Remedial Investigation Work Plan

MINUTE MAN CLEANERS
89 OCEAN AVENUE
EAST ROCKAWAY, NEW YORK

SUBMITTED TO:

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
BROWNFIELD CLEANUP PROGRAM

URS PROJECT NO. 38580332

August 23, 2006

Submitted By:
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INTRODUCTION

On behalf of Ben Ley Enterprises, Inc., URS Corporation – New York (URS) is pleased to submit this Remedial Investigation Work Plan (RIWP) for work to be performed at Minute Man Cleaners, located at 89 Ocean Avenue in East Rockaway, New York (the "Site") under New York State's Brownfield Cleanup Program. This RIWP incorporates the comments on the Draft RIWP received from the New York State Department of Environmental Conservation (NYSDEC) on June 26, 2006.

Ben Ley Enterprises (Ben Ley) has entered into the Brownfield Cleanup Program (BCP) with the NYSDEC as a participant to investigate and, where necessary, remediate contaminated soil and groundwater at Minute Man Cleaners (Minute Man), located in East Rockaway, New York (Figure 1).

SITE DESCRIPTION

The Site is 0.19 acres and occupied by an approximately 1,500 square foot one-story brick building currently operating as Minute Man Cleaners, a dry cleaning facility. The remainder of the Site is occupied by asphalt paved parking areas and small landscaped areas. The Site is located on the southeast corner of the intersection of Atlantic Avenue and Ocean Avenue in the Village of East Rockaway, Town of Hempstead, Nassau County, New York (Figure 1). The Site is located on Lot 1 and partially on Lot 2 of Block 69, Section 42. The Site is bordered to the north by Atlantic Avenue, to the west by Ocean Avenue, to the south by a restaurant, and to the east by a bulkhead portion of the Mill River. The bulkhead is composed of treated piles with treated wood siding and is, at a minimum, forty to fifty years old.

Prior to 1968, the Site was undeveloped. The Site was developed in 1968 for a pizzeria/restaurant (Pizza Hut) and connected to the public sewer system at that time. The Site was later used as a clothing store. The property was then purchased by Ben Ley in 1982 and has been used as a dry cleaning facility since 1982. There is one interior floor drain in the building (see Figure 3) that is likely connected to a sanitary sewer line.

A dry cleaning machine, which uses tetrachloroethene (PCE), has been in use at the Site since 1983. According to the owner of Minute Man, approximately half a dozen "acute" leaks of PCE occurred between 1983 and 1987 due to broken gaskets within the machine. At these times, spillage was observed underneath and behind the dry cleaning machine moving eastward towards the joint between the floor and the eastern wall of the facility, approximately three feet east of the dry cleaning machine. In 1987 all of the gaskets and cartridge tubes within the machine were replaced with new state of the art units for

that time. In March 2000, the machine was replaced with a new state-of-the-art unit and placed in the same location as the previous machine. No leaks have been observed since 1987.

ENVIRONMENTAL INVESTIGATION SITE HISTORY

Two (2) previous subsurface investigations were completed at the Site: (1) Investigation Services provided by Berninger Environmental, Inc. of Bohemia, New York (Berninger) dated February 1, 2005, and (2) Additional Investigation Services provided by Berninger dated February 28, 2005. Additionally, in May 2005, EEA Inc. of Garden City, New York (EEA) submitted a Brownfield Application to NYSDEC. The following is a summary of this previous work.

Initial Investigation (Berninger, February 1, 2005)

Two interior soil borings (GP-1 and GP-2) were completed between the dry cleaning machine and the eastern building wall. Boring locations are presented on Figure 2. According to the owner of the dry cleaner, the former dry cleaning machine was in the same location as the present machine and no chemicals were stored in other locations of the facility.

At both boring locations, the concrete floor was cored and the borings manually advanced with a Geoprobe® slide-hammer. One soil sample from one to six feet below grade and one groundwater sample from six to eight feet below grade were collected from each soil boring. Samples were analyzed for volatile organic compounds (VOCs); soil by EPA Method 8021/8260 and groundwater by EPA Method 601/624.

Tetrachloroethene (PCE), a common dry cleaning solvent, was detected in soil and groundwater in exceedance of NYSDEC guidelines, as follows:

Soil (units in ug/kg)	GP-1	GP-2	TAGM 4046
Tetrachloroethene	4,010	6,030	1,400

Groundwater (units in ug/l)	GP-1	GP-2	TOGS 1,1,1
Tetrachloroethene	47,300	48,200	5.0

Additional Investigation (Berninger, February 28, 2005)

An additional investigation included completion of eight additional soil borings (GP-3 through GP-10). Three of these borings, GP-3 through GP-5, were completed inside the building to the west, north and south of the dry cleaning machine. Five borings, GP-6 through GP-10, were completed outside of the building (generally the east side of the building). Boring locations are presented on Figure 2.

One soil sample was collected from each of the three indoor borings at a depth from surface grade to four feet below grade and groundwater samples were collected from the five outdoor borings from either six to eight, seven to nine, or nine to eleven feet below grade. Results show PCE concentrations in soil exceeding NYSDEC TAGM 4046 Recommended Soil Cleanup Objectives (RSCOs) in GP-3 through GP-5. PCE concentrations in groundwater exceeded NYSDEC Division of Water Technical and Operational Guidance Series (1.1.1.) Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations (TOGS) in each of the five borings completed outside of the cleaners. In addition, trichloroethene (TCE) was detected at a concentration exceeding TOGS in exterior boring GP-6, located immediately east of the dry cleaning machine, and vinyl chloride was detected at a concentration exceeding TOGS in GP-7 and GP-8, located outside the southeastern portion of the building. Based on results of both investigations, Berninger reported the findings to the NYSDEC on March 2, 2005 and spill number 04-12650 was opened for the Site. Spill No. 04-12650 was closed and the case was transferred to NYSDEC's Region 1 Bureau of Hazardous Waste Remediation.

The following is a summary of these data:

Soil (units in ug/kg)	Tetrachloroethene	Trichloroethene	TAGM 4046
GP-3	11,000	7.0	1,400 / 700
GP-4	7,000	9.4	1,400 / 700
GP-5	20,000	3.1	1,400 / 700

Groundwater (units in ug/l)	Tetrachloroethene	Trichloroethene	Vinyl Chloride	TOGS 1,1,1
GP-6	13,000	16	ND	5.0/5.0/2.0
GP-7	21	ND	15	5.0/5.0/2.0
GP-8	15	ND	26	5.0/5.0/2.0
GP-9	13	ND	ND	5.0/5.0/2.0
GP-10	31	ND	ND	5.0/5.0/2.0

Brownfield Application (EEA, May 16, 2005)

EEA submitted a Brownfield Application on behalf of Ben Ley Enterprises, Inc., owner of Minute Man Cleaners, as a participant in the Brownfield Cleanup Program. The application includes site description and site history, which are summarized above. Also noted is the adjacent and nearby land uses. Adjacent properties of potential concern include an automobile repair shop (formerly a gasoline filling station) to the north across Atlantic Avenue. According to a summary of historical atlas maps provided in the application, the property north of the Site was depicted as a filling station on maps from 1951, 1961, and 1969. Based on information provided in the application, it is unclear when the filling station became an auto repair shop.

SITE INVESTIGATION SCOPE OF WORK

Based on a review of previous environmental data collected at the Site, existing Site conditions, a tele-conference with NYSDEC on September 14, 2005 and comments received from NYSDEC, NYSDOH and NCDOH on the Draft RIWP dated June 26 and August 22, 2006, the following scope of work is proposed for the site investigation. The site investigation will be conducted in two phases, as follows:

- Phase A: soil gas survey, Geoprobe® borings, dry well sampling; and
- Phase B: river surface water and sediment sampling, bulkhead seepage sampling, monitoring well installation, site survey, monitoring well sampling, and potential indoor air sampling.

The Site work will follow health and safety procedures outlined in the Health and Safety Plan, included as Appendix A.

Prior to the commencement of field activities, URS will notify the NYSDEC, the NYSDOH and the NCDOH of the intent to begin work.

PHASE A

Soil Gas Survey

A soil gas survey will be conducted along the perimeter of the Site to investigate whether soil gas is potentially migrating to abutting properties.

Soil vapor samples will be collected in accordance with the *NYSDOH Draft Guidance for Evaluating Soil Vapor Intrusion in the State of New York* dated February 2005. Four soil vapor samples will be collected

using a Geoprobe® direct push soil sampling unit at perimeter locations of the Site. On-site utilities, including telephone, electric, natural gas, and sanitary sewer exit the southern end of the building and predominantly head west towards Ocean Avenue (Figure 3). Since utility corridors are potential migration pathways for soil vapor, one soil vapor sample will be collected on each side of the utility easement along the western perimeter of the Site adjacent to Ocean Avenue. In addition, one soil vapor sample will be collected at the northern boundary of the Site adjacent to Atlantic Avenue and one soil vapor sample will be collected at the southern boundary of the Site adjacent to the retail fish market / restaurant.

Temporary soil vapor probes will be constructed at each of the four locations. A drive point will be driven approximately four feet below grade with a Geoprobe® direct push soil sampling unit and porous backfill material will be used to create a one-foot sampling zone. The drive point will be fitted with ¼-inch polyethylene tubing and the probe will be sealed above the sampling zone with three feet of bentonite slurry.

Following temporary probe installation, one to three volumes of air will be purged prior to collection of the sample at flow rates not to exceed 0.2 liters per minute. Samples will be collected in laboratory-provided Summa® canisters. A tracer gas (e.g., helium) will be used when collecting samples to verify that the soil vapor sample has not been diluted by surface air. The tracer gas will be monitored with a portable monitoring device before and after collection of the sample.

A total of four soil vapor samples will be submitted to a NYSDOH ELAP-certified analytical laboratory for analysis. Soil vapor samples will be analyzed for VOCs by EPA Method TO-15. Laboratory analyses will be conducted in accordance with USEPA SW-846 methods and NYSDEC Analytical Services Protocol (ASP) B deliverable format.

Following soil vapor sample collection, boreholes will be grouted to surface grade. The surface will be patched with either asphalt or concrete to match surrounding surface conditions.

Geoprobe® Borings

Geoprobe® borings will be conducted at the Site to investigate subsurface lithology and to further assess the vertical and lateral extent of soil and groundwater contamination. Site-specific lithology is not known since the previous subsurface investigations completed by Berninger (February 1, 2005 and February 28, 2005) did not include boring logs or descriptions of the encountered lithology. Based on information provided in the Brownfield Application submitted by EEA, the Site is located at an elevation

of approximately five to six feet above mean sea level and is underlain by fine sands. URS expects that this sand (likely fill) layer beneath the building thickens eastward towards the bulkhead. The sand fill layer likely overlies finer grained sediments deposited by the former Mill River at depths within ten to twenty feet of surface grade. The potential presence of these finer grained paleochannel deposits may represent a confining, or semi-confining unit. The presence and lithology, continuity, and tilt of this potential confining unit will be assessed during this boring program.

Ten borings will be completed at the Site using the Geoprobe® direct push soil sampling unit. These borings will further assess and characterize the on-Site geology and extent of contamination. Eight borings will be completed to the top of the anticipated confining unit, expected between ten and twenty feet below grade. One boring will be completed through the confining unit outside the source area. Boring locations are presented on Figure 4. The following is a summary of boring locations:

- Four borings will be completed within the building: two along the eastern building wall, one west of the dry cleaning machine and one adjacent to the interior floor drain.
- Four borings will be completed outside the building: three borings will be completed between the building and the bulkhead and one boring will be completed along the southeastern perimeter of the Site.
- One deep boring will be completed in the northeast corner of the Site, outside of the source area.

Continuous soil samples will be collected using a 2-inch diameter by 4-foot long macrocore sampler to the top of the confining unit, anticipated at depths ranging from approximately 10 to 20 feet below grade. A macrocore piston point will be attached to the end of the sampler to control the interval at which the sample is being collected and prevent sampling of sloughed overlying soils. Soil collected in the macrocore sampler will be examined and logged by a URS geologist. The soil lithology, including grain size, color, moisture content, and presence of staining or odors will be classified using the Unified Soil Classification System (USCS). An analysis of the soil retrieved by the macrocore sampler via headspace screening will be screened for VOCs with a photoionization detector (PID). The headspace analysis will be conducted on a duplicate soil sample collected by the URS geologist exclusively for that purpose. The samples collected and submitted to the laboratory for analysis will not be screened with the PID since this may compromise the integrity of the sample. The borings will also be noted for evidence of staining or odors. Additionally, the PID will be used to monitor the work area within the building since this is an active dry-cleaning site. Measurements (including baseline readings) from this monitoring will be recorded in the field log.

Two soil samples will be collected from each boring for laboratory analysis based on our field observations and headspace analysis results: one from the vadose zone and one from the saturated zone. Based on Berninger's previous subsurface investigations, the saturated zone is above the anticipated confining unit (i.e., an unconfined aquifer). The groundwater table is anticipated at depths ranging from six to eight feet below grade depending on the stage of the tide. The sample chosen for laboratory analysis from the vadose zone will be based on elevated PID headspace readings or presence of staining or odors. In the absence of distinguishable characteristics, the soil sample collected immediately above the anticipated high tidal elevation of the water will be submitted to the laboratory for analysis. The sample chosen for laboratory analysis from the saturated zone will be collected immediately above the confining unit. An additional soil sample will be collected from below the confining unit in the deep boring. Soil samples will be collected with cleaned or disposable trowels, placed into laboratory prepared containers, stored in iced coolers, and delivered under chain-of-custody protocol to a laboratory. In addition, five quality control samples, including two soil duplicates and three equipment rinse blanks, will be collected.

A total of 24 samples, including two duplicate soil samples and three equipment rinse blank samples, will be submitted to a NYSDOH ELAP – certified analytical laboratory for analysis. Soil samples will be analyzed for VOCs using EPA Method 8260 plus tentatively identified compounds (TICS). Laboratory analyses will be conducted in accordance with USEPA SW-846 methods and NYSDEC ASP B deliverable format.

A grab groundwater sample will be collected above the confining unit in each boring. An additional grab groundwater sample will be collected from beneath the confining unit in the deep boring. Grab groundwater samples will be collected by advancing a SP15 screen point sampler with the Geoprobe® and utilizing disposable micro bailers. The SP15 screen point utilizes a screen with a standard slot size of 0.004 inches (0.1 mm) and an exposed screen length of 41 inches. Prior to sampling, the temporary geoprobe will be purged with a peristaltic pump. Groundwater samples will be placed into laboratory prepared containers, stored in iced coolers, and delivered under chain-of-custody protocol to a laboratory. In addition, three quality control samples, including two trip blanks and one duplicate groundwater sample, will be collected. One trip blank will be included for sample delivery to the lab; it is assumed two sample deliveries will be made.

A total of ten grab groundwater samples, plus two trip blanks and one duplicate groundwater sample, will be submitted to a NYSDOH ELAP – certified analytical laboratory for analysis. Groundwater samples will be analyzed for VOCs using EPA Method 8260 plus TICS. Laboratory analyses will be conducted in accordance with USEPA SW-846 methods and NYSDEC ASP B deliverable format.

Upon completion, boreholes will be pressure grouted to the surface through the Geoprobe® drilling rods. Drilling rods will be progressively lifted during grouting to ensure that boreholes are grouted from the bottom up. The surface will be patched with either asphalt or concrete to match surrounding surface.

During site reconnaissance, one floor drain inside the subject building was observed. This floor drain likely connects to the sanitary sewer via a grease trap system. During site investigations the connection to the sanitary sewer system will be verified via a dye test, if feasible. If it is determined that there is no connection to the sanitary sewer system or the connection could not be accurately determined, the proposed boring location adjacent to the drain location will be evaluated for evidence of contamination from this possible source.

Dry Well Sediment Sampling

Two shallow storm water dry wells exist on the Site. URS has determined that there are no discharge pipes associated with these shallow dry wells. URS will collect a sediment sample from inside each dry well using a decontaminated hand auger/AMS-type slide hammer sampler or a disposable trowel at a depth six to 12 inches below the sediment level in the dry well and placed into appropriate laboratory prepared containers. Dry well observations, such as staining, odor and sediment lithology will be recorded.

The sediment samples will be submitted to a NYSDOH ELAP – certified analytical laboratory for analysis. Sediment samples will be analyzed for VOCs using EPA Method 8260 plus TICS, total organic carbon, and grain size. Laboratory analyses will be conducted in accordance with USEPA SW-846 methods and NYSDEC ASP B deliverable format.

PHASE B

River Surface Water and Sediment Sampling

Sediment samples will be collected from the Mill River following collection and analysis of on-site soil and groundwater data from the Phase A assessment activities. The sediment samples will be collected from Mill River, 0 to 6-inches below ground surface (bgs) at two shallow borings and from 0 to 6 feet bgs over two foot increments at three deeper borings (five total borings). The shallow sediment samples will be collected with a hand auger/AMS-type slide hammer sampler or disposable polyethylene trowel during low tide from the top six inches of the sediment column immediately upstream and immediately

downstream of the Site. Three deeper sediment samples will be collected from the three, six-foot borings (one sample from each boring) in the sediment near the bulkhead at the Site, using a boat equipped with a slide hammer and Geoprobe rod apparatus. Thus, at least five sediment samples will be collected from the five borings. Sediment sample spacing will be determined based on soil and groundwater data collected during Phase A of the investigation.

The deeper sediment sample locations will be based on the findings of the soil and groundwater data on the upland side of the bulkhead, but will be collected immediately adjacent to and at two other locations approximately 10 to 20 feet further away from the bulkhead as to assess for potential horizontal migration. The three, two-foot increment samples from each deep boring will be headspace screened and the sample with the highest readings, visible staining or strongest odor will be collected for laboratory analysis.

The sediment samples will be placed into laboratory prepared containers, stored in iced coolers, and delivered under chain-of-custody protocol to a NYSDOH ELAP – certified analytical laboratory for analysis. Sediment samples will be analyzed for VOCs using EPA Method 8260 plus TICS, total organic carbon, and grain size. Laboratory analyses will be conducted in accordance with USEPA SW-846 methods and NYSDEC ASP B deliverable format.

Surface water samples will also be collected from Mill River. Three surface water samples will be collected: 1) upstream of Site, 2) downstream of Site, and 3) adjacent to Site's source area. Surface water samples will be collected using new disposable bailers during low tide. Disposable bailers will be lowered into the water from the western bank of Mill River, adjacent to the bulkhead. Water samples will be collected and decanted directly into the laboratory supplied bottle ware, stored on ice, and submitted under chain-of-custody procedures to a NYSDOH ELAP - certified analytical laboratory for analysis. A total of three surface water samples will be submitted for analysis. Surface water samples will be analyzed for VOCs using EPA Method 8260 plus TICS. Laboratory analyses will be conducted in accordance with USEPA SW-846 methods and NYSDEC ASP B deliverable format.

Bulkhead Seepage Water Sampling

A bulkhead water seepage sample will be collected at low tide directly from the bulkhead by identifying seepage water, if present, and capturing it in appropriate laboratory prepared bottles. Seepage water observations and field measurements will be recorded on a Sampling Record form. An OVA or PID measurement will be obtained by inserting the probe inside the sampling container and record the measurement on the sampling record. The headspace analysis will be conducted on a duplicate sample of

water retained by the URS personnel exclusively for that purpose. Alternatively URS can collect a seepage water sample at the one area of the canal where the bulkhead and sediment are exposed at low tide.

The seepage sample will be analyzed for VOCs using EPA Method 8260 plus TICS. Laboratory analyses will be conducted in accordance with USEPA SW-846 methods and NYSDEC ASP B deliverable format. The laboratory conducting the analysis will be NYSDOH ELAP certified.

Monitoring Well Installation

Following completion of the Geoprobe® boring program and analysis of soil and grab groundwater samples, permanent shallow and deep monitoring wells will be installed on-Site at locations based upon review of the Phase A data, but anticipated to be similar to the locations depicted in Figure 4. URS will install five well clusters composed of a shallow and deep monitoring well. Three of the five well clusters will be installed between the building and the bulkhead, east of the dry cleaning machine. The final locations of the two additional well clusters will be based on the soil and groundwater data collected during the Geoprobe® boring program. It is anticipated, however, that one well cluster will be installed in the northwest corner of the Site and the other southeast of the building along the bulkhead (Figure 4).

Monitoring wells will be installed with the Geoprobe® direct push soil sampling unit. A 3.25-inch outer diameter rod with an expendable point will be pushed to the desired depth and a 1-inch inner diameter and 2.5-inch outer diameter PVC prepacked screen with 0.010-inch slot size will be installed. Prepacked screens consist of slotted PVC well screen pipe surrounded by stainless steel mesh. Sand is packed between the slotted PVC and the stainless steel mesh. A one-inch blank PVC casing (i.e., riser) will be constructed from the top of the prepacked screen to approximately six-inches below grade. Two feet of standard Morie #1 sand will be placed above the screen and the annular space between the borehole and the blank casing will be pressure grouted to approximately one foot below grade. The monitoring well will be finished with a flush-mounted well box cover cemented into place. Following completion, the monitoring well will be developed by pumping until purged fluid is clear and free of sediment. Purged water will be containerized.

Each monitoring well cluster will consist of a shallow and deep monitoring well constructed approximately five-feet from one another. The deep monitoring well will be screened with a five-foot section of pre-packed screen directly above the top of the anticipated confining unit. The shallow monitoring well will be screened with a ten-foot screen length partially straddling the water table. Depth to the confining unit, if present, is unknown.

Following monitoring well construction and development, water levels in the monitoring wells will be gauged at the anticipated high and low tidal stages with a Solinst water level indicator with accuracy of 0.01-feet. Groundwater flow direction will be established via triangulation and potential vertical gradients will be established during synoptic well gauging events.

Site Survey

A New York State-licensed surveyor will survey soil vapor, boring, and monitoring well locations. The northing, easting, and vertical elevation coordinates will be surveyed at soil vapor and boring locations, including previous boring locations completed by Berninger (if able to ascertain in the field), to the nearest 0.01 foot. Similarly, elevations of the top of monitoring well casings and top of protective well casings for each monitoring well will be surveyed to the nearest 0.01 foot.

Monitoring Well Sampling

One round of groundwater samples will be collected from the monitoring well network.

Prior to sampling the well, a Solinst water level indicator with accuracy of 0.01-feet will be used to measure the depth to the water table. Total depth of the well will also be measured. Subsequently, initial field indicator parameters (i.e., pH, specific conductance, temperature, dissolved oxygen, and redox potential) will be measured using a Horiba U-22 water quality meter. Measurements will be recorded on groundwater sampling field forms.

After collecting initial indicator parameters, the monitoring well will be purged and sampled. A peristaltic pump with disposable polyethylene tubing for each well will be lowered to the center of the water column and at least three well volumes will be purged. Purging will be considered complete when at least three volumes of water contained in the monitoring well is purged and three consecutive measurements of indicator parameters meet the following criteria:

- Temperature readings do not vary by more than 1°C;
- Measurements of pH do not vary by more than 0.1 standard pH unit; and
- Specific conductance readings do not vary by more than 20 percent.

Following purging, a sample will be collected using a new disposable bailer. The sample will be collected as to minimize agitation/excitation of the samples. All sample containers should be filled with minimal turbulence by allowing the groundwater to flow gently down the inside of the container.

Groundwater samples will be placed in laboratory-supplied bottleware, stored on ice, and submitted under chain-of-custody procedures to a NYSDOH ELAP - certified analytical laboratory for analysis. A total of ten groundwater samples, plus two trip blanks, one duplicate sample, and one equipment rinsate blank sample, will be submitted to a NYSDOH ELAP – certified analytical laboratory for analysis. Groundwater samples will be analyzed for VOCs using EPA Method 8260 plus TICS. Laboratory analyses will be conducted in accordance with USEPA SW-846 methods and NYSDEC ASP B deliverable format.

Indoor Air (depending on the Phase A and Phase B findings)

Based on results of soil vapor, groundwater, and soil and sediment sample data, indoor air sampling and an associated sub-slab soil gas evaluation may be conducted through an addendum to this Work Plan.

COMMUNITY AIR MONITORING PLAN (CAMP)

Real-time air monitoring, on a routine and periodic basis, for VOCs and particulates will be conducted by URS personnel at the downwind perimeter of each work area during site activities. Monitoring for VOCs will be conducted continuously during ground intrusive activities (i.e., well installation, geoprobing) at the sample locations. The monitoring equipment will be calibrated daily, using an appropriate surrogate, and will calculate 15-minute running averages of VOC concentrations. The averages will be recorded and compared to an upwind value. Based on the downwind/upwind ratio, the following actions will be implemented:

- If the downwind value exceeds 5 parts per million (ppm) above background, work activities will be halted while monitoring continues. If the VOC level decreases below 5ppm over background, work activities will resume with continued monitoring.

- If the downwind VOC levels persist at levels greater than 5 ppm over background but less than 25 ppm, work activities will be halted, the source of vapors identified, corrective actions taken to abate emissions and monitoring continued. After these steps, work activities will resume if the VOC level 200 feet downwind of the work zone (or one half the distance to the nearest potential receptor, but not less than 20 feet) is less than 5 ppm over background.

- If the level of VOCs is greater than 25 ppm at the perimeter of the work area, all activities will be halted.

In addition to VOCs, particulates will also be monitored on a routine and periodic basis at the upwind and downwind perimeters of the work zone during work activities. The monitoring will be conducted utilizing a real-time PM-10 monitor capable of integrating over 15 minute periods and equipped with an audible alarm. Based on the downwind/upwind ration, the following actions will be implemented:

- If the downwind PM-10 level is 100 micrograms per cubic meter (mcg/m^3) greater than the background level for 15 minutes or if airborne dust is visible leaving the work area, the dust suppression techniques will be employed. Work will continue, with dust suppression ongoing, if levels do not exceed 150 mcg/m^3 above upwind levels or no visible dust is migrating from the work zone.

- If, after implementation of dust suppression techniques, downwind PM-10 levels are greater than 150 mcg/m^3 above the upwind levels, work will be halted and on-site personnel will re-evaluate work activities. Work will resume if dust suppression methods reduce the downwind concentration to within 150 mcg/m^3 of the upwind and prevent the migration of visible dust.

Readings will be recorded and available for DEC and DOH review.

WASTE MANAGEMENT

All investigation-derived wastes (IDW) generated during the site investigation will be containerized into 55-gallon DOT approved drums. IDW include soil cuttings generated during soil gas sample collection, boring completion, and monitoring well installation and groundwater from monitoring well development and purging. The drums will be labeled and staged in a secure area on Site as determined by URS and facility representatives. All IDW will be characterized and disposed according to environmental regulations following the site investigation.

QUALITY ASSURANCE PROJECT PLAN

This Quality Assurance Project Plan ("QAPP") has been prepared to provide a mechanism of control and evaluation of the quality of the sampling and analytical data to be acquired throughout the course of the remedial investigation as proposed in the RIWP for the Minute Man Cleaners Site.

The objectives of the RIWP are to present the remedial investigation elements and activities that are proposed for implementation at the subject site as they relate to the BCP administered by the NYSDEC. As a participant in the BCP, the responsible party is required to investigate and, where necessary, remediate contaminated soil and groundwater at the subject site.

Project Organization And Responsibilities

Specific members of the project team have been designated to enhance the collection of valid measurements and for routine assessment of precision and accuracy.

Project Team		
Project Manager	Bob Wolff	212.609.8128
Project Quality Assurance Officer	Margaret Halasnik	908.709.3927
Field Operations Supervisor	Claire Burns	212.609.8099
Field Operations Supervisor	Pete Reynolds	973-812-6834

The following provides a summary of the project team qualifications and lines of responsibility.

Project Management

The Project Manager will help to oversee the work activities and development of the project plans and implement these plans through the remedial investigation stages that are authorized by Ben Lay Enterprises, Inc. The Project Manager is responsible for directly managing daily project activities, budgets and project milestones and providing coordination among personnel, the project's laboratory, and other subcontractors (drillers, surveyors, etc.) that may be required during the course of the field investigation. The Project Manager will provide day-to-day communication and reporting with field staff and subcontractors.

Quality Assurance Officer

The Project Quality Assurance Officer, Margaret Halasnik, is responsible for the validation of both field and laboratory measurements. The Quality Assurance Officer will perform periodic assessments of the data and procedures such that the work is being performed to the standards specified in the project plans. The Quality Assurance Officer will implement corrective action upon identification of problems through standard QC data reviews.

The Quality Assurance Officer will serve as the primary laboratory contact for laboratory QA matters and will respond to QA needs and address QA problems. Appendix B contains the Quality Assurance Officer's Resume. Other technical staff members will provide support as required to meet project objectives.

Field Operations Supervisors

The Field Operations Supervisors will be responsible for supervising field-work. He/she will be on-site for field investigation work and will oversee proper collection and recording of data, as well as management of subcontractor's activities (drillers, etc.). The subcontractor's staff will be responsible for implementing high quality subcontracted services in accordance with project requirements.

Subcontractors

The following is a summary of the anticipated subcontractors that will be used to implement the tasks outlined in this RIWP:

Role	Name	Address	Contact
Driller	Zebra Environmental Corporation	30 N. Prospect Avenue, Lynbrook, NY 11563	David Vines (516) 596-4422
Analytical Laboratory	Severn Trent Laboratories, Inc.	777 New Durham Road Edison, NJ 08817	Sarah Chen (732) 549-3900

Sampling Procedures

Each phase of the field investigation is subject to QA/QC controls. Sampling methods, sample preservation requirements, decontamination procedures for field equipment and field QA/QC will conform to the methods specified in this QAPP. Field investigation activities that may be required include:

- Soil Gas Survey
- Geoprobe® Borings
- Sediment Sampling (under water)
- Surface Water Sampling
- Bulkhead Seepage Sampling
- Monitoring Well Installation and Sampling

Table 1, The Quality Assurance Project Plan Summary, summarizes the scope of work and includes a description of the sample locations, the number of samples to be collected, sampling methods, QA/QC samples, holding times, preservative type, bottle types, and methods for sample analysis.

Detailed procedures for implementing each of these tasks are provided below.

Soil Gas Survey

The following provides guidelines and procedures for determining the soil gas concentrations, if any, of un-saturated soils beneath the Site by conducting a soil gas survey. Soil vapor probe locations are presented on Figure 4.

Temporary soil vapor probes will be constructed at each sampling location. A drive point will be driven four feet below grade with a Geoprobe® direct push soil sampling unit and porous backfill material will be used to create a one-foot sampling zone. The drive point will be fitted with ¼-inch polyethylene tubing and the probe will be sealed above the sampling zone with three feet of bentonite slurry. Following temporary probe installation, one to three volumes of air will be purged prior to collection of the sample at flow rates not to exceed 0.2 liters per minute. Samples will be collected in laboratory-provided Summa® canisters. A tracer gas (e.g., helium) will be used when collecting samples to verify that the soil vapor sample has not been diluted by surface air. The tracer gas will be monitored with a portable monitoring device before and after collection of the sample.

Labels will be affixed to the Summa® canisters with the following information:

- Company Name.
- Sample Identification Number
- Sample date and time.
- Project Location.

The samples will be placed in a cooler packed with ice or an ice pack to maintain a temperature of 4°C. As the samples are placed in the cooler, they will be recorded on the Chain-of-Custody Form. After placing the Chain-of-Custody Form inside a plastic bag and taping it to the inside top of the cooler, the cooler will be taped shut using strapping tape and chain-of-custody seals. The cooler will be stored in a cool location for temporary storage before transport. The coolers will be transported to the laboratory within 24 hours of collection of samples. The laboratory will be notified by the project manager in a timely manner of the impending arrival of the samples. The laboratory will be prepared to receive the sample and perform preliminary extractions or analyses within the applicable holding times.

Soil vapor samples will be analyzed for VOCs by EPA Method TO-15. Laboratory analyses will be conducted in accordance with USEPA SW-846 methods and NYSDEC Analytical Services Protocol B deliverable format.

Following soil vapor sample collection, boreholes will be grouted to surface grade. The surface will be patched with either asphalt or concrete to match surrounding surface conditions. Field personnel will prevent cross-contamination from one sampling point to another by steam-cleaning all sampling equipment before and after drilling each vapor probe location.

Geoprobe® Borings

Geoprobe® borings will be conducted at the Site to investigate subsurface lithology and to further assess the vertical and lateral extent of soil and groundwater contamination. Borings will be completed at the Site using the Geoprobe® direct push method. Boring locations are presented on Figure 4.

Continuous soil samples will be collected using a 2-inch diameter by 4-foot long macro core sampler. A macro core piston point will be attached to the end of the sampler to control the interval at which the sample is being collected and prevent sampling of sloughed overlying soils. Soil collected will be classified using the Unified Soil Classification System (USCS). Headspace analysis of the soil samples will be screened for VOCs with a photoionization detector (PID).

Soil samples will be collected with cleaned or disposable trowels and placed into laboratory prepared containers. Labels will be affixed to the containers with the following information:

- Company Name.
- Sample Identification Number
- Sample date and time.
- Project Location.

The sample containers will be packaged, handled, recorded and transported to the analytical laboratory using the procedures previously described in the Soil Gas Survey Section.

Soil samples will be analyzed for VOCs using EPA Method 8260 and tentatively identified compounds (TICS). Laboratory analyses will be conducted in accordance with USEPA SW-846 methods and NYSDEC ASP B deliverable format. The laboratory conducting the analysis will be NYSDOH ELAP certified.

Grab groundwater samples will also be collected from each Geoprobe® boring. Grab groundwater samples will be collected by advancing a SP15 screen point sampler with the Geoprobe® and utilizing new disposable micro bailers. The SP15 screen point utilizes a screen with a standard slot size of 0.004 inches (0.1 mm) and an exposed screen length of 41 inches.

For monitoring well sampling a new disposable bailer will be lowered into the well using dedicated polypropylene line. A reel may be used to hold the line, or the line may be lowered and raised by hand

with the slack portion of the line left to lie on polyethylene sheeting or in a clean container placed next to the well.

For each well sampled, the bailer will be handled with a new pair of disposable plastic surgical gloves or other type of gloves, depending on Health and Safety Plan (HASP) requirements. Water samples will be carefully transferred from the bailer to the sample bottles to minimize the potential for aeration of the sample. No headspace or air bubbles in the VOC sample bottles will be allowed to exist in the bottles. In addition, overflowing bottles will be avoided to prevent loss of floating substances (i.e., oil and grease) and preservative.

Groundwater samples will be placed into laboratory prepared containers using the same sample handling and chain-of-custody procedures as described above. In addition, three quality control samples, including two trip blanks and one duplicate sample, will be collected. The trip blanks will be included for sample delivery to the lab.

The groundwater samples will be analyzed for VOCs using EPA Method 8260 plus TICS. Laboratory analyses will be conducted in accordance with USEPA SW-846 methods and NYSDEC ASP B deliverable format. . The laboratory conducting the analysis will be NYSDOH ELAP certified.

Upon completion, boreholes will be pressure grouted to the surface through the Geoprobe® drilling rods. Drilling rods will be progressively lifted during grouting to ensure that boreholes are grouted from the bottom up. The surface will be patched with either asphalt or concrete to match surrounding surface. Field personnel will prevent cross-contamination from one sampling point to another by steam-cleaning all sampling equipment before and after drilling each Geoprobe boring.

Mill River Sediment Sampling

The objective of the sediment sampling is to obtain representative surface sediment samples from Mill River, located adjacent to the Site. Sediment samples will be collected from the sediment surface of Mill River, 0 to 6-inches below ground surface (bgs) and from 0 to 6 feet bgs, over two foot increments.

The shallow sediment samples will be collected with a hand auger/AMS-type slide hammer sampler during low tide from the top six inches of the sediment column, immediately upstream and immediately downstream of the Site. Three deeper sediment samples will be collected from the three, six-foot borings in the sediment near the bulkhead at the Site, using a boat equipped with a slide hammer and Geoprobe rod apparatus. Soil collected will be classified using the Unified Soil Classification System (USCS).

The sample rings will be removed from the AMS sample barrel and capped with Teflon® sheeting and plastic end caps before being labeled with the following information:

- Company Name.
- Sample Identification Number
- Sample date and time.
- Project Location.

The sample containers will be packaged, handled, recorded and transported to the analytical laboratory using the procedures previously described in the Soil Gas Survey Section.

The sediment samples will be analyzed for VOCs using EPA Method 8260, TICS, total organic carbon and grain size. Laboratory analyses will be conducted in accordance with USEPA SW-846 methods and NYSDEC ASP B deliverable format. The laboratory conducting the analysis will be NYSDOH ELAP certified.

Mill River Surface Water Sampling

The objective of the surface water sampling is to obtain representative surface water samples from Mill River, located adjacent to the Site.

Surface water observations and field measurements will be recorded on a Sampling Record form. An OVA or PID measurement will be obtained by inserting the probe inside the sampling container and record the measurement on the sampling record.

A new polyethylene disposable bailer will be lowered into the surface water using dedicated polypropylene line. The line and bailer will be lowered into the surface water of Mill River and a grab sample collected. For each surface sample, the bailer will be handled with a new pair of disposable plastic surgical gloves or other type of gloves, depending on Health and Safety Plan (HASP) requirements. Water samples will be carefully decanted from the bailer to the sample bottles to minimize the potential for aeration. No headspace or air bubbles in the VOC sample bottles will be allowed to exist in the bottles. In addition, overflowing bottles will be avoided to prevent loss of floating substances (i.e., oil and grease) and preservative.

The sample bottle caps will be closed snugly but not over-tightened. Labels will be affixed to the bottles with the following information:

- Company Name.
- Sample Identification Number (Company and laboratory I.D. numbers, if different).
- Sample date and time.
- Project Location.

The sample containers will be packaged, handled, recorded and transported to the analytical laboratory using the procedures previously described in the Soil Gas Survey Section.

The surface water samples will be analyzed for VOCs using EPA Method 8260 plus TICS. Laboratory analyses will be conducted in accordance with USEPA SW-846 methods and NYSDEC ASP B deliverable format. The laboratory conducting the analysis will be NYSDOH ELAP certified.

Shallow Dry Well Sediment Sampling

Two storm water dry wells exist on the Site from which URS will collect sediment samples. The objective of the sediment sampling is to obtain representative sediment samples from the two dry wells. URS will collect a sediment sample from inside each dry well using a hand auger/AMS-type slide hammer sampler. The samples will be collected using a dedicated disposable trowel at a depth six to 12 inches below the sediment level in the dry well and placed into appropriate laboratory prepared containers. Dry well observations, such as staining, odor and sediment lithology will be recorded. PID measurements will also be obtained by inserting the probe inside the dry well and recording the measurement on the sampling record. Soil collected will be classified using the Unified Soil Classification System (USCS).

The sample rings will be removed from the AMS sample barrel and capped with Teflon® sheeting and plastic end caps before being labeled with the following information:

- Company Name.
- Sample Identification Number
- Sample date and time.
- Project Location.

The sample containers will be packaged, handled, recorded and transported to the analytical laboratory using the procedures previously described in the Soil Gas Survey Section.

The sediment samples will be submitted to a NYSDOH ELAP – certified analytical laboratory for analysis. Sediment samples will be analyzed for VOCs using EPA Method 8260 plus TICS, total organic

carbon, and grain size. Laboratory analyses will be conducted in accordance with USEPA SW-846 methods and NYSDEC ASP B deliverable format.

Bulkhead Seepage Sampling

The objective of collecting and analyzing a bulkhead seepage sample is to evaluate the bulkhead seepage water for constituents of concern as they relate to Site operations.

A bulkhead water seepage sample will be collected at low tide directly from the bulkhead by identifying seepage water, if present, and capturing it in appropriate laboratory prepared bottles. Seepage water observations and field measurements will be recorded on a Sampling Record form. An OVA or PID measurement will be obtained by inserting the probe inside the sampling container and record the measurement on the sampling record. Alternatively URS can collect a seepage water sample at the one area of the canal where the bulkhead and sediment are exposed at low tide. No headspace or air bubbles in the VOC sample bottles will be allowed. In addition, overflowing bottles will be avoided to prevent loss of floating substances (i.e., oil and grease) and preservative.

The sample bottle caps will be closed snugly but not over-tightened. Labels will be affixed to the bottles with the following information:

- Company Name.
- Sample Identification Number (Company and laboratory I.D. numbers, if different).
- Sample date and time.
- Project Location.

The sample containers will be packaged, handled, recorded and transported to the analytical laboratory using the procedures previously described in Section 3.1.

The seepage sample will be analyzed for VOCs using EPA Method 8260 plus TICS. Laboratory analyses will be conducted in accordance with USEPA SW-846 methods and NYSDEC ASP B deliverable format. The laboratory conducting the analysis will be NYSDOH ELAP certified.

Monitoring Well Installation And Sampling

Monitoring wells will be installed on the Site to evaluate potential constituents of concern that may be present within the groundwater beneath the Site. Proposed monitoring well locations are presented on Figure 4. Various provisions will be made to achieve high quality groundwater samples.

Monitoring wells will be installed with the Geoprobe® direct push soil sampling unit. A 3.25-inch outer diameter rod with an expendable point will be pushed to the desired depth and a 1-inch inner diameter

and 2.5-inch outer diameter PVC prepacked screen with 0.010-inch slot size will be installed. Sand is packed between the slotted PVC and the stainless steel mesh. A one-inch blank PVC casing (i.e., riser) will be constructed from the top of the prepacked screen to approximately six-inches below grade. Two feet of standard Morie #1 sand will be placed above the screen and the annular space between the borehole and the blank casing will be pressure grouted to approximately one foot below grade. The monitoring well will be finished with a flush-mounted well box cover cemented into place. Following completion, the monitoring well will be developed by pumping until purged fluid is clear and free of sediment. Purged water will be containerized.

Each monitoring well cluster will consist of a shallow and deep monitoring well constructed approximately five-feet from one another. The deep monitoring well will be screened with a five-foot section of pre-packed screen directly above the top of the anticipated confining unit. The shallow monitoring well will be screened with a ten-foot screen length partially straddling the water table. A detailed diagram of the well construction will be maintained during installation and development.

Following monitoring well construction and development, water levels in the monitoring wells will be gauged at the anticipated high and low tidal stages with a Solinst water level indicator with accuracy of 0.01-feet. Groundwater flow direction will be established via triangulation and potential vertical gradients will be established during synoptic well gauging events.

The complete identification number of the monitoring well will be painted on or affixed to the protective casing. The elevation to the top of the well casing will be determined by surveying the elevation to +/- 0.01 foot (mean sea level datum) and a referenced point will be permanently marked on the well casing.

The monitoring well will be developed, using surge block or pumping, after the completion of the well installation. The monitoring well will be developed for approximately 1 hour or until the water is visually clear. A minimum of approximately five times the volume of water standing will be removed. Pumps will be equipped with check valves to prevent well water within the discharge lines from re-entering the well. Polyethylene lines will be dedicated to each well. Water pumped from the wells during development will be discharged into appropriate 55-gallon drums.

The water level in the new well will be allowed to stabilize with the aquifer for a minimum of two weeks before sampling. The wells will be sampled in order of least suspected contamination to most suspected contamination.

Prior to sampling activities, the observations, purge data and field measurements will be recorded on a Groundwater Sampling Record. An OVA or PID measurement will be obtained by inserting the probe

inside the well casing and record the measurement on the groundwater sampling record. Measure to 0.01 foot and record the static water level in the well with an electric water-level indicator equipped with a calibrated tape or cable, and record depth to water. To avoid cross-contamination between wells, rinse off the indicator probe and the immersed portion of the tape or cable with distilled water. If there is any oily residue, rinse with a non-phosphate detergent followed by distilled water.

The wells will be purged of at least three casing volumes using a peristaltic pump. A new section of dedicated, check-valve-equipped, polyethylene flexible suction hose will be used in each well. The purged water will be discharged into appropriate 55-gallon drums, using a calibrated bucket to estimate the pumping rate.

The wells will be sampled immediately following purging using a new disposable polyethylene bailer for each well. For slow recovery wells, volatile samples will be collected as soon as there is sufficient water to fill the bottles.

The bailer will be lowered into the well using dedicated polypropylene line. A reel may be used to hold the line, or the line may be lowered and raised by hand with the slack portion of the line left to lie on polyethylene sheeting or in a clean container placed next to the well.

For each well sampled, the bailer will be handled with a new pair of disposable plastic surgical gloves or other type of gloves, depending on Health and Safety Plan (HASP) requirements. Water samples will be carefully transferred from the bailer to the sample bottles to minimize the potential for aeration of the sample. No headspace or air bubbles in the VOC sample bottles will be allowed. In addition, overflowing bottles will be avoided to prevent loss of floating substances (i.e., oil and grease) and preservative.

The sample bottle caps will be closed snugly but not over-tightened. Labels will be affixed to the bottles with the following information:

- Company Name.
- Sample Identification Number (Company and laboratory I.D. numbers, if different).
- Sample date and time.
- Project Location.

Field measurements will be performed on each monitoring well before purging, after purging and after sample collection using a Horiba meter. A separate flask or jar will be filled with well water from the bailer to perform the field tests for temperature, pH and specific conductivity. The probes will be inserted into the container while gently agitating the sample. The readings are recorded when the meter display stabilizes. After each use, the probes and the container will be rinsed with distilled water. The well will

be capped and the protective casing locked. Field blanks will be collected in accordance with procedures described in this section whenever applicable.

The sample containers will be packaged, handled, recorded and transported to the analytical laboratory using the procedures previously described in the Soil Gas Survey Section.

Data Quality Assurance Samples

As part of the Quality Assurance program, several QA/QC samples will be prepared and collected to provide control over the collection of environmental measurements and subsequent review, interpretation and validation of generated analytical data. Two types of QA/QC samples will be prepared or collected: Trip blanks and field (equipment rinsate) blanks. These QA/QC samples are discussed in more detail below.

Additionally, the laboratory analyzes method blanks (laboratory blanks), matrix spike and duplicate samples as part of their internal quality assurance program. Detailed information regarding laboratory QA procedures will be forwarded under separate cover upon selection of the laboratory, if requested.

Trip Blanks

The primary purpose of the trip blank is to detect additional sources of contamination that could potentially influence contaminant values reported in the actual samples, both quantitatively and qualitatively. Trip blanks serve as a mechanism of control on sample bottle preparation, blank water quality and sample handling. The trip blank travels to the site with the empty sample bottles and back from the site with the collected samples in an effort to simulate sample handling conditions. Contaminated trip blanks may indicate inadequate bottle cleaning or blank water of questionable quality.

A trip blank consists of a set of sample bottles filled at the laboratory with laboratory-demonstrated analyte-free water. This water must originate from one common source and physical location within the laboratory and must be the same water as the method blank water used by the laboratory performing the analysis. Trip blanks should be handled, transported and analyzed in the same manner as the samples acquired that day, except the trip blank containers themselves are not opened in the field but just travel with the sample collector. Individual sample matrices and associated blanks must be packaged in separate sample containers prior to shipment back to the laboratory. Trip blanks must return to the laboratory with the same set of bottles they accompanied to the field.

Field (Equipment Rinsate) Blank

The primary purpose of the field blank is to provide an additional check on possible sources of contamination beyond those intended for trip blanks. A field blank serves the same purpose as a trip blank, but is collected during both soil and groundwater sampling, and is also used to indicate potential contamination from ambient air and from sampling instruments used to collect and transfer samples from the point of collection into sample containers.

A field blank is collected using two identical sets of laboratory-cleaned sample containers. One set of containers is empty and will serve as the sample containers to be analyzed. The second set of containers is filled at the laboratory with laboratory-demonstrated analyte-free water. This water must originate from one common source and physical location within the laboratory and must be the same water as the method blank water used by the laboratory performing the analysis. Field blanks should be handled, transported and analyzed in the same manner as the samples acquired that day. At the field location, in the most contaminated area, this analyte-free water is passed through clean sample equipment and placed in the empty sample container for analysis. (Note: The laboratory may have to provide extra, full volatile organics vials to ensure sufficient volume of blank water to eliminate headspace.) The reason for collecting field blanks in the most contaminated area is to attempt to simulate a worst-case scenario regarding ambient air contributions to sample contamination. Field blanks must return to the laboratory with the same set of sample bottles they accompanied to the field. Field blanks must be packaged with their associated matrix.

The purpose of a field blank is to place a mechanism of control on sample handling, storage and shipment. The field blank travels and is stored with the sample, and is thereby representative of effects on sample quality. By being opened in the field and transferred over a cleaned sampling device (where applicable), the field blank is also indicative of ambient conditions and/or equipment conditions that may potentially affect the quality of the associated samples.

Sample Custody Procedures

A Chain-of-Custody Form will accompany the sample from initial sample container selection and preparation commencing at the laboratory, to the field for sample containment and preservation, through its return to the laboratory. The Chain-of-Custody Form will trace the path of each individual sample container by means of a unique identification number.

HEALTH AND SAFETY PLAN

URS prepared a Site-specific Health and Safety Plan (HASP) for environmental work performed on-site (Appendix A). Each party performing environmental work on Site will comply with the Site-specific HASP. The HASP satisfies, at a minimum, the requirements established in 29 CFR 1910.120. Subcontractors will either provide their own HASP or work under the URS HASP.

REPORTING

Following the investigation, a Remedial Investigation (RI) Report will be submitted to NYSDEC. The RI report will present conclusions and recommendations based on the evaluation and interpretation of field and analytical data collected during this assessment, compare the new data to past site assessment data, and review the data relative to current NYSDEC soil and groundwater cleanup objectives or standards. The RI Report will include an analysis of the Site lithology, including location, depth, and thickness of any identified confining unit(s), groundwater kinetics, plume delineation in both soil and groundwater, and a Fish and Wildlife Impact Analysis following NYSDEC protocols. The RI Report will also include a qualitative exposure assessment consisting of characterization of the exposure setting, identification of exposure pathways and an evaluation of contaminant fate and transport. Finally, the RI Report will also include the results of QA/QC review of laboratory data and a Data Usability Summary Report (DUSR).

SCHEDULE

URS anticipates that it will take approximately 30 days to complete the Phase A activities of the RI. This time frame includes 10 days to compile and review the Phase A data so that Phase B of the RI can be adjusted or modified, if required. Phase B of the RI is anticipated to be complete approximately 30 days following completion of Phase A. Approximately ten days have been scheduled to review and compile the Phase B data. Following review of the Phase B data, URS will present the conclusions and recommendations in the Remedial Investigation Report. The Remedial Investigation Report will be available approximately 24 days after the completion of the Phase B fieldwork.

Table 2, Remedial Investigation Schedule, summarizes the RIWP Phase A and Phase B activity subtasks and provides an anticipated time of completion for each. The table also includes a cumulative remedial investigation completion time in a subtask-by-subtask format.

TABLES

TABLE 1
QUALITY ASSURANCE PROJECT PLAN SUMMARY
Minuteman Cleaners
89 Ocean Avenue
East Rockaway, NY.

PHASE A ACTIVITY	Number of Boring/Sample Locations	Boring/Sample Location	Total Anticipated Depth of Boring/Sample (feet bgs)	Number of Samples Collected Per Location	Total Number of Samples	Sampling Method	Total Number of QA/QC Samples for Activity	Analysis Method	Container Type	Preservative	Holding Time [1] [2]
Soil Gas Survey	4	(2) Utility Corridor, (1) Northern Boundary of Site, (1) Southern Boundary of Site	4	1	4	Geoprobe Direct Push With 1/4-inch polyethylene Tubing With Flow Rates Not to Exceed 0.2 Liters Per Minute	NA	VOCs by EPA TO-15	Summa Canisters	None	14 Days
Geoprobe Borings	8	(4) Inside Building, (3) Between Building and Bulkhead, (1) Southeastern Perimeter of Site	10 - 20	(2) Soil, (1) Groundwater	16 Soil, 8 Groundwater	Geoprobe Direct Push With 2-inch Diameter by 4 foot Long Macrocore Sampler For Soil. SP15 screen point with Microbailer for Groundwater.	(2) Duplicate Samples and (3) Equipment Rinse Blanks For Soil. (1) Duplicate Sample and (2) Trip Blanks for Groundwater	VOCs by EPA 8260 + TICS	Laboratory Prepared Containers For Soil. 40 ml VOA For Groundwater.	None For Soil, HCL For Groundwater	7 days
	1	(1) Northeast Corner of Site	>20	(3) Soil, (2) Groundwater	3 Soil, 2 Groundwater						
Dry Well Sediment Sampling	2	(2) On-Site Dry Wells	0.5 - 1.0	1	2	Hand Auger/Slide Hammer/Disposable Trowel	NA	VOCs by EPA 8260 + TICS	Laboratory Prepared Containers	None	7 days
PHASE B ACTIVITY											
Sediment Sampling	1	(1) Upstream of Site in Mill Creek	0.5	1	1	Hand Auger/Slide Hammer	(1) Duplicate Sample and (2) Equipment Rinse Blanks	VOCs by EPA 8260 + TICS + Total Organic Carbon + Grain Size	Laboratory Prepared Containers	None	7 days for 8260, 28 Days for Total Organic Carbon,
	1	(1) Down Stream of Site in Mill Creek	0.5	1	1	Hand Auger/Slide Hammer					
	3	(3) Adjacent to Site in Mill Creek	6	1	3	Boat with Slide Hammer/Geoprobe Rod Apparatus					
Surface Water Sampling	1	(1) Upstream of Site in Mill Creek	Surface	1	1	Disposable Bailer Lowered into Mill River at Low Tide	(1) Duplicate Sample and (1) Trip Blank	VOCs by EPA 8260 + TICS	40 ml VOA	HCL	10 Days
	1	(1) Down Stream of Site in Mill Creek	Surface	1	1						
	1	(1) Adjacent to Site in Mill Creek	Surface	1	1						
Bulkhead Seepage Sampling	1	(1) From Bulkhead Directly East of Dry Cleaning Machine	Surface	1	1	Collect Grab Sample Directly From Bulkhead Seepage		VOCs by EPA 8260 + TICS	40 ml VOA	HCL	10 Days
Monitoring Well Installation	5 Well Clusters	(3) Between Building and Bulkhead, (1) Northwest Perimeter of Site, (1) Southeast of Building Along Bulkhead	10 - 20	2	10	Geoprobe Direct Push With 3.25-inch Diameter Rod and a 2.5-inch Diameter PVC Prepacked screen with 0.010-inch slot size Will Be Installed.	(1) Duplicate Sample, (1) Equipment Rinsate Blank and (2) Trip Blanks	VOCs by EPA 8260 + TICS	40 ml VOA	HCL	10 Days

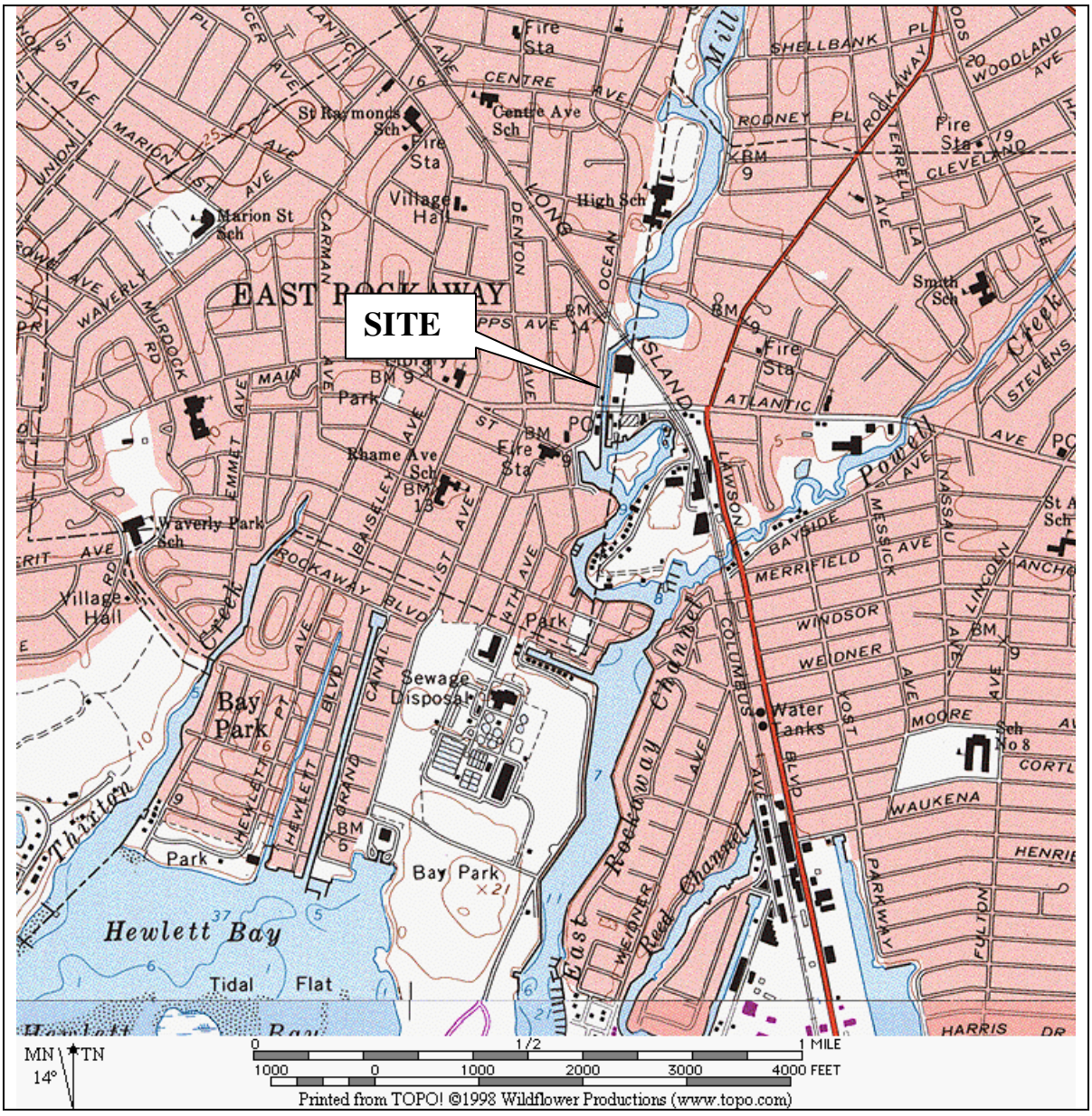
Notes:
(1) Holding times are in accordance with Exhibit I of the NYSDEC Analytical Services Protocol.
(2) Holding times are calculated from the verified time of sample receipt at the laboratory.

TABLE 2
REMEDIAL INVESTIGATION SCHEDULE
Minuteman Cleaners
89 Ocean Avenue
East Rockaway, NY.

PHASE A ACTIVITY	Phase Activity Subtask	Approximate Subtask Duration [1]	Approximate Start Date [1]
Soil Gas Survey	Mark and Clear All Boring Locations	1 Day	05-Sep-06
	Install and Sample (4) Soil Vapor Probes	1 Day	06-Sep-06
Geoprobe Borings	Install and Sample (9) Soil/Grab Groundwater Borings	2 Days	07-Sep-06
Dry Well Sediment Sampling	Collect Sediment Samples from Dry Wells On-Site	1 Day	11-Sep-06
Laboratory Analysis	Analyze Soil Vapor Probe/Soil/Grab Groundwater Samples	10 Days	12-Sep-06
Review Phase A Data	Compile and Review Phase A Data	10 Days	26-Sep-06
PHASE B ACTIVITY			
Sediment Sampling	Advance and Sample (5) Sediment Borings Within the Mill River	0.5 Days	10-Oct-06
Surface Water Sampling	Collect (3) Surface Water Samples from Mill River	0.5 Days	10-Oct-06
	Collect (1) Bulkhead Seepage Sample	0.5 Days	11-Oct-06
Monitoring Well Installation	Advance and Install (5) Monitoring Wells	2 Days	11-Oct-06
	Develop Monitoring Wells by Pumping	2 Days	13-Oct-06
Site Survey	Survey Soil/Soil Vapor Borings and Groundwater Monitoring Locations	2 Days	17-Oct-06
Monitoring Well Installation (continued)	Gauge and Sample Monitoring Wells	2 Days	19-Oct-06
Laboratory Analysis	Analyze Sediment/Surface Water/Bulkhead/Groundwater Samples	10 Days	23-Oct-06
Review Phase B Data	Compile and Review Phase B Data	10 Days	13-Nov-06
Remedial Investigation Report	QA/QC Lab Data and Produce Report of Remedial Investigation Findings	14 Days	27-Nov-06

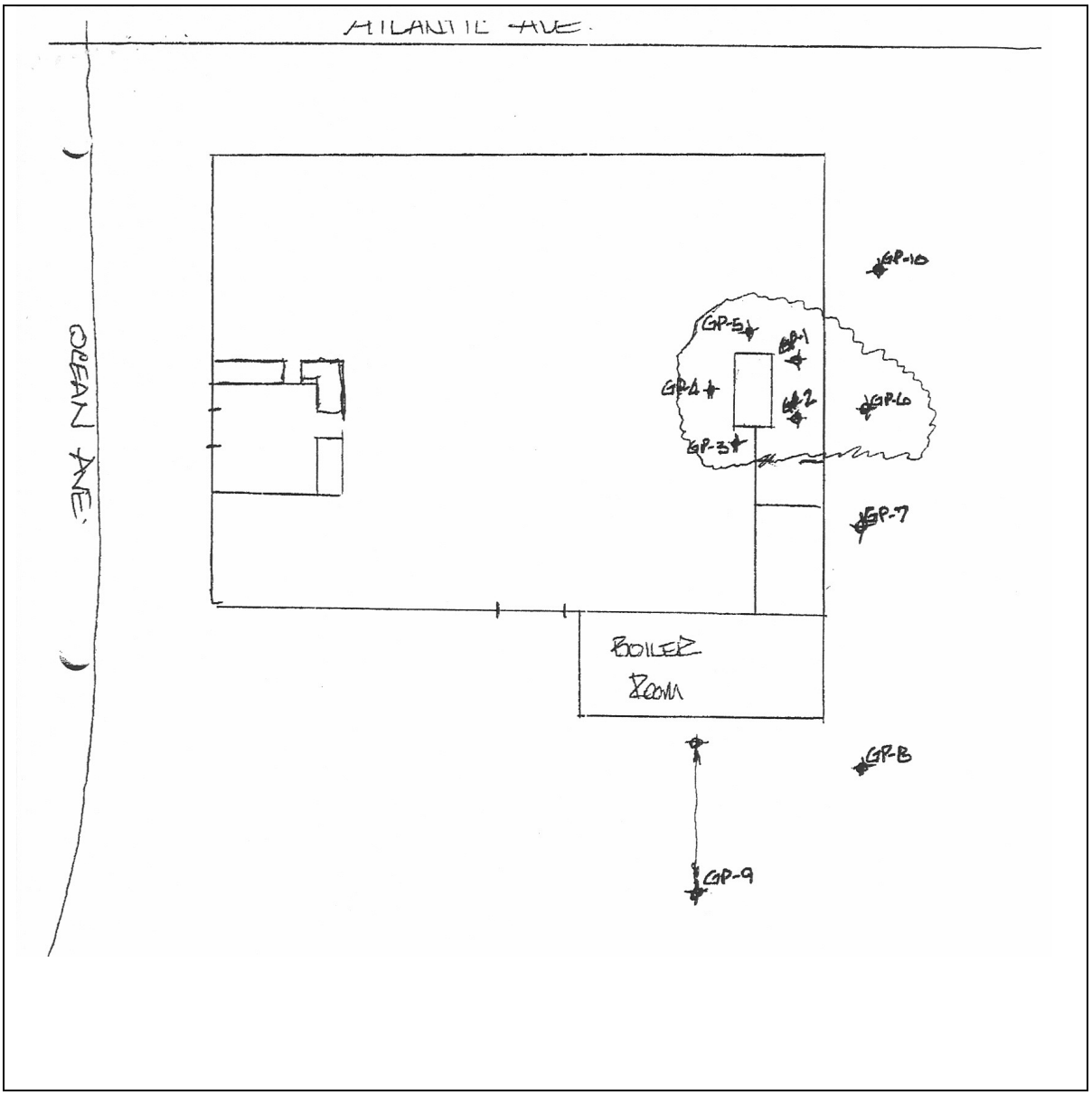
[1] Days equal normal business days.

FIGURES



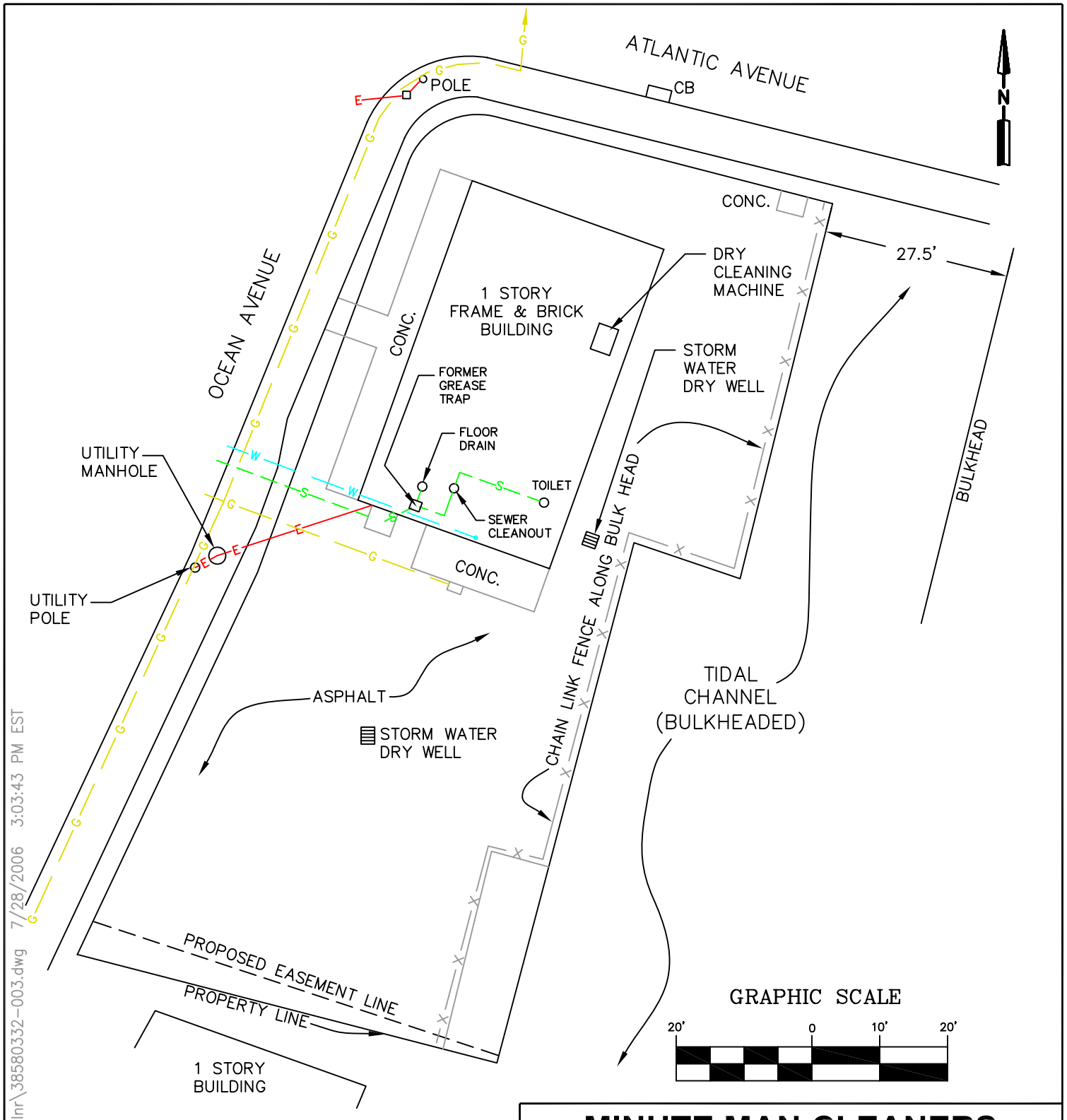
Source:
USGS Topographic Quadrangle,
Lynbrook, New York

URS	**Minute Man Cleaners** **89 Ocean Avenue** **East Rockaway, New York**
URS Corp. – New York 5 Penn Plaza, 15th Floor NY, NY 10001	FIGURE 1 SITE LOCATION MAP DATE: October 17, 2005 PROJECT: 38580332



Source:
Additional Investigation
Berninger Environmental, Inc.
February 28,2005

URS	**Minute Man Cleaners** **89 Ocean Avenue** **East Rockaway, New York**
URS Corp. – New York 5 Penn Plaza, 15th Floor NY, NY 10001	FIGURE 2 PREVIOUS SOIL BORING LOCATIONS DATE: October 17, 2005 PROJECT: 38580332



LEGEND:

- G — WATER
- E — ELECTRIC
- S — SANITARY SEWER
- G — NATURAL GAS
- MH ○ MANHOLE
- ▤ DRYWELL

* PHONE WIRES ARE OVERHEAD PARALLELING THE ELECTRIC LINE

MINUTE MAN CLEANERS
89 OCEAN AVENUE
EAST ROCKAWAY, NEW YORK

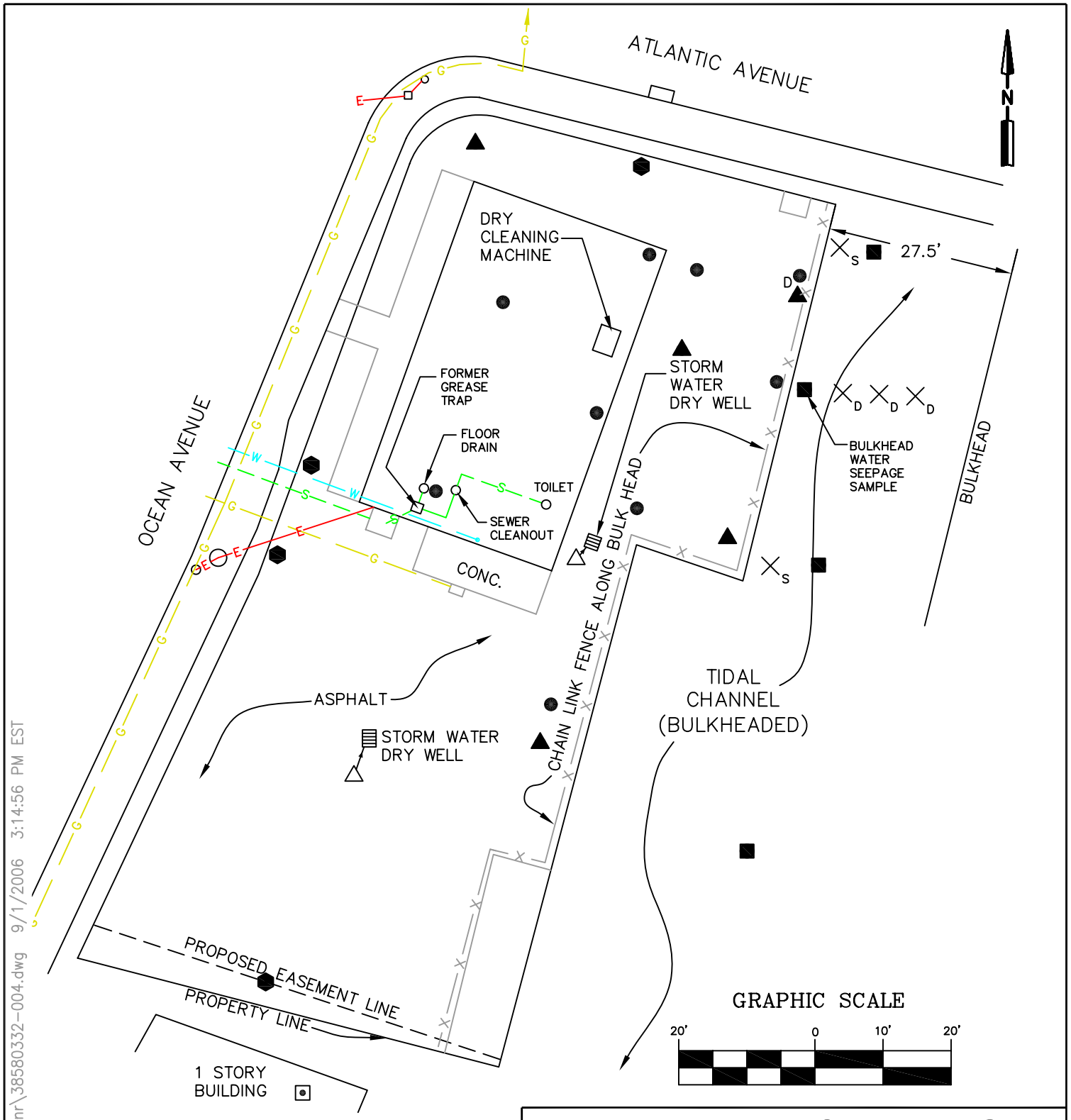
UTILITY LOCATION MAP

URS CORP - NEW YORK
5 PENN PLAZA, 15th FL.
NEW YORK, NY, 10001
PHONE: (212) 840-0595
FAX: (212) 921-0388

DATE: 07/28/06
JOB: 38580332

FIGURE 3

S:\Projects\38580332-Minute Man Clnr\38580332-003.dwg 7/28/2006 3:03:43 PM EST



LEGEND:

- SHALLOW SOIL BORING (8)
- $_{D}$ DEEP SOIL BORING (1)
- MONITORING WELL CLUSTER (5)
- SOIL VAPOR SAMPLE (4)
- POTENTIAL INDOOR AIR SAMPLE (1)
- SURFACE WATER SAMPLE (4)
- DRYWELL SEDIMENT SAMPLE (2)
- $\times_{D}$ DEEP RIVER SEDIMENT SAMPLE (3)
- $\times_{S}$ SHALLOW RIVER SEDIMENT SAMPLE (2)

MINUTE MAN CLEANERS
89 OCEAN AVENUE
EAST ROCKAWAY, NEW YORK

PROPOSED INVESTIGATION POINTS

URS CORP - NEW YORK
5 PENN PLAZA, 15th FL.
NEW YORK, NY, 10001
PHONE: (212) 840-0595
FAX: (212) 921-0388

DATE: 08/23/06
JOB: 38580332

FIGURE 4

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APPENDIX A

HEALTH AND SAFETY PLAN

HEALTH AND SAFETY PLAN TEMPLATE

"GeoProbe" - this document addresses investigations where only a geoprobe is used. This document is fairly brief and can typically be modified with minimal effort.

As the name indicates, this is a template. In other words, additional information must be provided before the template can be considered an acceptable site-specific health and safety plan. Basically, any experienced, environmental field person can use this document to develop a draft health and safety plan. However, a senior health and safety professional (i.e. a Certified Industrial Hygienist [CIH], Certified Safety Professional [CSP] or Regional Health, Safety, and Environment Manager [RHSEM]), must review and approve the plan before it can be finalized. This template is intended to address work activities conducted by URS personnel. Contractors are normally responsible for developing their own health and safety plans.

This template also references a number of URS Safety Management Standards (SMSs). Referenced SMSs must be attached when the plan is completed and issued for use in the field. These SMSs are available on the URS Health, Safety, and Environment web site. Access the Web site from the SoURSe or through the Internet (www.urshse.com).

Please contact your Health, Safety, and Environment Representative or Regional Health, Safety, and Environment Manager if you have any questions.

Disclaimer:

This Health and Safety Plan, and each of its provisions, is applicable only to, and for use only by, URS Corporation, its affiliates, and its subcontractors. Any use of this Plan by other parties, including, without limitation, third party contractors on projects where URS is providing engineering, construction management or similar services, without the express written permission of URS, will be at that party's sole risk, and URS Corporation shall have no responsibility therefor. The existence and use of this Plan by URS shall not be deemed an admission or evidence of any acceptance of any safety responsibility by URS for other parties unless such responsibility is expressly assumed in writing by URS in a specific project contract.

HEALTH AND SAFETY PLAN
Remedial Investigation
Minute Man Cleaners
East Rockaway, New York

		PHONE
Project Number:	38580332	
Project Manager:	Liz Elliott	212.609.8102
Plan Preparer:	Liz Elliott	212.609.8102
Preparation Date:	October 20, 2005	
Expiration Date:	One year from preparation date.	

APPROVALS

Health, Safety, and Environment Representative

Regional Health, Safety, and Environment Manager:

Project Manager:

THIS HSP IS TO BE USED FOR THE SPECIFIC PROJECT DESCRIBED HEREIN. IT IS NOT TO BE USED FOR ANY OTHER PROJECT, NOR IS IT TO BE USED FOR PROJECTS IN WHICH SIGNIFICANT CONTAMINANT REMOVAL IS REQUIRED.

SITE HEALTH AND SAFETY PLAN
GEOPROBE DRILLING ACTIVITIES

Activities covered under this HSP include the oversight of **geoprobe drilling, soil gas sampling, and hand auger sampling** activities. This plan has been developed for URS personnel; it is not intended for subcontractor or client use.

URS personnel on this project must meet the training requirements of 29 CFR 1910.120(e) and be participating in a medical surveillance program as per 29 CFR 1910.120(f). Eating, drinking and smoking will only be allowed in designated areas of the support zone.

This plan is valid only for the specific project identified in the following project description. The Project Manager and Site Safety Officer are responsible for implementation of this plan that includes the site safety briefing. Field activities are limited to providing general oversight in accordance with the workplan, and obtaining soil and/or groundwater samples for laboratory analysis.

PROJECT DESCRIPTION

Project Name Minute Man Cleaners Field Dates Unknown

Site Address 89 Ocean Avenue, East Rockaway, New York

SITE HISTORY

A dry cleaning machine, which uses tetrachloroethene (PCE), has been in use at the Site since 1982. According to the owner of Minute Man, approximately half a dozen "acute" leaks of PCE occurred between 1982 and 1989 due to broken gaskets. At these times, spillage was observed between the dry cleaning machine and the western wall of the facility. In March 2000, the machine was replaced and placed in the same location as the previous machine. No leaks have been observed since 1989.

Two subsurface investigations have been conducted at the Site. The first investigation, dated February 1, 2005, included completion of two soil borings (GP-1 and GP-2) adjacent to the current dry cleaning machine (east side). Soil and groundwater samples collected from these borings revealed concentrations of tetrachloroethene, a common dry cleaning solvent, in both soil and ground water above New York State Department of Environmental Conservation (DEC) guidelines.

An additional investigation, dated February 28, 2005, included completion of eight additional soil borings (GP-3 through GP-10). Three of these borings, GP-3 through GP-5, were completed inside the building to the west, north and south of the current dry cleaning machine. Five borings, GP-6 through GP-10, were completed outside of the building (generally the east side of the building). Soil samples were collected from the three

indoor borings while ground water samples were collected from the five outdoor borings. Results show tetrachloroethene (PCE) concentrations in soil exceeding DEC TAGM 4046 Recommended Soil Cleanup Objectives (RSCOs) in GP-3 through GP-5. PCE concentrations in ground water exceeded DEC Division of Water Technical and Operational Guidance Series (1.1.1.) Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations (TOGS) in each of the five borings completed outside of the cleaners. In addition, trichloroethene (TCE) was detected at a concentration exceeding TOGS in GP-6, located immediately east of the dry cleaning machine, and vinyl chloride was detected at a concentration exceeding TOGS in GP-7 and GP-8, located outside the southeastern portion of the building.

This Site is part of the New York State Department of Environmental Conservation Brownfield Cleanup Program and accordingly, has agreed to investigate and where necessary, remediate contaminated soil and groundwater.

SCOPE OF WORK

The site investigation will be conducted in two phases, as follows:

- Phase A: soil gas survey and soil borings; and
- Phase B: creek and sediment sampling, monitoring well installation, site survey, monitoring well sampling, and indoor air sampling.

All Site work will follow health and safety procedures outlined in the Health and Safety Plan, included as Appendix A.

PHASE A

Soil Gas Survey

A soil gas survey will be conducted along the perimeter of the Site to investigate whether soil gas is migrating to abutting properties.

Soil vapor samples will be collected in accordance with the *NYSDOH Draft Guidance for Evaluating Soil Vapor Intrusion in the State of New York* dated February 2005. Four soil vapor samples will be collected using a Geoprobe® direct push soil sampling unit at perimeter locations of the Site. On-site utilities, including telephone, electric, natural gas, and sanitary sewer exit the southern end of the building and predominantly head west towards Ocean Avenue (See Figure 3). Since utility corridors are potential migration pathways for soil vapor, one soil vapor sample will be collected on each side of the utility easement along the perimeter of the Site adjacent to Ocean Avenue. In addition one soil vapor sample will be collected at the northern

boundary of the Site adjacent to Atlantic Avenue and one soil vapor sample will be collected at the southern boundary of the Site adjacent to the retail fish market / restaurant.

Temporary soil vapor probes will be constructed at each of the four locations. A drive point will be driven approximately four feet below grade with a Geoprobe® direct push soil sampling unit and porous backfill material will be used to create a one-foot sampling zone. The drive point will be fitted with ¼-inch polyethylene tubing and the probe will be sealed above the sampling zone with three feet of bentonite slurry.

Following temporary probe installation, one to three volumes of air will be purged prior to collection of the sample at flow rates not to exceed 0.2 liters per minute. Samples will be collected in laboratory-provided Summa® canisters. A tracer gas (e.g., helium) will be used when collecting samples to verify that the soil vapor sample has not been diluted by surface air. The tracer gas will be monitored with a portable monitoring device before and after collection of the sample.

A total of four soil vapor samples will be submitted to a NYSDOH ELAP-certified analytical laboratory for analysis. Soil vapor samples will be analyzed for VOCs by EPA Method TO-15. Laboratory analyses will be conducted in accordance with USEPA SW-846 methods and NYSDEC Analytical Services Protocol (ASP) B deliverable format.

Following soil vapor sample collection, boreholes will be grouted to surface grade. The surface will be patched with either asphalt or concrete to match surrounding surface conditions.

Soil Borings

Soil borings will be conducted at the Site to investigate subsurface lithology and the vertical and lateral extent of soil and groundwater contamination. Site-specific lithology is not known since the previous subsurface investigations completed by Berninger (February 1, 2005 and February 28, 2005) did not include boring logs or descriptions of the encountered lithology. Based on information provided in the Brownfield Application submitted by EEA, the Site is located at an elevation of approximately five to six feet above mean sea level and is underlain by fine sands. URS expects that this sand layer beneath the building thickens eastward towards the bulkhead. The sand fill layer likely overlies finer grained sediments deposited by the former Mill River at depths within ten to twenty feet of surface grade. The potential presence of these finer grained paleochannel deposits may represent a confining, or semi-confining unit. The presence and lithology, continuity, and tilt of this potential confining unit will be assessed during this soil boring program.

Eleven soil borings will be completed at the Site using a Geoprobe® direct push soil sampling unit. These borings will further assess and characterize the on-Site geology and extent of contamination. Ten soil borings will be completed to the top of the anticipated confining unit, expected between ten and twenty feet below grade. One soil boring will be completed through the confining unit outside the source area. Boring locations are presented on Figure 4. The following is a summary of soil boring locations:

- Four soil borings will be completed within the building: three along the eastern building wall, including one adjacent to the dry cleaning machine, and one soil boring west of the dry cleaning machine.

- Six soil borings will be completed outside the building: three soil borings will be completed between the building and the bulkhead, two soil borings will be completed along the southeastern perimeter of the Site, and one soil boring will be completed adjacent to the dry well south of the building in the central / southern portion of the Site.

- One deep boring will be completed in the northeast corner of the Site, outside of the source area.

Continuous soil samples will be collected using a 2-inch diameter by 4-foot long macrocore sampler to the top of the confining unit, anticipated at depths ranging from approximately 10 to 20 feet below grade. A macrocore piston point will be attached to the end of the sampler to control the interval at which the sample is being collected and prevent sampling of sloughed overlying soils. Soil collected in the macrocore sampler will be examined and logged by a URS geologist. The soil lithology, including grain size, color, moisture content, and presence of staining or odors will be classified using the Unified Soil Classification System (USCS). Ambient air quality around the soil borings and the soil retrieved by the macrocore sampler will be screened for VOCs with a photoionization detector (PID) and noted for evidence of staining or odors.

Two soil samples will be collected from each soil boring for laboratory analysis: one from the vadose zone and one from the saturated zone. Based on Berninger's previous subsurface investigations, the saturated zone is above the confining unit (i.e., an unconfined aquifer). The groundwater table is anticipated at depths ranging from six to eight feet below grade. The sample chosen for laboratory analysis from the vadose zone will be based on elevated PID readings or presence of staining or odors. In the absence of distinguishable characteristics, the soil sample collected immediately above the water will be submitted to the laboratory for analysis. The sample chosen for laboratory analysis from the saturated zone will be collected immediately above the confining unit. An additional soil sample will be collected from below the confining unit in the deep soil boring. Soil samples will be collected with cleaned or disposable trowels, placed into laboratory prepared containers, stored in iced coolers, and delivered under chain-of-custody protocol to a laboratory. In addition, five quality control samples, including two duplicates and three equipment rinse blanks, will be collected.

A total of twenty-eight soil samples, including two duplicate samples and three equipment rinse blank samples, will be submitted to a NYSDOH ELAP – certified analytical laboratory for analysis. Soil samples will be analyzed for VOCs using EPA Method 8260 plus tentatively identified compounds (TICS). Laboratory analyses will be conducted in accordance with USEPA SW-846 methods and NYSDEC ASP B deliverable format.

A grab groundwater sample will be collected above the confining unit in each soil boring. An additional grab groundwater sample will be collected from beneath the confining unit in the deep soil boring. Grab groundwater samples will be collected by advancing a SP15 screen point sampler with the Geoprobe®. The SP15 screen point utilizes a screen with a standard slot size of 0.004 inches (0.1 mm) and an exposed screen length of 41 inches. Groundwater samples will be placed into laboratory prepared containers, stored in iced coolers, and delivered under chain-of-custody protocol to a laboratory. In addition, four quality control samples, including two trip blanks and one duplicate sample, will be collected. One trip blank will be included for sample delivery to the lab; it is assumed two sample deliveries will be made.

A total of fifteen grab groundwater samples, including two trip blanks and one duplicate sample, will be submitted to a NYSDOH ELAP – certified analytical laboratory for analysis. Groundwater samples will be analyzed for VOCs using EPA Method 8260 plus TICS. Laboratory analyses will be conducted in accordance with USEPA SW-846 methods and NYSDEC ASP B deliverable format.

Upon completion, boreholes will be pressure grouted to the surface through the Geoprobe® drilling rods. Drilling rods will be progressively lifted during grouting to ensure that boreholes are grouted from the bottom up. The surface will be patched with either asphalt or concrete to match surrounding surface.

PHASE B

Creek and Sediment Sampling

Sediment samples will be collected from the Mill River following collection and analysis of on-Site soil and grab groundwater data. Sediment samples will be collected with a hand auger during low tide from the top six inches of the sediment column immediately east of the bulkhead. Sediment sample spacing will be determined based on soil and groundwater data collected during the previous stages of the investigation.

At least five sediment samples will be collected. Sediment sample locations will be based on the findings of the soil and groundwater data, but will be collected immediately adjacent to the Site as well as both upstream

and downstream of the Site. Sediment samples will be collected with cleaned or disposable trowels, placed into laboratory prepared containers, stored in iced coolers, and delivered under chain-of-custody protocol to a laboratory.

At least five sediment samples will be submitted to a NYSDOH ELAP – certified analytical laboratory for analysis. Soil samples will be analyzed for VOCs using EPA Method 8260 plus TICS, total organic carbon, and grain size. Laboratory analyses will be conducted in accordance with USEPA SW-846 methods and NYSDEC ASP B deliverable format.

In addition, surface water samples will be collected from Mill River. Three surface water samples will be collected: 1) upstream of Site, 2) downstream of Site, and 3) adjacent to Site. Surface water samples will be collected using dedicated disposable bailers during low tide. Disposable bailers will be lowered into the water from the western bank of Mill River, adjacent to the bulkhead. Water samples will be collected directly into the laboratory supplied bottle ware, stored on ice, and submitted under chain-of-custody procedures to a NYSDOH ELAP - certified analytical laboratory for analysis. A total of three surface water samples will be submitted for analysis. Surface water samples will be analyzed for VOCs using EPA Method 8260 plus TICS. Laboratory analyses will be conducted in accordance with USEPA SW-846 methods and NYSDEC ASP B deliverable format.

Monitoring Well Installation

Following completion of the soil boring program and analysis of soil and grab groundwater samples, permanent shallow and deep monitoring wells will be installed on-Site. URS will install one shallow monitoring well and five well clusters, composed of a shallow and deep monitoring well. One shallow monitoring well will be installed along the southern Site boundary and three of the five well clusters will be installed between the building and the bulkhead, east of the dry cleaning machine. The locations of the two additional well clusters will be based on the soil and groundwater data collected during the soil boring program. It is anticipated, however, that one well cluster will be installed in the northwest corner of the Site and the other southeast of the building along the bulkhead (Figure 4).

Monitoring wells will be installed with the Geoprobe® direct push soil sampling unit. A 3.25-inch outer diameter rod with an expendable point will be pushed to the desired depth and a 1-inch inner diameter and 2.5-inch outer diameter PVC prepacked screen with 0.010-inch slot size will be installed. Prepacked screens consist of slotted PVC well screen pipe surrounded by stainless steel mesh. Sand is packed between the slotted PVC and the stainless steel mesh. A one-inch blank PVC casing (i.e., riser) will be constructed from the top of the prepacked screen to approximately six-inches below grade. Two feet of standard Morie #1 sand will be

placed above the screen and the annular space between the borehole and the blank casing will be pressure grouted to approximately one foot below grade. The monitoring well will be finished with a flush-mounted well box cover cemented into place. Following completion, the monitoring well will be developed by pumping until purged fluid is clear and free of sediment. Purged water will be containerized.

Each monitoring well cluster will consist of a shallow and deep monitoring well constructed approximately five-feet from one another. The deep monitoring well will be screened with a five-foot section of pre-packed screen directly above the top of the confining unit. The shallow monitoring well will be screened with a ten-foot screen length straddling the water table. Depth to the confining unit, if present, is unknown. The shallow monitoring well located on the southern boundary of the Site will be constructed similarly to the shallow clustered well.

Following monitoring well construction and development, water levels in the monitoring wells will be gauged during various tidal stages with a Solinst water level indicator with accuracy of 0.01-feet. Groundwater flow direction will be established via triangulation and vertical gradients will be established during different hydraulic regimes.

Site Survey

A New York State-licensed surveyor will survey soil vapor, soil boring, and monitoring well locations. The northing, easting, and vertical elevation coordinates will be surveyed at soil vapor and soil boring locations, including previous soil boring locations completed by Berninger, to the nearest 0.01 foot. Similarly, elevations of the top of monitoring well casings and top of protective well casings for each monitoring well will be surveyed to the nearest 0.01 foot.

Monitoring Well Sampling

One round of groundwater samples will be collected from the monitoring well network.

Prior to sampling the well, a Solinst water level indicator with accuracy of 0.01-feet will be used to measure the depth to the water table. Total depth of the well will also be measured. Subsequently, initial field indicator parameters (i.e., pH, specific conductance, temperature, dissolved oxygen, and redox potential) will be measured using a Horiba U-22 water quality meter. Measurements will be recorded on groundwater sampling field forms.

After collecting initial indicator parameters, the monitoring well will be purged and sampled. A peristaltic pump with disposable polyethylene tubing for each well will be lowered to the center of the water column and at least three well volumes will be purged. Purging will be considered complete when at least three volumes of water contained in the monitoring well is purged and three consecutive measurements of indicator parameters meet the following criteria:

- Temperature readings do not vary by more than 1°C;
- Measurements of pH do not vary by more than 0.1 standard pH unit; and
- Specific conductance readings do not vary by more than 20 percent.

Following purging, a sample will be collected directly into the laboratory bottles by lowering the flow rate. Groundwater samples will be placed in laboratory-supplied bottleware, stored on ice, and submitted under chain-of-custody procedures to a NYSDOH ELAP - certified analytical laboratory for analysis. A total of eleven groundwater samples, plus two trip blanks, one duplicate sample, and one equipment rinsate blank sample, will be submitted to a NYSDOH ELAP – certified analytical laboratory for analysis. Groundwater samples will be analyzed for VOCs using EPA Method 8260 plus TICS. Laboratory analyses will be conducted in accordance with USEPA SW-846 methods and NYSDEC ASP B deliverable format.

Indoor Air

Based on results of soil vapor, groundwater, and soil samples collected on-Site, indoor air sampling may be conducted. One indoor air sample may be collected from the building south of the Site, occupied by the retail fish market, in accordance with the *NYSDOH Draft Guidance for Evaluating Soil Vapor Intrusion in the State of New York* dated February 2005. Regional groundwater flow is to the south towards Hewlett Bay, and consequently, this building represents a potential off-Site receptor.

The indoor air sample may be collected from the northern end of the building (i.e., closest portion of building to Minute Man); likely the retail fish market building. The sample may be collected in the basement, or on the first floor if there is no basement, at a height approximately three to six feet above the floor to represent the height at which occupants are normally seated or standing. The sample may be collected in a laboratory-provided Summa® canister.

The soil vapor sample will be submitted to a NYSDOH ELAP-certified analytical laboratory for VOCs analysis by EPA Method TO-15. Laboratory analyses will be conducted in accordance with USEPA SW-846 methods and NYSDEC Analytical Services Protocol (ASP) B deliverable format.

RESPONSIBLE PERSONNEL	Name	Phone
Project Manager	Liz Elliott	212.609.8102
Site Manager	Mike Murphy	212.609.8091
Site Safety Officer	Mike Murphy	212.609.8102

Health, Safety, and Environment Representative _____ Date _____

REGIONAL HEALTH, SAFETY, AND ENVIRONMENT MANAGER (RHSEM) Steven Sherman, CIH

RHSEM PHONE NUMBERS 716.923.1363

EMERGENCY/CONTINGENCY INFORMATION

Hospital/Clinic South Nassau Communities Hospital Phone No. 516-763-2030

Hospital Address 2445 Oceanside Rd, Oceanside, NY 11572

Paramedic 911 Fire Dept. 911 Police Dept. 911

Hospital Directions:

To reach the hospital from the site:

1:Start out going NORTHEAST on OCEAN AVE toward ATLANTIC AVE.<0.1 miles
2:Turn RIGHT onto ATLANTIC AVE.0.8 miles
3:Turn LEFT onto LINCOLN AVE.0.2 miles
4:Turn RIGHT onto DAVISON AVE W.0.3 miles
5:Turn LEFT onto OCEANSIDE RD.0.5 miles
6:End at South Nassau Communities Hosp
2445 Oceanside Rd, Oceanside, NY 11572, US

Total Est. Time: 7 minutesTotal Est. Distance: 2.06 miles

EMERGENCY/CONTINGENCY PLAN

Coordinate evacuation procedures with the drilling contractor and remain a safe distance from the emergency. Perform First Aid/CPR as warranted by the situation. Do not move personnel with suspected neck or back injuries. Report all injuries to the supervisor (see Attachments). Note: the hospital route map is located in the Attachments.

CHEMICAL HAZARDS

Chemical Name	OSHA PEL	Concentration Present Soil	Water	Health Hazards/ Target Organs	Symptoms Of Overexposure
Tetrachloroethene	100 ppm			Eyes, skin, respiratory system, liver, kidneys,	Irritation eyes, skin, nose, throat,

			central nervous system	respiratory system; nausea; flush face, neck; dizziness, incoordination; headache, drowsiness; skin erythema (skin redness); liver damage; [potential occupational carcinogen]
Trichloroethene	100 ppm		Eyes, skin, respiratory system, heart, liver, kidneys, central nervous system	Irritation eyes, skin; headache, visual disturbance, lassitude (weakness, exhaustion), dizziness, tremor, drowsiness, nausea, vomiting; dermatitis; cardiac arrhythmias, paresthesia; liver injury; [potential occupational carcinogen]

PHYSICAL HAZARDS

Physical hazards are inherently present during geoprobe sampling activities. Common physical hazards include mechanical hazards; noise exposure associated with the operation of sampling equipment; slip-trip-fall hazards associated with the field environment; hazards associated with weather conditions; musculoskeletal injury resulting from lifting tasks; and explosion hazards from underground pipes or lines that may be encountered during the drilling process. The typical physical hazards anticipated to be present on the site and the methods for preventing injury due to these hazards are described below.

Sampling Equipment - Operation of Geoprobe sampling equipment during site activities presents potential physical hazards to personnel. During all site activities, personal protective equipment (PPE) such as steel-toed shoes, safety glasses or goggles, and hard hats should be worn whenever such

equipment is present, and personnel should at all times be aware of the location and operation of sampling equipment, and take precautions to avoid getting in the way of its operation.

Noise - The primary noise hazard at this site is from the Geoprobe drilling equipment. Whenever feasible, noise levels, identified as exceeding 85 decibels, will be reduced by means of personal protective equipment. Ear plugs and/or muffs will be worn at all times when URS personnel are within 25 feet of operating equipment. Hearing protection will also be worn in the vicinity of generators, concrete cutters, and any other high noise emitting equipment. See URS SMS 26 for additional information.

Slip-Trip-Fall Hazards - Slip-trip fall hazards are common at field sites due to open holes; muddy, slippery or unstable surfaces; and equipment on the ground. While it is difficult to eliminate all slip-trip-fall hazards, implementing safe work practices, utilizing proper footwear, and keeping the work area free of obstructions will minimize risk of injury.

Lifting Hazards - Field operations often require the performance of laborious tasks. All employees must implement proper lifting procedures, such as keeping the load close to the body, and using leg muscles instead of back muscles to perform lifting tasks. Additionally, employees will not attempt to lift large, heavy, or awkwardly shaped objects without assistance. See URS SMS 45 for additional information.

Weather - Weather conditions are an important consideration in planning and conducting site operations. Extremely hot or cold weather can cause physical discomfort, loss of efficiency and personal injury. Of particular importance at drilling sites is heat stress, often resulting from the use of impermeable protective clothing, which decreases the body's natural cooling processes.

Lightning may accompany storms, creating an electrocution hazard during outdoor operations. To eliminate this hazard, weather conditions will be monitored and work suspended during electrical storms.

The following potential weather hazard exists at the site:

__ Heat Stress
_X_ Cold Stress
___ Neither is anticipated

Underground Utilities - All proximal underground utility locations must be located by either URS or the drilling contractor prior to the commencement of drilling activities. The proper utility company personnel should certify the deactivation of utilities. See URS SMS 34 for additional information.

Overhead Hazards - Overhead power lines pose a danger of shock or electrocution if the power line is contacted or severed during site operations. Prior to conducting work in areas where overhead lines could be impacted, the appropriate utility company will be notified and information will be obtained regarding the line voltage and the minimum separation distance required for work in this area. See URS SMS 34 for additional information.

Work Area Protection - As the project operation may be undertaken in a roadway or parking lot, motor vehicles may be a hazard. Guidance on properly conning and flagging the work area is located in the Attachments. See URS SMS 32 for additional information.

MONITORING EQUIPMENT

The following monitoring equipment will be used during drilling activities:

___ Organic Vapor Analyzer	__X__ Microtip w/lamp 10.6 eV
___ HNu w/lamp __ eV	___ Organic Vapor Monitor w/lamp __ eV
___ Explosimeter	___ MiniRAE PID w/lamp ___ eV.

(T) The monitoring equipment must be calibrated in accordance with the manufacturer's instructions. In addition, the results of daily instrument calibrations shall be logged in the field logbook, or on the Daily Instrument Calibration Check Sheet found in the Attachments.

ACTION LEVELS

Action levels and response criteria are presented below. Initial monitoring is conducted on a regular basis (every 10 minutes) in the work area. All readings are to be recorded in the field logbook.

Analyzer Reading*	Location	Duration	Action	Personal Protective Equipment
< 15 ppm	Point of Operations/ Release Source point	_____	Continue periodic monitoring.	Minimum Site Ensemble (Hardhat, Steel-toed boots, eye protection, hearing protection)
> 15 ppm	Point of Operations/ Release Source point	>1 minute	Monitor OBZ; don protective clothing; establish work zones	Minimum Site Ensemble, PLUS: Tyvek coveralls□, Nitrile Outer Gloves, and Nitrile Inner (surgical) Gloves
< 15 ppm	OBZ	-----	No respirators required.	Same as above
> 15 ppm	OBZ	>1 minute	Provide respiratory protection; establish decon area	Add respirators with organic vapor cartridges (RHSEM will specify half face or full face respirators)
>75 ppm OR > 150 ppm	OBZ OBZ	>1 minute instanta-neous	Stop work; move upwind while vapors dissipate. If elevated levels remain, cover boring and cuttings, evacuate upwind and notify RHSEM or	As specified by RHSEM.

(OBZ - Operator's Breathing Zone)

SITE CONTROL

Work area barricades will be used to prevent access by unauthorized persons. Yellow caution tape and/or sawhorse-type barricades can be used for this purpose. Formal work zones will be implemented if the analyzer reading exceeds 15 ppm in the work area.

DECONTAMINATION PROCEDURES

Wash hands thoroughly before eating; clean-up and wash hands and face when work activities are completed. Formal decontamination procedures are required if the analyzer reading exceeds 15 ppm in the OBZ (see Attachments).

HEALTH AND SAFETY EQUIPMENT R = Required A = As Needed

R Hard Hat	R Eye Protection (Type) Safety Glasses
R Hearing Protection	R Gloves (Type) Nitrile gloves.
R Steel-toed Boots	A Chemical-resistant steel-toed Boots
A Orange Safety Vest	A Respirator (Type) Half-face APR
A Tyvek Coveralls	A Cartridges (Type) Organic Vapor
A Poly-coated Tyvek	R Fire Extinguisher
R First Aid Kit	___ Other _____

The HSP Preparer has conducted a Hazard Assessment for this project based upon information provided by the Project Manager, in accordance with 29 CFR 1910.132 (d).

HAZARD COMMUNICATION (MSDSs)

T TSP/Alconox	___ Hexane
T Isobutylene	___ Other

(T) See the information sheet found in the Attachments.

See URS SMS 002 for additional information.

INJURY AND ILLNESS PREVENTION PROGRAM

The purpose of this program is to provide and maintain a safe and healthful work environment and to reduce the incidence of work place injuries and illnesses (see Attachments). The SSO is responsible for implementing the Program during site activities. See URS SMS 005 for additional information.

ATTACHMENTS

- HOSPITAL ROUTE MAP
- INCIDENT REPORT FORM (SMS 049)
- MATERIAL SAFETY DATA SHEETS
- INJURY AND ILLNESS PREVENTION PROGRAM (California only)

SAFETY MANAGEMENT STANDARDS

The Project Manager is to append the following URS Safety Management Standards to this HSP:

SMS 2 - Worker Right to Know
SMS 12 - Electrical Safety
SMS 13 - Excavation Safety
SMS 14 - Fire Prevention
SMS 26 - Noise and Hearing Conservation
SMS 32 - Traffic Control
SMS 34 - Utility Clearances
SMS 46 - Subcontractor Health and Safety Requirements
SMS 47 - Biological Hazards
SMS 49 – Injury/Illness/Incident Reporting and Notifications
SMS 56 – Drilling Safety
SMS 57 - Vehicle Safety
SMS 64 - Hand Safety
SMS 65 - Injury Management
SMS 69- Manual Material Handling

These Safety Management Standards (SMS) are available on the URS Health, Safety, and Environment website. Access the website from the SoURSe home page through lotus notes or through the internet (www.urshse.com).

username: urshse
password: hardhat

Go to Safety Management Standards, and click on the "Print this SMS" link for each SMS.

GENERAL SITE RULES

- Eating, drinking, chewing gum or tobacco, and smoking are prohibited in the contaminated or potentially contaminated area or where the possibility for the transfer of contamination exists.
- Alcohol consumption is prohibited during work hours. Excessive drinking is strongly discouraged at all times while the team is in the field. Use of prescription medications that impair judgement or affect motor skill and all illegal drugs are also prohibited. For additional information, please review the URS Substance Abuse Policy. Behavior that could endanger the health or safety of any individual of the field team will not be tolerated. Any individual violating these requirements will be subject to disciplinary action that may include termination.
- Personnel will wash their hands and faces thoroughly with soap and water prior to eating, drinking, or smoking.

- Personnel will avoid contact with potentially contaminated substances. Do not walk through puddles, pools, mud, etc. Avoid, whenever possible, kneeling, leaning, or sitting on contaminated surfaces. Do not place monitoring equipment on potentially contaminated surfaces (i.e., the ground, etc.)
- All field crew members should remain alert to potentially dangerous situations in which they should not become involved (i.e., note the presence of strong, irritating, or nauseating odors, etc.).
- Only those vehicles and the equipment required to complete work tasks should be permitted within the EZ/work zone (drill rigs, excavators, and similar items). All non-essential vehicles should remain within the support zone.
- Containers, such as drums, will be moved only with the proper equipment and will be secured to prevent dropping or the loss of control during transport.
- Field survey instruments, such as PIDs, will be covered with plastic or similar coverings to minimize the potential for contamination.
- No matches or lighters are permitted in the work area/EZ or CRZ.
- Contaminated protective equipment, such as respirators, hoses, boots, and disposable protective clothing, will not be removed from the work area/EZ or decontamination area until it has been cleaned or properly packaged and labeled.
- Spills should be prevented, to the extent possible. Should a spill occur, any liquid should be contained, if possible.
- Splashing of contaminated materials should be prevented.
- Field crew members should be familiar with the physical characteristics of the site operations including:
    - Accessibility to equipment and vehicles;
    - Wind direction in relation to the contaminated area;
    - Areas of known or suspected contamination;
    - Site access; and
    - Nearest water sources.
- The number of personnel and equipment in the EZ should be minimized, but only to the extent consistent with workforce requirements for safe site operations.
- All wastes generated by URS activities at the site will be disposed of as directed by the PM.
- All personal protective equipment will be used as specified and required.
- The buddy system will be used at all times when sampling for hazardous material, when the first action level criteria has been exceeded, or when working in remote areas.
- Personnel are to immediately notify the SSO or Site Manager if any indications of potential explosions or unusual conditions are observed.

SAFETY COMPLIANCE AGREEMENT, BRIEFING FORM,
AIR MONITORING LOG, AND CALIBRATION CHECK SHEET
FOR (*)

I have read the Health and Safety Plan for the project and I understand it, and agree to comply with all of its provisions. I understand that I could be prohibited from working on the project for violating any of the health and safety requirements specified in the Plan.

	Name	Signature
URS Site Manager		
URS Site Safety Officer		
URS Site Personnel		
URS Site Personnel		

SAFETY ISSUES

	DISCUSSED Yes	No
Protective Clothing/Equipment	___	
Chemical and Physical Hazards	___	
Control Methods	___	
Air Monitoring Action Levels and Requirements	___	
Nearest Phone	___	
Hospital Name/Address/Directions	___	

Meeting conducted by: _____ Date: _____

Attendees' Names (print) **Signatures**

_____
_____
_____
_____
_____

DAILY INSTRUMENT CALIBRATION CHECK SHEET

DATE	INSTRUMENT	BATTERY CHECK OK?	ZERO ADJUST OK?	CALIBRATION GAS(PPM)	READING (PPM)	CALIBRATED BY

FIELD MONITORING ACTIVITY LOG

DATE	ACTIVITY MONITORED	TIME	LOCATION	READING	ACTION	READING BY

ATTACHMENTS

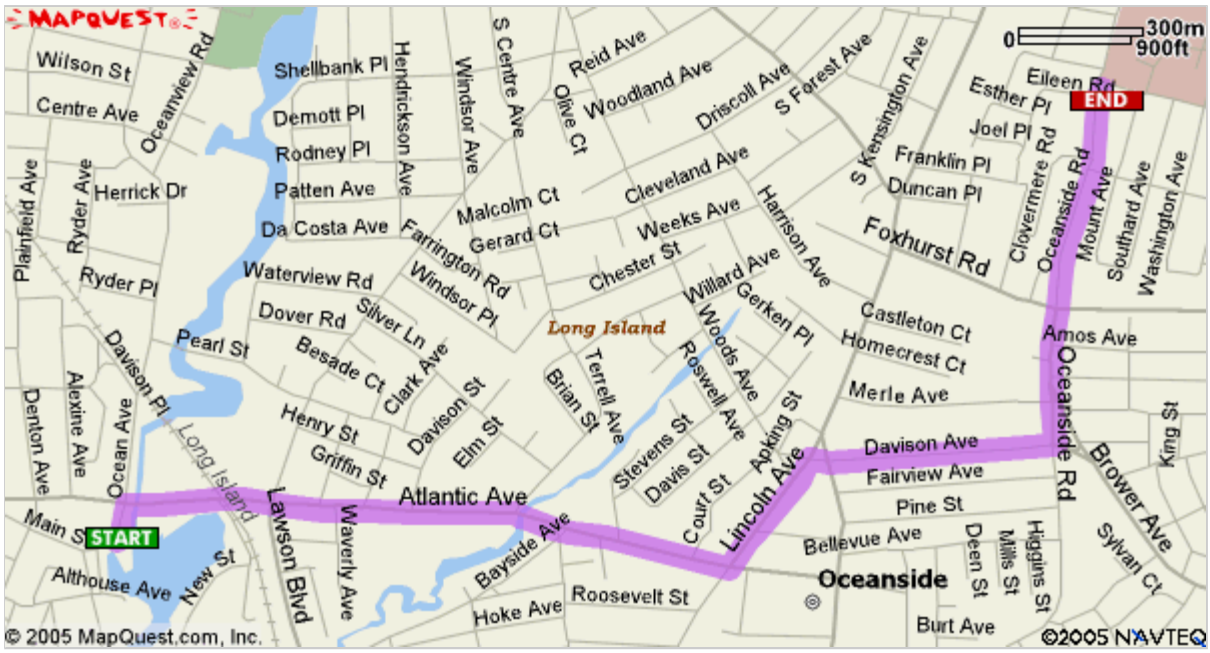
MAPQUEST

Start: **89 Ocean Ave**
East Rockaway, NY 11518-2004, US

End: **South Nassau Communities Hosp**: 516-763-2030
2445 Oceanside Rd, Oceanside, NY 11572, US

Notes:

Directions	Distance
Total Est. Time: 7 minutes **Total Est. Distance:** 2.06 miles	
START **1:** Start out going NORTHEAST on OCEAN AVE toward ATLANTIC AVE.	<0.1 miles
2: Turn RIGHT onto ATLANTIC AVE.	0.8 miles
3: Turn LEFT onto LINCOLN AVE.	0.2 miles
4: Turn RIGHT onto DAVISON AVE W.	0.3 miles
5: Turn LEFT onto OCEANSIDE RD.	0.5 miles
END **6:** End at **South Nassau Communities Hosp** 2445 Oceanside Rd, Oceanside, NY 11572, US	
Total Est. Time: 7 minutes **Total Est. Distance:** 2.06 miles	



Start:
89 Ocean Ave
East Rockaway, NY 11518-2004, US

End:
South Nassau Communities Hosp:
516-763-2030
2445 Oceanside Rd, Oceanside, NY 11572, US

MATERIAL SAFETY DATA SHEET
NSN: 7930011986050
Manufacturer's CAGE: 17534
Part No. Indicator: A
Part Number/Trade Name: ALCONOX

General Information

Item Name: DETERGENT, GENERAL PURPOSE
Company's Name: ALCONOX INC.
Company's Street: 215 PARK AVE SOUTH
Company's City: NEW YORK
Company's State: NY
Company's Country: US
Company's Zip Code: 10003-1603
Company's Emerg Ph #: 212-473-1300
Record No. For Safety Entry: 001
Tot Safety Entries This Stk#: 001
Status: SEU
Date MSDS Prepared: 01FEB91
Safety Data Review Date: 04DEC91
Supply Item Manager: CX
MSDS Serial Number: BLLFP
Hazard Characteristic Code: N1
Unit Of Issue: BX
Unit Of Issue Container Qty: 4.00 LBS
Type Of Container: BOX
Net Unit Weight: 4.00 LBS

Ingredients/Identity Information

Proprietary: NO
Ingredient: THE MANUFACTURER STATES THAT NO HAZARDOUS INGREDIENTS ARE PRESENT IN THIS PRODUCT.
Ingredient Sequence Number: 01
Percent: N/A
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE
Other Recommended Limit: NONE SPECIFIED

Physical/Chemical Characteristics

Appearance And Odor: WHITE POWDER INTERSPERSED WITH CREAM COLORED FLAKES, ODORLESS.
Boiling Point: N/A
Melting Point: N/A
Vapor Pressure (MM Hg/70 F): N/A
Vapor Density (Air=1): N/A
Specific Gravity: N/A
Evaporation Rate And Ref: N/A
Solubility In Water: APPRECIABLE (>10%)
Percent Volatiles By Volume: N/A
pH: N/A

Fire and Explosion Hazard Data

Flash Point: NONE
Lower Explosive Limit: N/A
Upper Explosive Limit: N/A
Extinguishing Media: WATER, CARBON DIOXIDE, FOAM, SAND/EARTH.
Special Fire Fighting Proc: FOR FIRES INVOLVING THIS MATERIAL DO NOT ENTER WITHOUT PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS.
Unusual Fire And Expl Hazrds: NONE

Reactivity Data

Stability: YES
Cond To Avoid (Stability): NONE

Materials To Avoid: STRONG ACIDS.
Hazardous Decomp Products: MAY RELEASE CARBON DIOXIDE GAS ON BURNING.
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): NOT APPLICABLE

Health Hazard Data

LD50-LC50 Mixture: UNKNOWN
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: NO
Route Of Entry - Ingestion: YES
Health Haz Acute And Chronic: INHALATION OF POWDER MAY PROVE LOCALLY IRRITATING TO MUCOUS MEMBRANES. INGESTION MAY CAUSE DISCOMFORT.
Carcinogenicity - NTP: NO
Carcinogenicity - IARC: NO
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: NOT APPLICABLE
Signs/Symptoms Of Overexp: INGESTION MAY CAUSE DIARRHEA.
Med Cond Aggravated By Exp: RESPIRATORY CONDITIONS.
Emergency/First Aid Proc: EYES: FLUSH WITH PLENTY OF WATER FOR 15 MIN. SKIN: FLUSH WITH PLENTY OF WATER. INGESTION: DRINK LARGE QUANTITIES OF WATER. GET MEDICAL ATTENTION FOR DISCOMFORT.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: MATERIAL FOAMS PROFUSELY. SHOVEL AND RECOVER AS MUCH AS POSSIBLE. RINSE REMAINDER TO SEWER. MATERIAL IS COMPLETELY BIODEGRADABLE.
Neutralizing Agent: NONE
Waste Disposal Method: SMALL QUANTITIES MAY BE DISPOSED OF IN SEWER. LARGE QUANTITIES SHOULD BE DISPOSED OF ACCORDING TO LOCAL REQUIREMENTS FOR NON-HAZARDOUS DETERGENTS.
Precautions-Handling/Storing: STORE IN A DRY AREA TO PREVENT CAKING.
Other Precautions: NO SPECIAL REQUIREMENTS OTHER THAN THE GOOD INDUSTRIAL HYGIENE AND SAFETY PRACTICES EMPOLYED WITH ANY INDUSTRIAL CHEMICAL.

Control Measures

Respiratory Protection: DUST MASK.
Ventilation: NORMAL LOCAL EXHAUST.
Protective Gloves: USEFUL BUT NOT REQUIRED.
Eye Protection: USEFUL BUT NOT REQUIRED.
Other Protective Equipment: NONE REQUIRED.
Work Hygienic Practices: NO SPECIAL PRACTICES REQUIRED.
Suppl. Safety & Health Data: NONE

Transportation Data

Trans Data Review Date: 91338
DOT PSN Code: ZZZ
DOT Proper Shipping Name: NOT REGULATED BY THIS MODE OF TRANSPORTATION
IMO PSN Code: ZZZ
IMO Proper Shipping Name: NOT REGULATED FOR THIS MODE OF TRANSPORTATION
IATA PSN Code: ZZZ
IATA Proper Shipping Name: NOT REGULATED BY THIS MODE OF TRANSPORTATION
AFI PSN Code: ZZZ
AFI Prop. Shipping Name: NOT REGULATED BY THIS MODE OF TRANSPORTATION
Additional Trans Data: NONE

Disposal Data

Label Data

Label Required: YES
Technical Review Date: 04DEC91
Label Date: 04DEC91
Label Status: F
Common Name: ALCONOX
Chronic Hazard: NO
Signal Word: CAUTION!

Acute Health Hazard-Slight: X
Contact Hazard-Slight: X
Fire Hazard-None: X
Reactivity Hazard-None: X
Special Hazard Precautions: INHALATION OF POWDER MAY PROVE LOCALLY IRRITATING TO MUCOUS MEMBRANES. INGESTION MAY CAUSE DISCOMFORT. STORE IN A DRY AREA TO PREVENT CAKING. FIRST AID: EYES: FLUSH WITH PLENTY OF WATER FOR 15 MIN. SKIN: FLUSH WITH PLENTY OF WATER. INGESTION: DRINK LARGE QUANTITIES OF WATER. GET MEDICAL ATTENTION FOR DISCOMFORT.
Protect Eye: Y
Protect Respiratory: Y
Label Name: ALCONOX INC.
Label Street: 215 PARK AVE SOUTH
Label City: NEW YORK
Label State: NY
Label Zip Code: 10003-1603
Label Country: US
Label Emergency Number: 212-473-1300

APPENDIX B

QUALITY ASSURANCE OFFICER RESUME

Material Safety Data Sheet

from Genium's Reference Collection
Genium Publishing Corporation
1145 Catalyn Street
Schenectady, NY 12303-1836 USA
(518) 377-8855

GENIUM PUBLISHING CORP.

No. 674

ISOBUTYLENE

Issued: November 1988

27

SECTION 1. MATERIAL IDENTIFICATION

Material Name: ISOBUTYLENE

Description (Origin/Uses): Obtained from refinery steams by absorption on 65% sulfuric acid (H_2SO_4) at 59°F (15°C). Used primarily to produce diisobutylene, trimers, butyl rubber, and other polymers; also used to produce antioxidants for foods, plastics, and packaging food supplements.

Other Designations: Isobutene; 2-Methylpropene; *gamma*-Butylene; $CH_2=C(CH_3)_2$; CAS No. 0115-11-7

Manufacturer: Contact your supplier or distributor. Consult the latest edition of the *Chemicalweek Buyers' Guide* (Genium ref. 73) for a list of suppliers.

NFPA

HMIS	
H 1	R 1
F 4	I 1
R 0	S 1
PPG*	K 4

*See sect. 8

SECTION 2. INGREDIENTS AND HAZARDS

	%	EXPOSURE LIMITS
Isobutylene, CAS No. 0115-11-57	Ca 100	OSHA PEL None Established ACGIH TLV, 1988-89 None Established NIOSH REL None Established Toxicity Data* Rat, Inhalation, LC_{50}: 620 g/m³ (4 Hrs) Mouse, Inhalation, LC_{50}: 415 g/m³ (2 Hrs)

*Monitor NIOSH, *RTECS* (UD0890000), for additional data.

SECTION 3. PHYSICAL DATA

Boiling Point: -19.6°F (-6.9°C)
Melting Point: -220°F (-140°C)
Vapor Density (Air = 1): 1.9
Specific Gravity (H_2O = 1): Ca 0.6

Molecular Weight: 56 Grams/Mole
Solubility in Water (%): Insoluble*
% Volatile by Volume: 100

Appearance and Odor: A colorless, extremely flammable gas; odor not listed.

*Isobutylene is very soluble in alcohol, ether, and sulfuric acid.

SECTION 4. FIRE AND EXPLOSION DATA

Flash Point*	Autoignition Temperature: 869°F (465°C)	LEL: 1.8% v/v	UEL: 9.6% v/v

Extinguishing Media: Isobutylene gas is an extremely flammable gas that has a substantial explosive air-gas range. For isobutylene fires, the recommended fire-fighting technique is to stop the flow of gas instead of extinguishing the fire. If the flames are extinguished and the isobutylene gas continues to escape or leak, an explosive air-gas mixture can form quickly and ignite without warning. A resulting explosion could cause greater damage than that which would be caused by allowing the fire to burn itself out. If the fire must be extinguished to allow safe access to shutoff valves, recommended extinguishing agents include CO_2 and dry chemical. Unusual Fire or Explosion Hazards: In many cases, the preferred strategy is to allow the flames to continue to burn and to cool the surroundings with water spray to prevent ignition of nearby combustibles. Isobutylene gas is heavier than air and can collect in low-lying, confined spaces. Potentially explosive air-gas mixtures are especially likely to build up in such an area, so enter it with extreme caution whether or not it is presently involved in a fire. Possible sources of ignition must not be brought into any area suspected of containing substantial concentrations of isobutylene gas. Special Fire-fighting Procedures: Wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in the pressure-demand or positive-pressure mode.

* Sax (Genium ref. 6) reports a flash point of -105°F (-76°C) for isobutylene.

SECTION 5. REACTIVITY DATA

Stability/Polymerization: Isobutylene is stable in closed, pressurized containers during routine operations at room temperature. Hazardous polymerization cannot occur. Chemical Incompatibilities: Isobutylene can react dangerously with strong oxidizing materials. Conditions to Avoid: Prevent exposing isobutylene to any source of ignition such as an open flame, sparks, lighted tobacco products, or steam lines. Hazardous Products of Decomposition: Isobutylene fires can produce toxic gases such as carbon monoxide (CO) or lower-molecular-weight hydrocarbons. Comments: The extreme flammability of isobutylene means that any reactions involving this material, including nonhazardous ones, must be performed carefully in order to prevent fires and/or explosions.

SECTION 6. HEALTH HAZARD INFORMATION

Carcinogenicity: Isobutylene is not listed as a carcinogen by the NTP, IARC, or OSHA.
Summary of Risks: Isobutylene is a simple asphyxiant. As such it will not cause significant physiological responses, but it can displace the minimum required atmospheric oxygen level. Significant displacement by isobutylene results in an oxygen-deficient atmosphere with no adequate warning properties. Asphyxiation fatalities can occur especially in confined, low-lying, poorly ventilated spaces because isobuty-

SECTION 6. HEALTH HAZARD INFORMATION, cont.

lene gas is almost twice as dense as air itself (see sect. 3). Medical Conditions Aggravated by Long-Term Exposure: None reported. Target Organs: None reported. Primary Entry: Inhalation. Acute Effects: Initial symptoms of the effects of simple asphyxiant gases are rapid respiration and air hunger, diminished mental alertness, and impaired muscular coordination. Continuing lack of oxygen causes faulty judgment, depression of all sensations, rapid fatigue, and emotional instability. As the asphyxia continues, nausea; vomiting; prostration; loss of consciousness; and, finally, convulsions; deep coma; and death can occur. Chronic Effects: None reported. FIRST AID: Inhalation. Would-be rescuers need to be concerned about their own safety when entering confined, poorly ventilated, oxygen-deficient areas. Self-contained breathing equipment must be readily available for rescuers. Station standby workers outside the immediate area so that they can summon additional help if it is needed. Remove the exposed person to fresh air; restore and/or support his or her breathing as needed. Have qualified medical personnel administer oxygen as required. Comments: The extreme flammability of isobutylene gas warrants special attention even during rescue operations. Rescue personnel must not smoke. All emergency lamps and floodlights that must be lowered into enclosed areas for rescue operations must be explosion proof. Obtain this equipment before any emergency occurs and make it accessible to emergency-response personnel. Get medical help (in plant, paramedic, community) for all exposures. Seek prompt medical assistance for further treatment, observation, and support after first aid.

SECTION 7. SPILL, LEAK, AND DISPOSAL PROCEDURES

Spill/Leak: *Treat any isobutylene gas leak as an emergency.* If the leaking gas has not yet ignited, use water spray to direct flammable gas-air mixtures away from sources of ignition. Extinguish all sources of ignition as quickly as possible; however, if the leaking gas is burning, do not attempt to extinguish the flames until the source of the isobutylene gas is located and sealed. Otherwise, flammable isobutylene gas-air mixtures can explode without warning and cause widespread damage that might not have occurred if the original fire had been allowed to burn itself out. If it is necessary to extinguish isobutylene flames in order to gain access to a shutoff valve, use dry chemical or carbon dioxide as extinguishing agents. Waste Disposal: Contact your supplier or a licensed contractor for detailed recommendations. Follow Federal, state, and local regulations.

OSHA Designations
Air Contaminant (29 CFR 1910.1000 Subpart Z): Not Listed
EPA Designations (40 CFR 302.4): Not Listed

SECTION 8. SPECIAL PROTECTION INFORMATION

Respirator: Follow OSHA respirator regulations (29 CFR 1910.134). For emergency or nonroutine operations (leaks or cleaning reactor vessels and storage tanks), wear an SCBA. Warning: Air-purifying respirators will *not* protect workers in oxygen-deficient atmospheres, which lack warning properties; to work in them safely requires that an SCBA be worn. Ventilation: Install and operate general and local maximum, explosion-proof ventilation systems powerful enough to maintain airborne levels of this material below the lower explosive limit cited in section 4. Local exhaust ventilation is preferred because it prevents dispersion of the contaminant into the general work area by eliminating it at its source. Consult the latest edition of Genium reference 103 for detailed recommendations. Safety Stations: Make emergency eyewash stations, safety/quick-drench showers, and washing facilities available in work areas. Contaminated Equipment: Contact lenses pose a special hazard; soft lenses may absorb irritants, and all lenses concentrate them. Do *not* wear contact lenses in any work area. Comments: Practice good personal hygiene; always wash thoroughly after using this material and before eating, drinking, smoking, using the toilet, or applying cosmetics. Keep it off your clothing and equipment. Avoid transferring it from your hands to your mouth while eating, drinking, or smoking. Do *not* eat, drink, or smoke in any work area. Do not inhale isobutylene vapor.

SECTION 9. SPECIAL PRECAUTIONS AND COMMENTS

Storage/Segregation: Store isobutylene in closed, pressurized containers in a cool, dry, well-ventilated area away from sources of ignition, combustible materials, and strong oxidizers. Protect containers from physical damage. Engineering Controls: Make sure all engineering systems (production, transportation) are of maximum explosion-proof design. Electrically ground and bond all containers, pipelines, etc., used in shipping, transferring, reacting, production, and sampling operations to prevent static sparks. Comments: Isobutylene is an extremely explosive and flammable gas. It must not be exposed to any possible source of ignition in work or storage areas.

Transportation Data (49 CFR 172.101-2)

DOT Shipping Name: Liquefied Petroleum Gas
DOT Hazard Class: Flammable Gas
ID No. UN1055
DOT Label: Flammable Gas
DOT Packaging Requirements: 49 CFR 173.304, .314, .315
DOT Packaging Exceptions: 49 CFR 173.306

IMO Shipping Name: Isobutylene
IMO Hazard Class: 2.1
IMO Label: Flammable Gas

References: 1, 6, 84-94, 116, 117, 120, 122.

Prepared by PJ Igoe, BS
Industrial Hygiene Review: DJ Wilson, CIH
Medical Review: W Silverman, MD

URS

Margaret Halasnik

Senior Environmental Scientist - Compliance Services Manager

Areas of Expertise

Data Validation
Environmental Due Diligence/Regulatory Compliance
Health & Safety Compliance
Quality Assurance

Years of Experience

With URS: 16 Years
With Other Firms: 4 Years

Education

BS/1985/Biology/Saint Michael's

Memberships

American Society of Safety Engineers

Overview

Ms Halasnik has over 20 years in the environmental field, with over 16 years with URS. Ms. Halasnik has extensive experience as a Project Manager for Phase I Environmental Site Assessments, Environmental Regulatory Compliance and Asbestos Building Surveys and Inspections for law firms, commercial and industrial clients and financial institutions throughout the United States for both single site and multi-site portfolios. Ms. Halasnik has served as a Project Manager for over 100 Environmental, Health and Safety (EHS) compliance assessments performed throughout the United States on behalf of a multi-national pharmaceutical/medical device/consumer products manufacturer. Ms. Halasnik is an AHERA licensed Building Inspector/Management Planner, a New York State licensed Asbestos Inspector and Management Planner and a Pennsylvania licensed Asbestos Inspector.

Project Specific Experience

ChevronTexaco, New Jersey – Project Health and Safety Officer and Data Validation Project Manager for an active asphalt refinery/tank terminal facility. Responsibilities include development and review of site-specific project health & safety programs to support remedial investigation and construction activities. Serve as Senior Chemical Data Evaluator for ongoing soil and groundwater sampling activities to determine data usability of organic and inorganic laboratory analyses.

Confidential Client – Quality Assurance Coordinator and Project Manager – Managed a $1M Phase II Environmental Site Investigation project involving 8 sites in both the United States and Europe for an electronics equipment manufacturer. Project responsibilities included development of Phase II work plans, ensuring that project activities were conducted consistent with project-specific Standard Operating Procedures (SOPs) and QAPP, performance of a QA audit during on-site activities, monitoring of laboratory QA activities, results report preparation and review, quality assurance reviews of soil and groundwater analytical data using USEPA National Functional Guidelines for Organic and Inorganic Data, primary client contact, and project budget and tracking. Supplemental Phase II Investigation work was awarded at two sites with reporting to regulatory agencies and implementation of remedial response measures.

US Army Corps of Engineers (USACE), Kansas City District – Chemical data evaluator for USEPA superfund project following project Quality Assurance Project Plan (QAPP), USACE Kansas City District data evaluation guidance and USEPA Region II Data Validation Guidelines. Project QAPP was developed in accordance with USACE Engineer Manual EM-200-1-3, *Requirements for the Preparation of Sampling and Analysis Plans* (USACE 1994), USACE Engineer Manual EM-200-1-2, *Technical Project Planning* (USACE 1998), *EPA Requirements for Quality Assurance Project Plans for Environmental Data Operations* (1999a), and *EPA*

Guidance for Quality Assurance Project Plans (1998b). Perform data validation/quality assurance reviews to determine data usability of organic and inorganic laboratory analyses of field-collected soil and groundwater samples. Responsibilities include data evaluation, report preparation, ensuring laboratory compliance with project QAPP, client and laboratory contact and comment resolution.

US Army Corps of Engineers (USACE), Kansas City District – Project Health & Safety Officer for a USEPA superfund project in Central New Jersey. Responsibilities include health & safety oversight, implementation of USACE/USEPA approved project health & safety program by field staff, project coordination and management during soil and groundwater investigation programs and quarterly/semiannual environmental surveillance sampling activities, primary laboratory contact and comment/dispute resolution.

American Airlines, JFK Airport, Jamaica, New York - Organic and Inorganic Data Validation - Chemical data evaluator for a remediation/design/build project at JFK Airport, Jamaica, New York. Responsibilities include the performance of data validation/quality assurance reviews of soil and groundwater analytical data to assess data usability and compliance with the modified New York State Department of Environmental Conservation (NYSDEC) Category A Data Deliverable format requirements. Guidance for the evaluation of laboratory data was obtained from the standard operating procedures for the validation of volatile organic and semi-volatile organic data using USEPA Region II SW-846 Method 8260B, SOP HW-24, Rev. 1 and Method 8270C, SOP HW-22, Rev. 2, respectively. Responsibilities include data evaluation, report preparation, client and laboratory contact and comment resolution.

Project Manager for over 100 Environmental, Health, and Safety (EHS) Assessments of External Manufacturers on behalf of a multi-national pharmaceutical/medical device manufacturer. Project responsibilities included performance of EHS Assessments and general compliance review, completion of client provided Environmental Health & Safety questionnaires, report preparation and review, client contact and project and budget tracking.

Regulatory Environmental Compliance Audit team member for annual audits for Church & Dwight Co. Inc. Audits included review of federal and state air, water, hazardous waste, community right-to-know, and site remediation compliance, including applicable permits, soil and groundwater monitoring data, and overall environmental compliance at multiple Church & Dwight facilities.

Westinghouse-Bettis, Bettis Atomic Power Laboratory - Project Manager Organic and Inorganic Data Validation for a three-year contract performing data validation to evaluate data usability with respect to Client-provided Data Validation Specification and Region III Modifications to the National Functional Guidelines for Organic and Inorganic Analyses of soil and groundwater samples. Responsibilities included data evaluation, report preparation, primary client and laboratory contact and comment resolution.

EHS Auditor of External Manufacturers on behalf of a pharmaceutical/consumer products company (Confidential Client). Project responsibilities included performance of external manufacturer EHS Assessments and overall environmental and health & safety compliance reviews, completion of client provided Environmental, Health & Safety and Employment questionnaire and report preparation and review.

Project Manager for a 63-site Phase I Environmental Site Assessment (ESA) property acquisition for an electrical distribution and supply company. Perform Phase I ESAs under the ASTM guidelines to identify potential areas of environmental concern prior to property acquisition. Responsibilities include site visits, contacting federal, state and local regulatory officials and report preparation and review.

Health and Safety Compliance (New Jersey Turnpike Authority) – Evaluated compliance of health and safety report submittals with environmental contract specifications and approved Health and Safety Plans for a 5-year major highway construction-widening project. Evaluation process included identification of contract deficiencies, designing corrective actions for environmental workplace hazards and the preparation of deficiency response correspondence for section engineers, engineering design consultant and the New Jersey Turnpike Authority.

Organics and Inorganic Data Review (Various public and private sector clients) - Perform data validation/quality assurance reviews to determine data usability with respect to USEPA National Functional Guidelines for Organic and Inorganic Data Review including USEPA Regions I, II and III, (Modifications), New Jersey Department of Environmental Protection (NJDEP), New York State Department of Environmental Conservation (NYSDEC) and Pennsylvania Department of Environmental Protection (PADEP) regulations for organic and inorganic laboratory analyses of environmental soil and groundwater samples. Responsibilities include data evaluation, report preparation and review, client contact and laboratory analytical contact and coordinator.

Laboratory Director for a multi-functional laboratory involving the analysis of air, water and bulk samples for airborne and industrial hygiene-related contaminants. Developed comprehensive quality assurance/quality control programs that were evaluated and approved for use by the American Industrial Hygiene Association, New York State Department of Health Environmental Laboratory Approval Program and National Institute of Standards and Technology National Voluntary Laboratory Accreditation Program. Designed and implemented OSHA Chemical Hygiene Plan for laboratory practices and procedures.

Defense Litigation (Confidential Client). Project team member assigned to provide technical support in defense litigation proceedings for multiple sites across the continental United States. Technical support was supplied in the form of building material quantity calculations, preparation of productivity and operation and maintenance cost estimates and quality assurance activities.

URS

Project Team Member - Assigned to perform asbestos building inspections for the New York City Division of General Services (NYCDGS) in support of a fire sprinkler retro-fit/fire system upgrade in 13 NYCDGS run office facilities and courthouses (total project square footage in excess of 11 million SF) and performed asbestos building inspections for both commercial and industrial clients in a variety of settings (projects ranging in size from 5,000 SF to over 1 million SF).

Project Manager for nationwide assessment of 66 AT&T communications facilities. Project activities included the completion of building surveys for suspect asbestos-containing materials, preparation of detailed survey documents, tables and drawings, interpretation of laboratory analytical results, report preparation, client contact, project quality assurance review activities, budget tracking and coordination and final report review from participating offices.

Asbestos Management Plans – Project manager for preparation of 15 Asbestos Management Plans throughout the United States for a large retail shopping mall developer. Responsibilities included preparation of management plans, coordination and quality assurance review of plans prepared by other URS offices, project and budget tracking and final management plan distribution.

Office Safety Coordinator - Coordinate OSHA training in accordance with 29 CFR 1910.120. Maintain office/training and medical surveillance databases. Function as a liaison between professional staff, management and corporate medical surveillance group. Prepare and approve health and safety plans for environmental field investigations in accordance with OSHA and company policy and procedures.

Specialized Training

USEPA – AHERA Accredited Asbestos Inspector (No. 009171)
USEPA – AHERA Accredited Management Planner (No. 009164)
NYS Certified Asbestos Inspector (AH-96-21895)
NYS Certified Asbestos Management Planner (AH-96-21895)
Pennsylvania Asbestos Inspector (026078)
40-Hour Health & Safety Training for Hazardous Waste Operations
8-Hour Supervisor Health & Safety Training for Hazardous Waste Operations