	2A

12. Ecological Information

Environmental Fate:
When released into the soil, this material may leach into groundwater. When released into the soil, this material is expected to quickly evaporate. When released to water, this material is expected to quickly evaporate. This material has an experimentally-determined bioconcentration factor (BCF) of less than 100. This material is not expected to significantly bioaccumulate. When released into the air, this material may be moderately degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to have a half-life between 1 and 10 days.
Environmental Toxicity:
The LC50/96-hour values for fish are between 10 and 100 mg/l. This material is expected to be slightly toxic to aquatic life.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: TRICHLOROETHYLENE
Hazard Class: 6.1
UN/NA: UN1710

Packing Group: III
Information reported for product/size: 5GL

International (Water, I.M.O.)

Proper Shipping Name: TRICHLOROETHYLENE
Hazard Class: 6.1
UN/NA: UN1710
Packing Group: III
Information reported for product/size: 5GL

International (Air, I.C.A.O.)

Proper Shipping Name: TRICHLOROETHYLENE
Hazard Class: 6.1
UN/NA: UN1710
Packing Group: III
Information reported for product/size: 5GL

---

15. Regulatory Information

--------\Chemical Inventory Status - Part 1\--------

Ingredient	TSCA	EC	Japan	Australia
Trichloroethylene (79-01-6)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\--------

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.
Trichloroethylene (79-01-6)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\--------

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.
Trichloroethylene (79-01-6)	No	No	Yes	No

--------\Federal, State & International Regulations - Part 2\--------

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Trichloroethylene (79-01-6)	100	U228	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No
Reactivity: No (Pure / Liquid)

WARNING:

THIS PRODUCT CONTAINS A CHEMICAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

Australian Hazchem Code: No information found.
Poison Schedule: S6
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

---

16. Other Information

NFPA Ratings: Health: **2** Flammability: **1** Reactivity: **0**
Label Hazard Warning:
WARNING! HARMFUL IF SWALLOWED OR INHALED. AFFECTS HEART, CENTRAL NERVOUS SYSTEM, LIVER AND KIDNEYS. CAUSES SEVERE SKIN IRRITATION. CAUSES IRRITATION TO EYES AND RESPIRATORY TRACT. SUSPECT CANCER HAZARD. MAY CAUSE CANCER. Risk of cancer depends on level and duration of exposure.
Label Precautions:
Do not get in eyes, on skin, or on clothing.
Do not breathe vapor.
Keep container closed.
Use only with adequate ventilation.
Wash thoroughly after handling.
Keep away from heat and flame.
Label First Aid:
If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. In all cases call a physician. Note to physician: Do not administer adrenaline or epinephrine to a victim of chlorinated solvent poisoning.
Product Use:
Laboratory Reagent.
Revision Information:
MSDS Section(s) changed since last revision of document include: 8, 11.
Disclaimer:
****

Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. MALLINCKRODT BAKER, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A

PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MALLINCKRODT BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.

****

Prepared by: Strategic Services Division
Phone Number: (314) 539-1600 (U.S.A.)

Flammables-area.

**** SECTION 8 - EXPOSURE CONTROLS, PERSONAL PROTECTION ****

Engineering Controls:

Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low. Use adequate general or local explosion-proof ventilation to keep airborne levels to acceptable levels.

Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
1,1-Dichloroethane	100 ppm	100 ppm TWA; 400 mg/m3 TWA; see Appendix C (Chloroethanes) for supplementary exposure limits 3000 ppm IDLH	100 ppm TWA; 400 mg/m3 TWA

OSHA Vacated PELs:

1,1-Dichloroethane:
100 ppm TWA; 400 mg/m3 TWA

Personal Protective Equipment

Eyes:

Wear chemical goggles. Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin:

Wear appropriate protective gloves to prevent skin exposure.

Clothing:

Wear appropriate protective clothing to prevent skin exposure.

Respirators:

A respiratory protection program that meets OSHA's 29 CFR §1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant a respirator's use.

**** SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES ****

Physical State:	Liquid
Appearance:	clear colorless to very faint yellow
Odor:	None reported.
pH:	Not available.
Vapor Pressure:	244 mbar @ 20 C
Vapor Density:	3.41
Evaporation Rate:	Not available.
Viscosity:	Not available.
Boiling Point:	57 deg C @ 760.00mm Hg
Freezing/Melting Point:	-97 deg C
Autoignition Temperature:	660 deg C (1,220.00 deg F)
Flash Point:	-10 deg C (14.00 deg F)
NFPA Rating:	(est.) Health: 2; Flammability: 3; Reactivity: 0
Explosion Limits, Lower:	.16 vol %
Upper:	.06 vol %
Decomposition Temperature:	
Solubility:	0.5g/100ml
Specific Gravity/Density:	1.1770g/cm3
Molecular Formula:	C2H4Cl2
Molecular Weight:	98.96

**** SECTION 10 - STABILITY AND REACTIVITY ****

Chemical Stability:
Stable under normal temperatures and pressures.
Conditions to Avoid:
Incompatible materials, ignition sources, excess heat, strong oxidants.
Incompatibilities with Other Materials:
Oxidizing agents.
Hazardous Decomposition Products:
Hydrogen chloride, phosgene, carbon monoxide, irritating and toxic fumes and gases, carbon dioxide.
Hazardous Polymerization: Has not been reported.

**** SECTION 11 - TOXICOLOGICAL INFORMATION ****

RTECS#:
CAS# 75-34-3: KI0175000
LD50/LC50:
CAS# 75-34-3: Inhalation, rat: LC50 =13000 ppm/4H; Oral, rat: LD50 = 725 mg/kg.
Carcinogenicity:
1,1-Dichloroethane -
ACGIH: A4 - Not Classifiable as a Human Carcinogen
California: carcinogen; initial date 1/1/90
Epidemiology:
No information available.
Teratogenicity:
No information available.
Reproductive Effects:
No information available.
Neurotoxicity:
No information available.
Mutagenicity:
No information available.
Other Studies:
See actual entry in RTECS for complete information.

**** SECTION 12 - ECOLOGICAL INFORMATION ****

**** SECTION 13 - DISPOSAL CONSIDERATIONS ****

Chemical waste generators must determine whether a discarded chemical is classif as a hazardous waste.
US EPA guidelines for the classification determination are listed in 40 CFR Part Additionally, waste generators must consult state and local hazardous waste regu ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: CAS# 75-34-3: was a number U076.

**** SECTION 14 - TRANSPORT INFORMATION ****

US DOT
Shipping Name: 1,1-DICHLOROETHANE
Hazard Class: 3
UN Number: UN2362
Packing Group: II
Canadian TDG
Shipping Name: 1,1-DICHLOROETHANE
Hazard Class: 3
UN Number: UN2362
Other Information: FLASHPOINT -10 C

**** SECTION 15 - REGULATORY INFORMATION ****

US FEDERAL
TSCA

CAS# 75-34-3 is listed on the TSCA inventory.
Health & Safety Reporting List
CAS# 75-34-3: Effective Date: June 1, 1987; Sunset Date: June 1, 1997
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
CAS# 75-34-3: 4/12b
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.

SARA
Section 302 (RQ)
CAS# 75-34-3: final RQ = 1000 pounds (454 kg)
Section 302 (TPQ)
None of the chemicals in this product have a TPQ.
Section 313
This material contains 1,1-Dichloroethane (CAS# 75-34-3, 99%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 372.

Clean Air Act:
CAS# 75-34-3 is listed as a hazardous air pollutant (HAP).
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.

Clean Water Act:
None of the chemicals in this product are listed as Hazardous Substances under the CWA.
CAS# 75-34-3 is listed as a Priority Pollutant under the Clean Water Act.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:
None of the chemicals in this product are considered highly hazardous by OSHA.

STATE
1,1-Dichloroethane can be found on the following state right to know lists: California, New Jersey, Florida, Pennsylvania, Minnesota, Massachusetts.
The following statement(s) is(are) made in order to comply with the California Safe Drinking Water Act:
WARNING: This product contains 1,1-Dichloroethane, a chemical known to the state of California to cause cancer.
California No Significant Risk Level:
CAS# 75-34-3: no significant risk level = 100 ug/day

European/International Regulations
European Labeling in Accordance with EC Directives
Hazard Symbols: XN F
Risk Phrases:
R 11 Highly flammable.
R 22 Harmful if swallowed.
R 36/37 Irritating to eyes and respiratory system.
R 52/53 Harmful to aquatic organisms; may cause long-term adverse effects in the aquatic environment.
Safety Phrases:
S 9 Keep container in a well-ventilated place.
S 16 Keep away from sources of ignition - No smoking.
S 23 Do not inhale gas/fumes/vapour/spray.
S 28A After contact with skin, wash immediately with plenty of water.
S 33 Take precautionary measures against static discharges.
S 37 Wear suitable gloves.
S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S 61 Avoid release to the environment. Refer to special instructions/Safety data sheets.

WGK (Water Danger/Protection)
CAS# 75-34-3: 3
United Kingdom Occupational Exposure Limits
CAS# 75-34-3: OES-United Kingdom, TWA 200 ppm TWA; 823 mg/m3 TWA

CAS# 75-34-3: OES-United Kingdom, STEL 400 ppm STEL; 1650 mg/m3 STEL
Canada

CAS# 75-34-3 is listed on Canada's DSL/NDSL List.
This product has a WHMIS classification of B2, D2B.
CAS# 75-34-3 is not listed on Canada's Ingredient Disclosure List.
Exposure Limits

CAS# 75-34-3: OEL-ARAB Republic of Egypt
OEL-AUSTRALIA:TWA 200 ppm (810 mg/m3);STEL 250 pp (1010 mg/m3)
OEL-AUSTRIA:TWA 100 ppm (400 mg/m3)
OEL-BELGIUM:TWA 200 ppm (810 mg/m3);STEL 250 ppm (1010 mg/m3)
OEL-DENMARK:TWA 100 ppm (400 mg/m3)
OEL-FINLAND:TWA 100 ppm (400 mg/m3);STEL 250 ppm (1000 mg/m3)
OEL-FRANCE:TWA 200 ppm (810 mg/m3)
OEL-GERMANY:TWA 100 ppm (400 mg/m3)
OEL-JAPAN:TWA 100 ppm (400 mg/m3)
OEL-THE NETHERLANDS:TWA 200 ppm (820 mg/m3)
OEL-THE PHILIPPINES:TWA 100 ppm (400 mg/m3)
OEL-RUSSIA:TWA 100 ppm
OEL-SWITZERLAND:TWA 100 ppm (400 mg/m3);STEL 200 ppm (800 mg/m3)
OEL-THAILAND:TWA 50 ppm;STEL 100 ppm
OEL-TURKEY:TWA 100 ppm (400 mg/m3)
OEL-UNITED KINGDOM:TWA 200 ppm (810 mg/m3);STEL 400 ppm
OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA check ACGIH TLV
OEL IN NEW ZEALAND, SINGAPORE, VIETNAM check ACGI TLV

**** SECTION 16 - ADDITIONAL INFORMATION ****

MSDS Creation Date: 9/02/1997 Revision #5 Date: 8/02/2000

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no way shall the company be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if the company has been advised of the possibility of such damages.

1,2-Dichloroethane, 99.8+% (GC) ACROS96087

**** SECTION 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION ****

MSDS Name: 1,2-Dichloroethane, 99.8+% (GC)
Catalog Numbers:
AC113360000, AC113360010, AC113360025, AC113360250, AC113361000
Synonyms:
Ethylene Dichloride; 1,2- Ethylene Dichloride; Glycol Dichloride; Ethane 1,2-Dichloro-.
Company Identification (Europe): Acros Organics N.V.
Janssen Pharmaceuticalaan 3a
2440 Geel, Belgium
Company Identification (USA): Acros Organics
One Reagent Lane
Fairlawn, NJ 07410
For information in North America, call: 800-ACROS-01
For information in Europe, call: 0032(0) 14575211
For emergencies in the US, call CHEMTREC: 800-424-9300
For emergencies in Europe, call: 0032(0) 14575299

**** SECTION 2 - COMPOSITION, INFORMATION ON INGREDIENTS ****

CAS#	Chemical Name	%	EINECS#
107-06-2	1,2-DICHLOROETHANE	>99.8	203-458-1

Hazard Symbols: T F
Risk Phrases: 11 22 36/37/38 45

**** SECTION 3 - HAZARDS IDENTIFICATION ****

EMERGENCY OVERVIEW

Appearance: colourless. Flash Point: 58 deg F.
Warning! Flammable liquid. Causes respiratory tract irritation. May cause digestive tract irritation. Irritant. May be harmful if swallowed. May cause central nervous system depression. May cause liver and kidney damage. Causes eye and skin irritation. May cause cancer based on animal studies. Potential cancer hazard.
Target Organs: Kidneys, central nervous system, liver.

Potential Health Effects

Eye:

Causes eye irritation. Vapors may cause eye irritation. May cause chemical conjunctivitis and corneal damage.

Skin:

Causes skin irritation. May be absorbed through the skin. May cause irritation and dermatitis. May cause cyanosis of the extremities.

Ingestion:

May cause central nervous system depression, kidney damage, and liver damage. May cause gastrointestinal irritation with nausea, vomiting and diarrhea. May cause liver and kidney damage. May cause effects similar to those for inhalation exposure. May be harmful if swallowed.

Inhalation:

Inhalation of high concentrations may cause central nervous system effects characterized by headache, dizziness, unconsciousness and coma. Causes respiratory tract irritation. May cause liver and kidney damage. Aspiration may lead to pulmonary edema. Vapors may cause

dizziness or suffocation. Can produce delayed pulmonary edema. May cause burning sensation in the chest.

Chronic:

Possible cancer hazard based on tests with laboratory animals. Prolonged or repeated skin contact may cause dermatitis. Prolonged or repeated eye contact may cause conjunctivitis. May cause liver and kidney damage. Effects may be delayed.

**** SECTION 4 - FIRST AID MEASURES ****

Eyes:

Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

Skin:

Get medical aid. Flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.

Ingestion:

Never give anything by mouth to an unconscious person. Get medical aid. Do NOT induce vomiting. If conscious and alert, rinse mouth and drink 2-4 cupfuls of milk or water.

Inhalation:

Remove from exposure to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid. DO NOT use mouth-to-mouth respiration.

Notes to Physician:

Treat symptomatically and supportively.

**** SECTION 5 - FIRE FIGHTING MEASURES ****

General Information:

As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Vapors may form an explosive mixture with air. Vapors can travel to a source of ignition and flash back. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Will burn if involved in a fire. Use water spray to keep fire-exposed containers cool. Containers may explode in the heat of a fire. Flammable Liquid. Vapors may be heavier than air. They can spread along the ground and collect in low or confined areas. May polymerize explosively when involved in a fire.

Extinguishing Media:

For small fires, use dry chemical, carbon dioxide, water spray or alcohol-resistant foam. For large fires, use water spray, fog, or alcohol-resistant foam. Use water spray to cool fire-exposed containers. Water may be ineffective. Do NOT use straight streams of water.

**** SECTION 6 - ACCIDENTAL RELEASE MEASURES ****

General Information: Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks:

Absorb spill with inert material, (e.g., dry sand or earth), then place into a chemical waste container. Avoid runoff into storm sewers and ditches which lead to waterways. Clean up spills immediately, observing precautions in the Protective Equipment section. Remove all sources of ignition. Use a spark-proof tool. Provide ventilation. A vapor suppressing foam may be used to reduce vapors.

**** SECTION 7 - HANDLING and STORAGE ****

Handling:

Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Ground and bond containers when transferring material. Use spark-proof tools and explosion proof equipment. Avoid contact with eyes, skin, and clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep

container tightly closed. Avoid contact with heat, sparks and flame. Avoid ingestion and inhalation. Use with adequate ventilation. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames.

Storage:

Keep away from heat, sparks, and flame. Keep away from sources of ignition. Store in a tightly closed container. Keep from contact with oxidizing materials. Store in a cool, dry, well-ventilated area away from incompatible substances. Flammables-area.

**** SECTION 8 - EXPOSURE CONTROLS, PERSONAL PROTECTION ****

Engineering Controls:

Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local explosion-proof ventilation to keep airborne levels to acceptable levels.

Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
1,2-DICHLOROETHANE	10 ppm	1 ppm TWA; 4 mg/m3 TWA; NIOSH Potential Occupational Carcinogen - see Appendix A ; see Appendix C (Chloroethanes) for supplementary exposure limits Potential NIOSH carcinogen.	50 ppm TWA; C 100 ppm; C 100 ppm

OSHA Vacated PELs:

1,2-DICHLOROETHANE:

1 ppm TWA; 4 mg/m3 TWA

Personal Protective Equipment

Eyes:

Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin:

Wear appropriate protective gloves to prevent skin exposure.

Clothing:

Wear appropriate protective clothing to prevent skin exposure.

Respirators:

A respiratory protection program that meets OSHA's 29 CFR §1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant a respirator's use.

**** SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES ****

Physical State:	Liquid
Appearance:	colourless
Odor:	chloroform-like
pH:	Not available.
Vapor Pressure:	66 mm Hg @ 20 C
Vapor Density:	3.5 (Air=1)
Evaporation Rate:	0.3 (Butyl acetate=1)
Viscosity:	Not available.
Boiling Point:	181 deg F

Freezing/Melting Point:	-31.9 deg F
Autoignition Temperature:	775 deg F (412.78 deg C)
Flash Point:	58 deg F (14.44 deg C)
NFPA Rating:	(est.) Health: 2; Flammability: 3; Reactivity: 0
Explosion Limits, Lower:	6.2
Upper:	15.9
Decomposition Temperature:	Not available.
Solubility:	Silghtly soluble in water
Specific Gravity/Density:	1.26 (Water=1)
Molecular Formula:	C2H4Cl2
Molecular Weight:	98.934

**** SECTION 10 - STABILITY AND REACTIVITY ****

Chemical Stability:
Stable at room temperature in closed containers under normal storage and handling conditions.
Conditions to Avoid:
Incompatible materials, ignition sources, excess heat, electrical sparks.
Incompatibilities with Other Materials:
Aluminum, bases, alkali metals, ketones, organic peroxides, nitric acid, strong oxidizing agents, strong reducing agents, liquid ammonia.
Hazardous Decomposition Products:
Hydrogen chloride, carbon monoxide, irritating and toxic fumes and gases, carbon dioxide.
Hazardous Polymerization: Has not been reported.

**** SECTION 11 - TOXICOLOGICAL INFORMATION ****

RTECS#:
CAS# 107-06-2: KI0525000
LD50/LC50:
CAS# 107-06-2: Inhalation, rat: LC50 =1000 ppm/7H; Oral, mouse: LD50 = 413 mg/kg; Oral, rabbit: LD50 = 860 mg/kg; Oral, rat: LD50 = 670 mg/kg; Skin, rabbit: LD50 = 2800 mg/kg.
Carcinogenicity:
1,2-DICHLOROETHANE -
ACGIH: A4 - Not Classifiable as a Human Carcinogen
California: carcinogen; initial date 10/1/87
NIOSH: occupational carcinogen
NTP: Suspect carcinogen
OSHA: Possible Select carcinogen
IARC: Group 2B carcinogen
Epidemiology:
IARC Group 2B: Proven animal carcinogenic substance of potential relevance to humans. IARC Group 2B: No data available on human carcinogenicity, however sufficient evidence of carcinogenicity in animals.
Teratogenicity:
May cause decreased fertility and other adverse effects in pregnant female rats and the progeny of the first generation, but not of the second, by giving them repeated 4-hr/day exposures to 57 mg/m3. Death, Ihl-rat, TCLo=20100 ug/m3/1H (female 7-14D post); Stunted fetus, Oral-rat, TDLo=1260 mg/kg (6-15D preg) Developmental abnormalities: Craniofacial, Ihl-mouse, TCLo=100 ppm/7H (female 6-15D post); Musculoskeletal, Oral-rat, TDLo=1260 mg/kg (6-15D preg)
Reproductive Effects:
No information found.
Neurotoxicity:
No information found.
Mutagenicity:
No information found.
Other Studies:
See actual entry in RTECS for complete information.

**** SECTION 12 - ECOLOGICAL INFORMATION ****

Ecotoxicity:

The following statement(s) is(are) made in order to comply with the California Safe Drinking Water Act:
WARNING: This product contains 1,2-DICHLOROETHANE, a chemical known to the state of California to cause cancer.
California No Significant Risk Level:
CAS# 107-06-2: no significant risk level = 10 ug/day

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols: T F

Risk Phrases:

R 11 Highly flammable.
R 22 Harmful if swallowed.
R 36/37/38 Irritating to eyes, respiratory system and skin.
R 45 May cause cancer.

Safety Phrases:

S 53 Avoid exposure - obtain special instructions before use.
S 9 Keep container in a well-ventilated place.
S 16 Keep away from sources of ignition - No smoking.
S 33 Take precautionary measures against static discharges.
S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

WGK (Water Danger/Protection)
CAS# 107-06-2: 3

United Kingdom Occupational Exposure Limits

Canada

CAS# 107-06-2 is listed on Canada's DSL/NDSL List.
This product has a WHMIS classification of B2, D2B, D2A.
CAS# 107-06-2 is not listed on Canada's Ingredient Disclosure List.

Exposure Limits

CAS# 107-06-2: OEL-ARAB Republic of Egypt:TWA 5 ppm (2 mg/m3)
OEL-AUSTRALIA:TWA 10 ppm (40 mg/m3)
OEL-AUSTRIA:TWA 20 ppm (80 mg/m3)
OEL-BELGIUM:TWA 10 ppm (40 mg/m3)
OEL-DENMARK:TWA 1 ppm (4 mg/m3);Skin
OEL-FINLAND:TWA 10 ppm (40 mg/m3);STEL 20 ppm (80 mg/m3);CAR
OEL-FRANCE:TWA 10 ppm (40 mg/m3)
OEL-GERMANY;Carcinogen
OEL-HUNGARY:STEL 4 mg/m3;Carcinogen
OEL-JAPAN:TWA 10 ppm (40 mg/m3)
OEL-THE NETHERLANDS:TWA 50 ppm (200 mg/m3)
OEL-THE PHILIPPINES:TWA 50 ppm (200 mg/m3)
OEL-RUSSIA:TWA 10 ppm
OEL-SWEDEN:TWA 1 ppm (4 mg/m3);STEL 5 ppm (20 mg/m3);Skin;CAR
OEL-SWITZERLAND:TWA 10 ppm (40 mg/m3);STEL 20 ppm (80 mg/m3)
OEL-TURKEY:TWA 50 ppm (200 mg/m3)
OEL-UNITED KINGDOM:TWA 10 ppm (40 mg/m3);STEL 15 ppm (60 mg/m3)
OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA check ACGIH TLV
OEL IN NEW ZEALAND, SINGAPORE, VIETNAM check ACGI TLV

**** SECTION 16 - ADDITIONAL INFORMATION ****

MSDS Creation Date: 9/02/1997 Revision #4 Date: 8/02/2000

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no way shall the company be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if the company has been advised of the possibility of such damages.

Seton Resource Center

Allow access to non-virtual folders: 0

Appendix C

HEALTH AND SAFETY PLAN ACCEPTANCE
AND TRAINING ACKNOWLEDGMENT

Instructions: This form is to be completed by each person that works on the Rose Cleaners' IHWDS Investigation Work Plan site and returned to the Site Safety and Health Officer.

I have read and agree to abide by the contents of the SITE-SPECIFIC HEALTH AND SAFETY PLAN for work activities at the site. I have completed the training requirements specified in the plan. I am currently participating in a medical surveillance program that satisfies the requirements of CFR 1910.120.

Signature:	Date:
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Return to:

Site Safety and Health Officer or

Berninger Environmental, Inc.

1615 Ninth Avenue Bohemia, New York 11716

RAPID INTERVENTION

Certificate of Completion

JUSTIN HALPIN

Has Successfully Completed The Requirements Of Training For

Hazardous Waste Operations and Emergency Response–8 Hour Refresher Course

29 CFR/OSHA Part 1910.120

Dated this 1st Day of March, 2008

Director of Training

RAPID INTERVENTION

Certificate of Completion

WALTER BERNINGER

Has Successfully Completed The Requirements Of Training For

Hazardous Waste Operations and Emergency Response–8 Hour Refresher Course

29 CFR/OSHA Part 1910.120

Dated this 1st Day of March, 2008

Director of Training

RAPID

INTERVENTION

Certificate of Completion

JOEL MEYERS

Has Successfully Completed The Requirements Of Training For

Hazardous Waste Operations and Emergency Response–8 Hour Refresher Course

29 CFR/OSHA Part 1910.120

Dated this 1st Day of March, 2008

Director of Training

RAPID

INTERVENTION

Certificate of Completion

EUSI WATKINS

Has Successfully Completed The Requirements Of Training For

Hazardous Waste Operations and Emergency Response–8 Hour Refresher Course

29 CFR/OSHA Part 1910.120

Dated this 1st Day of March, 2008

Director of Training