CDM

FINAL WORK PLAN
SITE CHARACTERIZATION
Speonk Solvent Plume
(Site No.:1-52-185)
Southampton, Suffolk County, New York

Prepared for

New York State Department of Environmental Conservation
Investigation and Design Engineering Services
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Introduction

This Work Plan for the Speonk Solvent Plume (herein referred to as the "Site") was prepared by Camp Dresser and McKee (CDM) for the New York State Department of Environmental Conservation (NYSDEC) under the Engineering Services for Investigation and Design, Standby Contract No. D004437. Background and site information used in the development of this Work Plan was furnished by NYSDEC. The work plan was developed in accordance with "State Superfund Standby Contract Work Assignment D004437-26, Site Characterization, Speonk Solvent Plume, Site No. 1-52-185."

The Site occupies approximately 600 acres of Southampton Township, Suffolk County and is centered near the intersection of Phillips Avenue and Old Country Road. The plume is approximately 7500 feet long, running approximately north-south. Based upon previous data, the primary contaminants of concern are tetrachloroethene (PCE), trichloroethene (TCE), chloroform and carbon tetrachloride.

1.1 Purpose and Objectives

The purpose of this work assignment is to determine the source or sources of the Speonk Solvent plume. The objectives of the field work are to find areas of residual soil contamination that may be continuing sources of groundwater contamination, obtain additional stratigraphic and groundwater quality data in these areas (including at the base of the upper glacial aquifer), and characterize the vertical and horizontal components of groundwater flow.

The collective body of information, which will include the data collected during this field investigation, previous data collected, and the results of historic records searches for select area properties, will be evaluated to determine probable source properties of the Speonk Solvent Plume. The results of the investigation will be further evaluated to determine if any properties should be listed as a New York State Hazardous Waste Site.

A multi-phased approach will be used to guide the field investigations toward the source area(s). Where appropriate, real-time field (e.g., Triad) data will be utilized to guide sampling decisions. The investigation will include:

- Groundwater modeling exercises, including particle backtracking using existing groundwater data, to evaluate possible source areas.
- Passive soil gas investigations, including a total of up to 75 gas probes, to screen potential source areas for VOC contamination and focus drilling efforts.
- Where possible source areas are in undeveloped locations, perform geophysical surveys to check for buried drums or tanks that may be present.

- Based upon groundwater modeling exercises, passive soil gas results and other pertinent data, select up to soil 10 boring locations. If necessary (such as on the interior of developed properties where utility companies do not mark out), perform geophysical surveys to identify subsurface utilities and clear the boring locations prior to drilling.

- Perform 10 soil borings and collect up to two soil samples from the vadose zone at each boring location for laboratory analysis of volatile organic compounds (VOC). If gross contamination is observed at the water table, continue to collect soil samples below the water table. At up to three locations continuous soil sampling will resume at a depth of 180 feet in order to determine the depth of the base of the upper glacial aquifer. For budgetary purposes, it is assumed that the base of the upper glacial aquifer is approximately 200 feet deep.

- After completion of soil sampling, advance the soil borings to depths of approximately 200 feet, and collect groundwater samples at 10-foot depth intervals. Groundwater samples will be screened for volatile organics with a PID, and approximately 50 percent of the samples will be selected for laboratory analysis. This will likely be performed from the bottom up as this is much more efficient; sampling vertically downward would likely require multiple boreholes at each location and increase costs significantly.

- Perform laboratory analysis of selected samples on a 1-week turnaround time and use the results to guide subsequent drilling locations.

- Select up to 5 additional boring locations based upon results from the first ten locations and perform groundwater profiling to 200 feet.

- Based upon stratigraphy, soil quality data and groundwater quality data, select three locations to install monitoring well clusters. Two monitoring wells will be installed at each cluster to evaluate vertical gradients and groundwater quality.

- Survey the locations and elevations of the six new monitoring wells, 15 new borings/groundwater profile locations, up to 75 new passive soil gas sample locations, and new Suffolk County groundwater profiling locations.

- Sample the six new monitoring wells, and up to six existing wells, for analysis of volatile organic compounds.

- Dispose of investigation derived waste.

1.2 Site Description and Background

1.2.1 Site Description

The Site occupies approximately 600 acres of Southampton Township, Suffolk County and is centered near the intersection of Phillips Avenue and Old Country Road. A site location map is provided as Figure 1-1. According to the United States Geological

Survey (USGS) *Eastport, New York* 7.5-Minute topographic map (1984), the Site lies approximately 30 to 60 feet above mean sea level (msl).

Previous investigations have characterized the plume as approximately 7,500 feet long, running approximately north-south. North of Old Country Road the Site is generally undeveloped, while south of Old Country Road the Site is primarily comprised of suburban residential properties. Commercial and industrial properties present in the area include:

- Sand and Gravel pit at the north end of the Site
- Asphalt plant at the north end of the Site
- Automobile junk yards near the northeast corner of the Site and near the southeast corner of the Site
- A duck research facility just west side of the Site
- A building supply distributor just east of the Site.
- Freight railroad yard at southern portion of the Site.

Former industries in the area include:

- A chromated copper arsenate (CCA) wood treatment plant near the northeast corner of the Site (presently the building supply distributor).
- Creosote wood treatment facility near the south end of the Site.
- Feather processing facility in the southwest portion of the Site.
- Septic service company west of the Site.
- Former weapons test range at north end of the Site

1.2.2 Site History

The Speonk solvent plume was first discovered in December 2001 when a residential private well was sampled as part of a property transaction. Chlorinated volatile organics were detected in the sample, including 1,200 µg/l of PCE. Based upon these results, the Suffolk County Department of Health Services (SCDHS) sampled additional residential wells in the area. PCE was found at another nearby residence, at a concentration of 820 µg/l (ERM, 2007).

The SCDHS subsequently installed 15 vertical groundwater profile borings, and installed monitoring wells at each location. In addition, 45 private potable wells were sampled. The objective of this investigation was to delineate the impacted groundwater (ERM, 2007).

Five of the potable wells contained chlorinated volatile organic compounds (CVOC) exceeding New York State Groundwater Quality Standards. CVOCs exceeding the standards were PCE; TCE; 1,1,1-trichloroethane (1,1,1-TCA); chloroform and carbon tetrachloride. The highest total CVOC concentration was 1,673 μg/l (ERM, 2007).

Under contract to NYSDEC, Environmental Resources Management (ERM) performed a site characterization between February 2004 and January 2007. The following activities were performed during the ERM site assessment:

- Passive soil gas sampling
- Soil vapor, sub-slab vapor and indoor air sampling
- Vertical groundwater profiling by mud rotary drilling and Hydropunch®
- Monitoring well installation and sampling.

The findings were presented in a preliminary site assessment report (ERM, 2007). While additional delineation was performed, the source of the Speonk solvent plume could not be determined. The data collected during the Preliminary Site Assessment indicate the following:

- Groundwater is 20 to 45 feet deep at the Site, and flows south-southwest.
- The solvent plume is approximately 10,000 feet long.
- Primary contaminants of concern include TCE, PCE, chloroform and carbon tetrachloride
- Groundwater concentrations detected are generally on the order 100 μg/l. Local areas of elevated concentrations on the order of 1,000 μg/l, have also been detected. These areas include GB-04 in the Circle Place area (at the approximate midpoint of the plume length), and MW-18 and MW-21 near the intersection of Wisteria Drive and Montauk Highway (near the southern limit of the mapped plume).
- Based upon vertical contaminant distribution maps, groundwater concentrations generally increase with depth to maximum concentrations at an approximate elevation -50 to -75 msl. Based on the data reported, decreasing concentration trends were generally observed below these elevations.
- The solvent plume appears to be migrating toward the surface as it moves downgradient in a southerly direction. The maximum concentrations were found at approximate elevation -75 msl at the north (upgradient) end of the Site, and at approximate elevation -50 msl at the south (downgradient) end of the Site.

- Elevated passive soil gas results, compared to the surrounding area, were found in the Circle Place area (soil vapor probes SV-CO1, SV-CO2SV-E02 and), and at the Old Country Road Pink Building (soil vapor probe SV-F05-SV-21). Based upon the results, a CVOC source may be present in the vicinity of these sample locations.

1.3 Environmental Setting

The Speonk Solvent Plume Site lies between approximate elevations of 30 to 60 feet above mean sea level (msl). Local topography slopes from the northeast to the southwest in the vicinity of the Site (USGS *Eastport, New York* 7.5-Minute topographic map, 1984). In consideration of the size of the Site (600 acres, with a plume approximately 7,500 feet long), this reflects the relatively gentle topography of the glacial outwash deposits of that form the ground surface of southern Long Island.

1.3.1 Regional Geology

Long Island is comprised of Cretaceous and Pleistocene unconsolidated deposits overlying a southward sloping surface of Early Paleozoic to Precambrian bedrock. The hydrogeology of Long Island has been well documented over the years by the USGS (Doriski and Wilde-Katz, 1983; Smolensky et al, 1989). The resulting wedge of sediments thickens southeasterly from its thinnest point in northern Queens, to a maximum thickness of 2,000 feet in southeastern Long Island.

Three major aquifers are present on Long Island, in order of increasing depth: the upper glacial aquifer, the Magothy aquifer and the Lloyd aquifer. A major confining unit, the Raritan Clay, separates the Lloyd aquifer from the overlying Magothy aquifer. The upper glacial aquifer is a water table aquifer comprised of glacial drift and outwash. The upper glacial and Magothy aquifers are often in direct hydraulic communication; however, they may be separated locally by thinner geologic formations along the south shore. The geologic formations that comprise Long Island's aquifer system in the site area are discussed further below.

1.3.1.1 Bedrock

The bedrock beneath Long Island is comprised of Paleozoic to Precambrian mica schist, gneiss and granite. A veneer of saprolite (weathered rock) overlies the bedrock formations. The bedrock is poorly permeable to virtually impermeable, and forms the lower boundary or Long Island's groundwater system (Smolensky, et al. 1989). The groundwater system consists of the overlying unconsolidated Cretaceous and Pleistocene formations.

1.3.1.2 Cretaceous Sediments

The Cretaceous sediments on Long Island area comprised of, from oldest to youngest, the Raritan Formation, the Magothy Formation and the Monmouth Greensand. Each of these formations is discussed below.

The Raritan Formation is divided into the basal Lloyd Sand Member and the overlying Raritan Clay Member. The Lloyd Sand is composed of white and grey fine to coarse sand and gravel, commonly with a clayey matrix. It rests unconformably on bedrock and is about 300 feet thick in the vicinity of the Site. The top of the Lloyd Sand is found at approximately 1,400 feet below msl (Smolensky, et al. 1989.

The Raritan Clay Member is composed chiefly of bedded variegated clay and silt, locally containing interbedded sands. Lignite fragments and iron and pyrite nodules are common. The clay member is approximately 300 feet thick in the vicinity of the Site. The top of the Raritan Clay is found at approximately 1,100 feet below MSL at the Site (Smolensky, et al. 1989).

The Magothy Formation unconformably overlies the Raritan; the contact is commonly marked by a change from the solid clays of the Raritan Clay Member to coarse sands and gravels of the basal unit of the Magothy. The dominant Magothy lithology generally is fine to medium quartz sand, interbedded with coarse sand, sandy clay and solid clay. The thickness of the Magothy is approximately 800 to 900 feet at the Site (Smolensky, et al. 1989).

The Monmouth Group-Monmouth Greensand unconformably overlies the Magothy Formation along the south shore of eastern Long Island. This formation is composed of clay, silt and sand and is rich in glauconite. The Monmouth greensand ranges in color from dark gray to greenish gray to black (Smolensky, et al. 1989). The Site is in the vicinity of the northern limit of the Monmouth Greensand, therefore it is expected to be very thin (it increases in thickness to the south, and is approximately 100 feet thick beneath Fire Island). The top of the Monmouth greensand is approximately 150 feet below msl based upon published maps (Smolensky, et al. 1989). Evidence of the Monmouth greensand was found 200 feet below ground surface during the BB&S Pre-Design Investigation Report (Earth Tech Northeast, 2007), at MWPD-1D. Assuming a ground surface elevation of 60 feet, the reported occurrence of the Monmouth greensand at MWPD-1D is at 140 feet below msl, consistent with the elevation expected based upon Smolensky, et al. 1989.

1.3.1.3 Quaternary Sediments

Quaternary deposits unconformably overly the Cretaceous deposits. The Gardiners Clay is composed of grayish green and brown silt and clay, also contains a few layers of sand. This formation also contains marine shells and green glauconite. Based upon information published by the USGS, the Site is in the vicinity of the northern limit of the Gardiners Clay; therefore, if it is present it is expected to very thin, and approximately 150 feet below sea level (Smolensky, et al. 1989). The Gardiners Clay is not believed to be continuous in this area. As discussed in Section 1.4, Suffolk County Department of Health Services (SCDHS) reported encountering the Gardiner's Clay 85-90 below ground surface at the southern end of the Site, along Montauk Highway.

The reported lithologies of the Gardiners Clay and the Monmouth Greensand overlap, and they are expected to be in contact with each other if both are present. Therefore, it may be difficult to distinguish them with certainty at the Site.

The shallowest Pleistocene deposits are those of the upper glacial aquifer. These deposits are comprised of glacial till of the terminal moraines along the central axis of Long Island, and outwash deposits between and south of the Moraines. The Site is near the south shore of Long Island, within the outwash deposits which are dominated by fine to coarse sand and gravel.

The upper glacial deposits are expected to be approximately 150 feet thick or more in the vicinity of the Site (Smolensky, et al. 1989). The base of the unit is expected to be at approximately 150 feet below msl.

1.3.2 Regional Hydrogeology

The hydrogeology of Long Island has been well documented over the years by the USGS and others. Three major aquifers are present on Long Island: the upper glacial aquifer, the Magothy aquifer and the Lloyd aquifer. One major confining layer, the Raritan Clay, also exists. These major hydrogeologic units are discussed below.

1.3.2.1 Lloyd Aquifer

The Lloyd aquifer overlies the saprolitic bedrock surface and is Long Island's deepest aquifer. The aquifer does not outcrop on Long Island and is believed to extend to the north beneath Long Island Sound in eastern Nassau County and in Suffolk County, and offshore to the south, beyond the barrier beaches. The Lloyd aquifer is confined in most places, except where the overlying Raritan clay has been eroded away (northern Long Island).

The average horizontal hydraulic conductivity is reported to be approximately 40 ft/day. Vertical anisotropy is estimated as 10:1 (Smolensky, et al. 1989). The Lloyd aquifer is approximately 300 feet thick at the Site; the top is found approximately 1,400 feet below msl.

1.3.2.2 Raritan Clay

Overlying the Lloyd aquifer is the Cretaceous age clay member of the Raritan Formation, referred to as the Raritan clay. The average vertical hydraulic conductivity is reported to be approximately 0.001 ft/day (Smolensky, et al. 1989). The Raritan Clay functions as a confining unit for the Lloyd aquifer. However, the clay is not present in northern Long Island.

The Raritan Clay is approximately 300 feet thick in the vicinity of the Site. The top of the Raritan clay is found at approximately 1,100 feet below msl.

1.3.2.3 Magothy Aquifer

The Magothy aquifer is the principal water supply aquifer in Nassau and Suffolk Counties, attributing to its thickness. Its average horizontal hydraulic conductivity is reported to be approximately 50 ft/day with a vertical anisotropy of 100:1 (Smolensky et al, 1989). It is generally unconfined and in direct connection with the overlying upper glacial aquifer. Confining conditions may exist locally, for example where the Gardiners Clay is present. The Magothy is approximately 800 to 900 feet thick at the Site.

1.3.2.4 Upper Glacial Aquifer

The upper glacial aquifer is the surficial water bearing unit on Long Island and is generally unconfined. However, local confining conditions may exist where local low-permeability layers are present within the formation.

The upper glacial aquifer is comprised of till deposits along the terminal moraine, and outwash deposits to the north and south. The estimated average horizontal hydraulic conductivity is 270 ft/day, with the till being about half as conductive as the outwash deposits. The vertical anisotropy is approximately 10:1 (Smolensky, et al. 1989).

The Site is located within the outwash deposits, which are moderately to highly permeable. As discussed in Section 1.4, the upper glacial aquifer ranges from 85 to 150 feet thick or more in the vicinity of the Site.

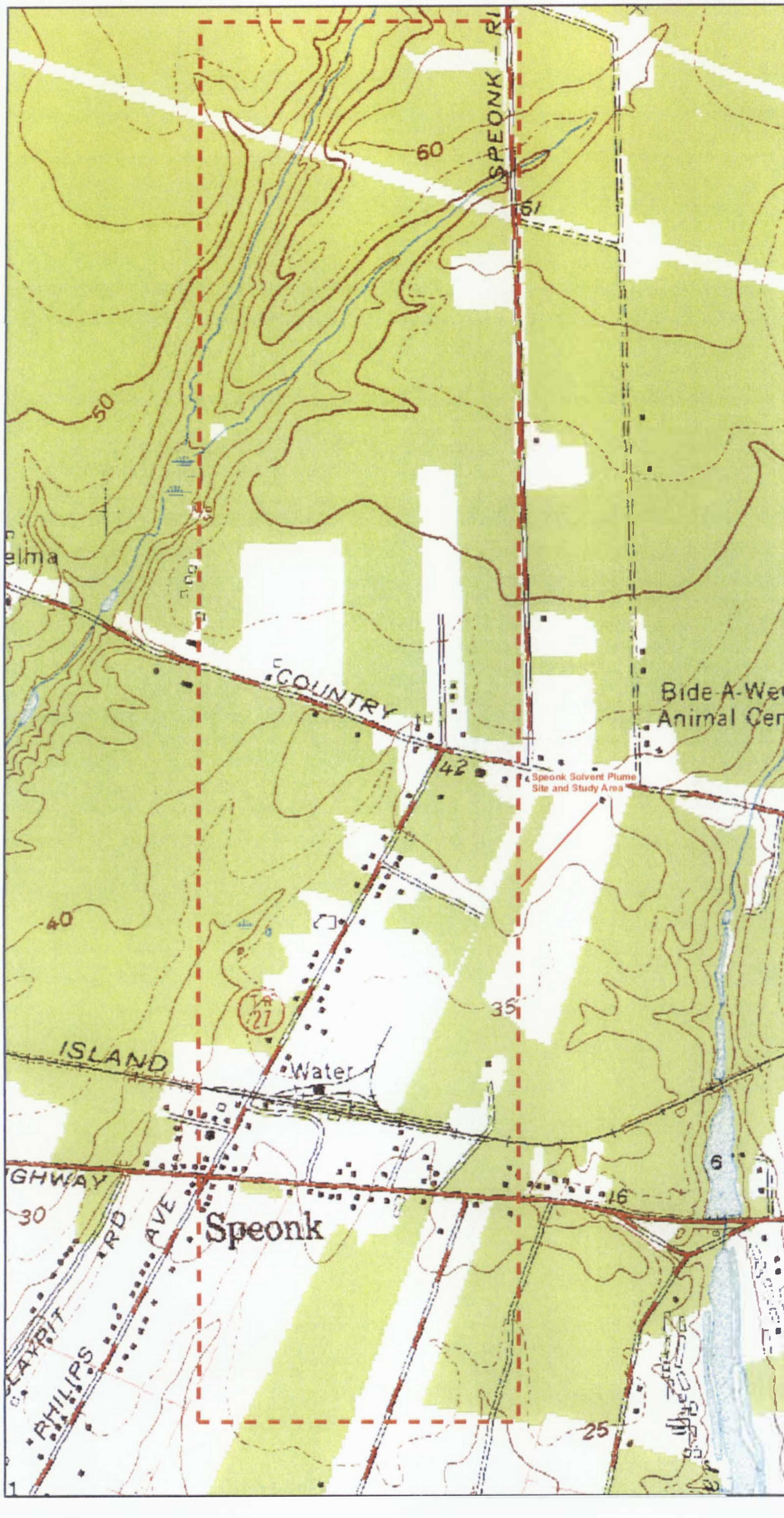
1.4 Local Hydrogeology

The upper glacial aquifer is estimated to be approximately 150 feet thick or more at the Site based upon published geologic reports, and was reported to be approximately 200 feet thick at MWPD-1D at the BB&S Site (Earth Tech Northeast, 2007). However, SCDHS reported encountering the Gardiners Clay at depths of 85 to 90 feet below ground surface at the southern part of the Site, along Montauk Highway. Based upon this information, the upper glacial aquifer is much thinner in this area than in the northern part of the Site, where the Gardiners Clay is believed to be absent.

The Magothy aquifer is expected to be approximately 800 to 900 feet thick at the Site. The Raritan Clay is a major confining layer that defines the bottom of the Magothy aquifer. The upper glacial and Magothy aquifer are hydraulically connected throughout portions of the study area. However, two intervening formations have been found below the upper glacial aquifer at the Site. The Gardiners Clay has been reported to be present at the southern end of the Site, as discussed above. Its presence would cause local confining conditions in the Magothy Aquifer. The Monmouth Greensand has been reported to be present at a depth of approximately 200 feet at BB&S well MWPD-1D, at the northern portion of the Site (Earth Tech Northeast, 2007).

The water table was reported to be approximately 19 to 40 feet below grade, at approximate elevations 5 to 19 feet msl. Groundwater flow is to the south-southwest (ERM, 2007). The Site is centrally located between two north-south trending reaches of Moriches Bay and their accompanying streams (Seatuck Creek, Little Seatuck Creek and East River to the west; Speonk River to the East). The East River and a tributary stream flow southwesterly across the northern portion of the Site, into a wetland at their confluence at the head of East River. This wetland is at the western edge of the Site. East River continues southeasterly from the wetland into Moriches Bay (Figure 1-1).

Groundwater and surface water discharge to Moriches Bay, south of the Site. In the vicinity of the streams and the northern reaches of Moriches Bay, local groundwater flow is likely diverted towards those surface water bodies.



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Source:United States Department of the Interior Geological Survey

Eastport Quad

Figure 1-1
Speonk Study Plume Site
Site Location Map
NYSDEC Site No. 1-52-185

CDM

Section 2
Scope of Work

Identification of the source or sources of the Speonk solvent plume is complicated by several variables concerning plume behavior that have not been characterized. These include:

- The number of sources is unknown. The three observed "hot spots" could be the result of multiple releases at the same source, or releases at more than one source.
- Age and mobility of the plume - the date of the release(s) is unknown. The rate of migration of the plume would be controlled by advection, matrix retardation and natural degradation, which have not been quantified at the Site. The general lack of degradation products suggests that biodegradation is not significant.
- Vertical distribution of contamination - The maximum CVOC concentrations are found on the order of 50 to 75 feet below the water table, and seem to be migrating toward the surface as the plume moves south. This could indicate that contamination originated at a distant upgradient source in a recharge area.
- Phase of the original release - if the CVOCs were released as dense non-aqueous phase liquid (DNAPL), source mass would have moved downward until a lower permeability zone was encountered (possibly the Gardiner's clay or Magothy formation). The pattern of maximum dissolved concentrations observed on the order of 50 to 75 feet below the water table could represent preferential plume migration in a more permeable zone encountered as the DNAPL moved downward. In this scenario, groundwater concentrations would be expected increase again in deeper strata near the low permeability zone, in the vicinity of the DNAPL.

The anticipated investigation activities will be performed in two parts. The first part includes the initial site visit (Task 1A), evaluation of existing data including groundwater flow and contaminant transport modeling (Task 1B) and property records searches Task 1C). Tasks 1A, 1B and 1C will be used to guide the second part will be the field program, which will include intrusive work to attempt to find the source(s) of contamination. This sequence of field work is designed to increase the probability of finding the source(s) amidst a large number of properties and hydrogeochemical variables.

2.1 Task 1A - Site Visit and Work Plan Development

A site visit was conducted on January 31, 2008. Notable findings during the site visit include:

- Drum remnants were observed in the ground in the area of the so-called "crop circle".

- A representative at the duck research facility indicated that carbon tetrachloride was used at the former duck processing facility.

- A representative at the duck research facility also indicated that BB&S used creosote to preserve wood at their former location south of the railroad. BB&S moved to its former CCA treatment facility in the 1960s. It is not known for certain whether the creosote process was used at the new facility, prior to changing to the CCA process.

The Work Plan references procedures detailed in the CDM Generic Quality Assurance Project Plan (QAPP) dated March 2007, which has been provided to NYSDEC for Contract Number D-00437. CDM's Generic QAPP presents methods that will be used to collect field data including project samples, and focuses on the analytical methods and quality assurance/quality control (QA/QC) procedures that will be used to analyze project samples, ensure the data are of known and acceptable quality, and manage the resultant data. A copy of the pertinent Generic QAPP methods will be provided.

The Work Plan will include a site specific Health and Safety Plan (HASP) presented in Appendix A and a Citizen Participation Plan (CPP) presented in Appendix B. The HASP describes the site health and safety for the field activities that will be performed. The CPP provides the primary contacts for the Site as well as various public entities and provides ways for citizens to be involved in the project.

2.2 Task 1B - Preliminary Groundwater Modeling

CDM, the Suffolk County Department of Health Services (SCDHS) and NYSDEC met on January 31, 2008, at the offices of SCDHS. Based upon this meeting, SCDHS agreed to allow CDM to utilize the existing Suffolk County groundwater model as a tool in this NYSDEC work assignment. As a result of these discussions, the existing Suffolk County groundwater flow model will be used to evaluate potential source areas based upon existing data. The existing regional groundwater model will be refined around the study area (see Figure 2-1) as follows:

- Increase the nodal discretization of the model local to the Site. Nodes will be added around the study area to tighten horizontal discretization. In addition, two model levels will be added in the upper glacial aquifer to increase vertical discretization. The revised model grid will be intersected with the digital elevation model (DEM) to better represent local creeks.

- Run the model under steady state conditions using 2005-2006 precipitation data; compare to head measurements collected in May 2006.

Once the flow model has been updated, a solute transport model, DYNTRACK, will be used to evaluate potential source areas:

- Run a series of back-tracks from delineated hot spots within the plume to identify potential source areas. These back tracks will assume long-term average conditions of recharge and pumping (from community supply wells). Backtracks will simulate particle behavior in three dimensions, from its release position to the water table surface.
- Run hypothetical plumes from the potential source areas identified by the particle backtrack runs. Dispersive contaminant plumes will be run from various source areas to evaluate their migration and compare to the extent of the Speonk solvent plume, as presently delineated. Particle release from depth, to simulate movement of particles dissolving from a possible DNAPL mass, may also be included. Up to six (6) potential sources will be simulated.

Data provided by SCDHS and NYSDEC for use in this modeling task includes groundwater sample results, soil boring data, and groundwater well locations and depths, as well as private well sampling data, and data and soil boring data from the nearby BB&S state Superfund site. Although lithologic refinements to the model will be incorporated where appropriate, it is not anticipated that significant changes will be made. This task assumes attendance at one meeting by the groundwater modeler.

2.3 Task 1C – Records Search and Sample Location Mapping

CDM has compiled Suffolk County property tax map data (block/lot numbers) along with the Site study area limits to gain an understanding of how many separate parcels are included within the study area and developed a preliminary map (see Figure 2-2). As shown in Figure 2-2, there more than 200 separate property parcels included in this study area.

Based upon the results of the groundwater modeling exercise and other pertinent information, records searches of select properties (assumes a total of ten properties on not more than five Sanborn maps, for budgetary purposes) will be performed to meet the requirements of NYSDEC's *Draft DER-10 Technical Guidance for Site Investigation and Remediation* dated December 2002. The properties selected will be those considered most likely to be possible sources based upon the groundwater modeling exercise. Information collected during the records/ background search will be summarized in a Record Search Report as a stand alone document. This report will be utilized to develop and refine the site characterization sampling activities detailed in Task 2. Unless requested by NYSDEC, interviewing former or current property owners is not included. This task assumes one 2-day visit to local offices to gather records.

As part of this task, CDM will also prepare a proposed sample location map based on the findings of the preliminary groundwater model and the records search. This mapping will include not only the proposed sample locations, but the locations where previous NYSDEC and Suffolk County groundwater samples were collected.

2.4 Task 2 - Site Characterization Work Plan

This Work Plan references procedures detailed in the CDM Generic Quality Assurance Project Plan (QAPP) dated February 2008 which has been provided to NYSDEC for Contract Number D-00437. The Generic QAPP presents methods that will be used to collect field data and quality assurance/quality control (QA/QC) procedures that will be used to manage data quality. A copy of the Generic QAPP is included in Appendix C of this Work Plan.

This Work Plan also includes a site specific Health and Safety Plan (HASP) presented in Appendix A and a Citizen Participation Plan (CPP) presented in Appendix B. The HASP describes the site health and safety for the field activities that will be performed. The CPP provides the primary contacts for the site as well as various public entities and provides ways for citizens to be involved in the project.

Site Characterization will be conducted in order to determine the source of groundwater contamination at the Site. The investigation is ultimately being conducted to determine if a source can be identified and listed as a New York State Hazardous Waste Site.

- The field program will include geophysical surveys, passive soil gas screening, the installation of soil borings using mud rotary drilling and Hydropunch®, groundwater sampling using mud rotary drilling and Hydropunch®, the installation of groundwater monitoring wells using the hollow stem augers, and soil and groundwater sampling. The actual locations for this work are presently unknown, and well be determined based upon the results of Task 1B and Task 1C. However, potential areas of interest during site characterization are shown on Figure 2-3. If necessary, this work plan scope and budget may be revised following completion of Task 1B and Task 1C.

The site characterization will be performed in accordance with the Technical Guidance for Site Investigation and Remediation (Draft DER-10). VOC sample results will be used to determine potential source areas for groundwater contamination. In addition, soil VOC results collected during the investigation will be compared to applicable NYSDEC soil standards, such as Soil Cleanup Objectives and Cleanup Levels (TAGM 4046) and/or Part 375 subpart 6 (6 NYCRR Part 375) soil cleanup objectives. Groundwater sample data will be compared to New York State Groundwater Quality Standards (NYCRR Chapter X, Subchapter A, Article 2 Part 703, Section 703.5) for Class GA groundwater.

The following section presents the anticipated field activities proposed for the Speonk Solvent Plume site characterization. Refer to Figure 2-3 for potential areas of interest. Field documentation and sampling procedures are provided in the CDM Generic QAPP referenced above. Applicable procedures contained in the Generic QAPP will be followed.

2.4.1 Geophysical Survey

Surface geophysical surveys will be used for two purposes during the investigation. The first objective will be to investigate the subsurface soils for possible buried drums. The second objective will be to clear boring locations of utilities in areas where the one-call service does not mark out utilities (i.e., the interior portions of private property).

Geophysical surveys will be performed in accordance with the QAPP. The surveys will utilize ground penetrating radar (GPR) and electromagnetic conductivity (EC) or other applicable methods. Methods will be selected to identify underground utilities, water lines, buried drums, underground storage tanks and/or any large anomalies such as conduits. In the case of drilling locations, subsurface utilities will be marked within 15 feet of each proposed location to allow for the relocation of borings if necessary, for example due to refusal.

It assumed that up to three mobilizations will be required:

- Scan for buried drums
- Clear initial drilling locations
- Clear additional drilling locations if necessary.

For this activity, 5 field days are estimated to complete this work, assuming up to three areas totaling 2 acres will be scanned for buried drums (1.5-* 2 days), and a total of 18 drilling locations will be cleared for utilities (distributed over three one-day mobilizations) .

2.4.2 Passive Soil Gas Screening

Passive soil gas samplers will be deployed in grid patterns at potential source areas identified by either previous data and/or the groundwater modeling exercise. Additionally, passive soil gas screening may be conducted at the planned residential development north of Old Country Road. If the groundwater modeling exercise does not indicate specific source areas, field activities would be conducted in the areas shown in Figure 2-3. The samplers are left in the subsurface for approximately two weeks. Assuming similar deployment times and lithogic conditions, the amount of VOCs adsorbed is proportional to the amount of VOCs present in the vicinity of the sampler. Thus, analyzing samplers deployed in a grid pattern can help identify hot spots and potential VOC source areas.

Grid spacing depends upon the area to be investigated and the specific objective of each investigation. In this case, grid spacing of 25 to 100 feet is anticipated; larger grid spacing may also be appropriate depending upon the size the investigation area and the suspected source.

For budgetary purposes, it is assumed that 75 passive soil gas samplers can be deployed in two working days and retrieved in two working days. Once the site and grid spacing have been determined, the passive soil gas screening investigation is performed as follows:

Mark out all soil gas sample locations with stakes or flags (or chalk/paint on concrete/asphalt surfaces). Drill a 1-½-inch diameter hole to a depth of 12-inches using a hammer and a metal stake, or a hammer drill if necessary. For locations covered by asphalt or concrete surfacing, drill a 1-½ diameter hole with a hammer drill through the pavement and underlying substrate, to the underlying soils. In areas of very organic topsoil, the sleeve should be installed below the organic layer. In paved/concrete covered areas, the sleeve must penetrate the entire thickness of the gravel substrate typically installed beneath paved areas, in order to isolate the sampler from any vapors that may be migrating in the porous media directly beneath the pavement.

Line the hole with a 12-inch long sanitized metal pipe sleeve (provided in the passive soil gas kit). Tap the pipe one inch onto the soil, so that the top of the pipe is one inch below the ground surface.

Once the metal sleeve is set, install the passive soil gas sampler in the top four inches of the sleeve, in accordance with the manufacturer's procedure (summarized below):

- Remove sampler from glass vial and straighten the retrieval wire;
- Remove solid cap from vial and replace with sampling cap; save the solid cap;
- Lower the sampler, open end down into the sleeve approximately 4 inches so that retrieval wire sticks out of the he hole.
- Cover the open end of the sleeve with a ball of aluminum foil, pressing it tightly with a tapping dowel so it forms a seal;
- For soil surface installations: Cover the hole to grade with local soils or sand, leaving the retrieval wire exposed; collapse the soils above the sampler with the hammer; coil the wire at ground surface and mark the location with a pin flag or wood stake.
- For paved/concrete surface installations: bend the retrieval wire over the top of the sleeve, plug the top of the hole with aluminum foil so that it seals the sleeve and rests ¼-inch below the surface, then cover the hole with ¼-inch thick concrete.
- Note date and time of deployment on Field Deployment Sheet.

Following the 10-day exposure period, collect the samplers and ship them to the laboratory with a trip blank. Retrieve samplers in the following manner:

- While holding onto the retrieval wire, remove the aluminum foil plug with vice grips or scratch awl;
- Retrieve sampler;
- Clean sides of vial with clean towel
- Remove sampling cap, cut wire from vial and clean threads with gauze
- Screw on the solid cap; clean vial with gauze;
- Record sample number corresponding to grid location on cap label with ballpoint pen;
- Place sealed and labeled vial into small plastic bag (sampler bag);
- Note date and time of retrieval on Field Deployment Sheet.
- Place up to 25 sampler bags and one trip blank into larger "return shipment bag"
- Ship samples to laboratory with Field Deployment Sheet and Chain of Custody form - no cooling of samples;
- Patch sample holes as necessary.

2.4.3 Soil Boring Investigation

A soil boring investigation will be performed to investigate potential source areas for residual soil contamination in the vadose zone, and investigation of the deeper strata to determine the bottom of the upper glacial aquifer. Test boring locations will be selected based upon the existing body of data, up to and including the results of Task 1 of this work plan. Potential areas to perform soil borings and soil sampling for VOC are listed below. Based upon the results Task 1B and Task 1C, areas may be removed from or added to this list:

- The area on Circle Place in the vicinity of MW-S01 (former Gore Sorber SV-CO1).
- Former treated wood manufacturing facilities.
- Old Country Road Pink Building (SV-F05-SV-21).
- Former feather processing facility
- Former Septic Service company.
- Vicinity of drums observed in so-called "crop circle" area.
- Potential upgradient sources

Refer to Figure 2-3 for potential areas of interest. Soil borings will be advanced by mud rotary drilling methods. Drilling and sampling will be performed in accordance with the Generic QAPP. Each soil sample will be characterized by an on-site CDM geologist. Depth, soil type, moisture, evidence of contamination (photoionization detector readings, visual evidence etc.) will be recorded. Soil samples will be collected to the water table; if gross contamination is observed then soil samples will continue into the water table until near background readings are observed. For budgetary purposes, it is assumed that two vadose zone soil samples in each of 15 groundwater profiling boreholes will be analyzed for VOC. In addition, up to three additional soil samples collected from near the bottom of the upper glacial aquifer will be analyzed for VOC from each of 3 soil borings that will be advanced to a depth of 200 feet. These soil boring samples will be collected at the same time as the groundwater profiling activities (see 2.4.4.1 below).

In addition to VOC analysis, up to 6 soil samples will be analyzed for total organic TOC. TOC samples will be biased toward strata that do not exhibit evidence of contamination, so that the results will reflect the natural organic carbon content of the soils. TOC samples can also be collected during well installation (Section 2.4.2.2).

2.4.4 Groundwater Investigation

The groundwater investigation will be performed in three phases:

- Perform groundwater profiling at 10-foot depth intervals following vadose zone soil sampling performed during the soil investigation.
- Install a total of six permanent monitoring wells at three well cluster locations, for long term monitoring and evaluating vertical head relationships.
- Sample 6 new monitoring wells and up to six pre-existing monitoring wells

2.4.4.1 Groundwater Profiling

Groundwater profiling will be performed by mud rotary drilling and Hydropunch® methods. Potential areas of interest are shown in Figure 2-3. The borehole will be advanced to the predetermined depth and a Hydropunch® sampler will be driven beyond the bottom of the borehole into the geologic formation. The sampler will then be opened, allowed to fill, and retrieved. Groundwater samples will then be collected from the sampler. Groundwater samples will be collected at 10-foot intervals moving down the borehole. For budgeting purposes it is assumed that profiles will be 200 feet in depth (approximate base of the upper glacial aquifer). Groundwater samples will be collected at 10-foot sample intervals. Field screening (e.g., head space) will be performed on each sample collected. As an economical measure, only fifty percent of the samples collected at each groundwater profile location will be submitted to the laboratory for VOC analysis.

For locations where the Gardiner's Clay is known to be present at depths of 100 feet or less, groundwater profiling may be performed by direct push drilling. Using this method, the borehole will be advanced to the predetermined depth and groundwater samples will be collected at 10-foot intervals moving up the borehole. It is assumed that each water sample collected will be visually clear within 1 hour of purging. Drilling and sampling will be conducted in general accordance with the Generic QAPP. However, the QAPP requirement that turbidity be less than 50 NTU will not be applied if purging time exceeds one hour.

For this activity, 45 field days are estimated to complete groundwater profiling along with soil boring sampling.

2.4.4.2 Groundwater Monitoring Well Construction

For budgetary purposes, it is assumed that six monitoring wells will be constructed of 2-inch diameter PVC screen and casing for groundwater sampling and monitoring purposes. If gross contamination (evidence of non-aqueous phase liquid) is found, it may be necessary to construct one or more monitoring wells of stainless steel. Drilling and sampling will be conducted in general accordance with the Generic QAPP. Potential areas of interest are shown in Figure 2-3.

Wells will be installed in shallow and deep clusters. For budgetary purposes, average well depths are assumed to be 100 feet and 200 feet deep. For budgetary purposes, it is expected that wells will be installed by hollow stem auger method. However, there is also a possibility that mud rotary drilling will be required for the deep wells if running sands are encountered.

Split spoon samples will be collected at 5-foot intervals at each of the deep wells to characterize stratigraphy and screen the deeper soils for VOC in the field. Split spoon sampling beneath the water table may require the use of drilling mud inside the augers to prevent running sands. If drilling mud is used, it will be flushed out of the augers with water prior to installation of the well. The CDM geologist will record the characteristics of each split spoon sample, including lithology, moisture and evidence of contamination (PID headspace readings). If evidence of contamination is noted, VOC soil samples will be collected. For budgetary purposes, a total of six soil samples are assumed to be collected during well drilling. Samples exhibiting little or no contamination may be submitted for TOC analysis (if fewer than 6 were collected during the borings).

Final well depths and screen settings will be based upon lithology, PID headspace readings, available groundwater profiling data and other pertinent factors. The wells will be developed after installation and will be allowed to stabilize for at least two weeks prior to sampling.

A total of 15 field days are estimated for groundwater sampling, assuming that each well requires no more than 1 hour of purging to satisfy the generic QAPP sampling requirements (i.e. turbidity is less than 50 NTU).

2.4.4.3 Groundwater Sampling

The 6 monitoring wells to be installed during this investigation, as well as up to six preexisting monitoring wells will be sampled. Prior to groundwater sampling, a synoptic round water level measurements will be performed for hydraulic head mapping and interpretation.

Groundwater sampling procedures are detailed in the Generic QAPP. Prior to sampling, three well volumes will be purged from each well. Groundwater samples will be submitted to a NYSDOH-certified laboratory for analysis for VOC analysis.

For this activity, 7 field days are estimated to complete well sampling.

2.4.5 Site Survey

The locations of all sample points will be surveyed. It is assumed that six survey mobilizations will be required. The following will be surveyed:

- Surface Geophysics Transects
- Passive soil gas sample locations (a total of up to 75 locations at up to 3 locations)
- Up to 15 new temporary groundwater profiling locations (two mobilizations)
- Up to six newly installed monitoring wells
- Up to 12 additional groundwater profiling locations recently installed by SCDHS.

The horizontal and vertical positions will be tied into the North American Datum 1983 (NAD83) coordinate system. The vertical positions will be tied to the North American Vertical Datum 1988 (NAVD88). The measuring point associated with the monitoring wells will be recorded to an accuracy level of 0.01 feet vertically. The coordinates will be used to map the locations on aerial photography. The well elevations will be used to evaluate the groundwater flow direction. Sample locations will be shown on the New York State GIS Clearinghouse ortho imagery aerial photography.

2.4.6 Investigative Derived Waste

Soil cuttings, drilling mud and purge water from each sampling location will be containerized in drums or other appropriate vessels and disposed off-site if they cannot be released to the ground surface. Investigative derived waste may be released to the ground surface if the following conditions are met: 1) the area is non-residential; 2) liquids can percolate into the ground and 3) field indicators (visual, olfactory, PID readings) do not indicate the material is contaminated.

It is assumed that approximately 15 cubic yards (60 drums) of non-hazardous soil and 20 drum of non-hazardous drilling mud will require off-site disposal. Well development and purge water is estimated at 5,000 gallons. Investigation-derived waste containers will be stored on-site at a location determined by NYSDEC until it is characterized and can be removed by a licensed waste hauler.

For this activity, one field day is estimated.

2.4.7 Decontamination Procedures

Non-dedicated equipment and tools used to collect samples for chemical analysis will be decontaminated prior to and between each sample interval using an Alconox wash and potable water rinse prior to reuse. Additional cleaning of the equipment with steam may be needed under some circumstances. Decontamination fluids will either be contained or discharged to the ground surface, using the same criteria set forth in Section 2.4.6 Contained fluids will be disposed of off-site by a licensed transportation and disposal services firm.

2.5 Task 3 - Field Documentation and Reporting

2.5.1 Field Documentation Procedures

Bound field notebooks will be used during all on-site work. A dedicated field notebook will be maintained by the field technician overseeing the Site activities. In addition to the notebook, any and all original sampling forms (e.g lithologic logs, well construction diagrams), and purge forms used during the field activities, will be submitted to the NYSDEC as part of the final report. Field and sampling procedures, including installation of the sample boreholes, existing monitoring wells, etc., will be photo-documented.

2.5.2 Sample Identification

Each sample collected will be designated by an alphanumeric code that will identify the type of sampling location, matrix sampled, and the specific sample designation (identifier). Each sample shall begin with the NYSDEC Site Number for the Speonk Solvent Plume site (152185). The following terminology shall be used for the samples collected during this investigation:

Passive Soil Gas: 152185-PSG- Location-Interval ("S" for shallow, "D" for deep) e.g. sample collected from the shallow soil vapor point SV-1 would be 152185-SV-1S

Water: 152185-Profiling ID-GW
152185-Monitoring Well ID-GW

Soil: 152185-Boring ID – S – Depth

Field Blanks: 152185-FB-DATE

Trip Blanks: 152185-TB-DATE

2.5.3 Sample Location

The field conditions at each sample location will be documented in the bound field log book.

2.5.4 Reporting

A total of four copies of a draft report will be submitted to NYSDEC for review and comment. The report will document the work conducted and will present the results of the sample analysis and provide recommendations for further investigation should it be warranted. Upon receipt of the comments, CDM will revise the draft report and print the four final copies and submit to NYSDEC. One copy of the final report; text, tables, maps, photos, etc., will be submitted as a single pdf file. The electronic files will be submitted to NYSDEC on a compact disc. The site investigation data will be submitted in the most recent version of the NYSDEC Electronic Data Deliverable (EDD) with the final report submission. Currently this is the USEPA Region 2 EDD dated December 2003.

2.5.5 Laboratory Analysis and Validation

All samples, with the exception of passive soil gas samples, will be analyzed by a NYSDOH-approved, ELAP-certified laboratory. Groundwater samples will be analyzed for Target Compound List volatile organic compounds (TCL VOCs) by EPA 8260B. Should groundwater profile samples need special extraction methods due to excessive silt (i.e., extract by hand instead of with the autosampler), this may result in an analytical method surcharge not currently included. Soil samples will be analyzed for TCL VOCs by EPA method 8260B. A NYSDEC ASP Category B data deliverable will be provided for these analyses (Table 2-1).

All samples collected, with the exception of passive soil gas samples will be validated in accordance with NYSDEC Data Usability Summary Report (DUSR) guidance by a party that is independent of the laboratory which performed the analyses and CDM. A usability analysis will be conducted by a qualified data validator and a DUSR will be submitted to the NYSDEC.

It is assumed for Task 3 that no meetings or site visits are needed.

2.6 Task 4 – Document Disposition and Data

CDM will make recommendations as to the proposals for future activities in a transmittal letter to the NYSDEC that accompanies the draft report. The necessary number of report copies and the EDD will be provided under Task 3 above.

As part of this task, CDM will compile a list of owner names, addresses and tax map numbers for the properties to be investigated. This list will be submitted to the NYSDEC no later than 28 days prior to the start of field work. This list will be updated by CDM when the final reports are submitted to the NYSDEC.

CDM will also submit monthly reports discussing project progress, and quarterly M/WBE utilization reports to the NYSDEC as part of this task.

It is assumed for Task 4 that no meetings or site visits are needed.

2.7 Task 5 - Citizen Participation Plan

CDM will develop a Citizen Participation Plan which will identify the groups, individuals, and officials that may be interested in the Site investigation activities that will take place. This plan will involve determining the addresses of adjacent property owners, local officials, and advocacy groups. CDM may be called upon to provide information and assist at a public meeting, and generate a fact sheet to be distributed to the addresses that are compiled.

For Task 5, it is assumed that CDM will attend one meeting.

Table 2-1
Analytical Program Summary
Speonk Solvent Plume Site
Speonk, Suffolk County, New York

Analytical Parameter	Sample Matrix	Number of Samples	Analytical Method	Field Duplicates (a)	Field Blank (b)	Trip Blanks (c)	Container	Sample Preservation	Holding Time
SOIL SAMPLES									
TCL Volatile Organic Compounds	Soil	45	EPA 8260B	5	2	0	4 oz clear glass jar	None	14 days
GROUNDWATER PROFILING SAMPLES									
TCL Volatile Organic Compounds	Groundwater	128	EPA 8260B	7	15	18	3 - 40ml clear glass vial with Teflon septum	HCl to pH <2; Cool to 4oC	14 days
GROUNDWATER SAMPLES									
TCL Volatile Organic Compounds	Groundwater	12	EPA 8260B	1	3	3	3 - 40ml clear glass vial with Teflon septum	HCl to pH <2; Cool to 4°C	14 days
Passive Soil Gas Screening Samples									
TCL Volatile Organic Compounds	Passive Soil Gas	75	EPA 8260B	3	0	3	hydrophobic adsorbent cartridge	None	14 days

Notes:
a) Ten percent of soil samples and 5 percent of groundwater samples should be duplicates; one duplicate shall be collected per 25 passive soil gas samples
b) Two percent of soil samples should be field blanks; groundwater field blanks shall be at the rate of one per two days for profiling, and one per day for monitoring wells
c) Trip blanks shall be included in every cooler for groundwater sampling, and at a rate of approximately one per 25 samples for passive soil gas

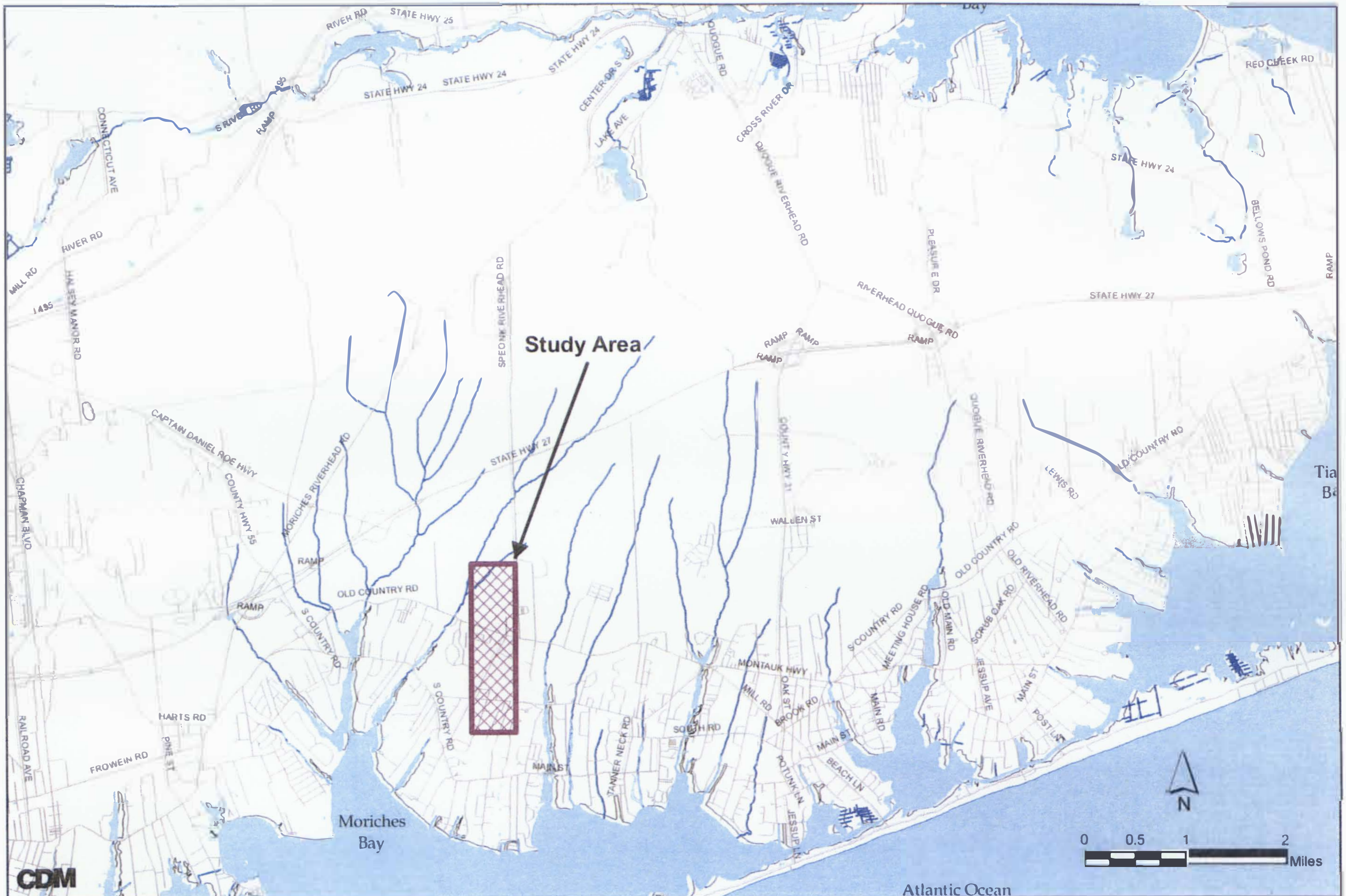


Figure 2-1
Speonk Solvent Plume Site
Study Area
NYSDEC Site No.: 1-52-185

0 400 800 1,600 Feet

Source: New York State Geographic Information Systems Clearinghouse, High Resolution Orthoimagery 2000 - 2005

N

Speonk Solvent Plume Site and Study Area

Parcels

Existing Monitoring Well

Existing Monitoring Well - Origin Unknown

Existing Groundwater Sample

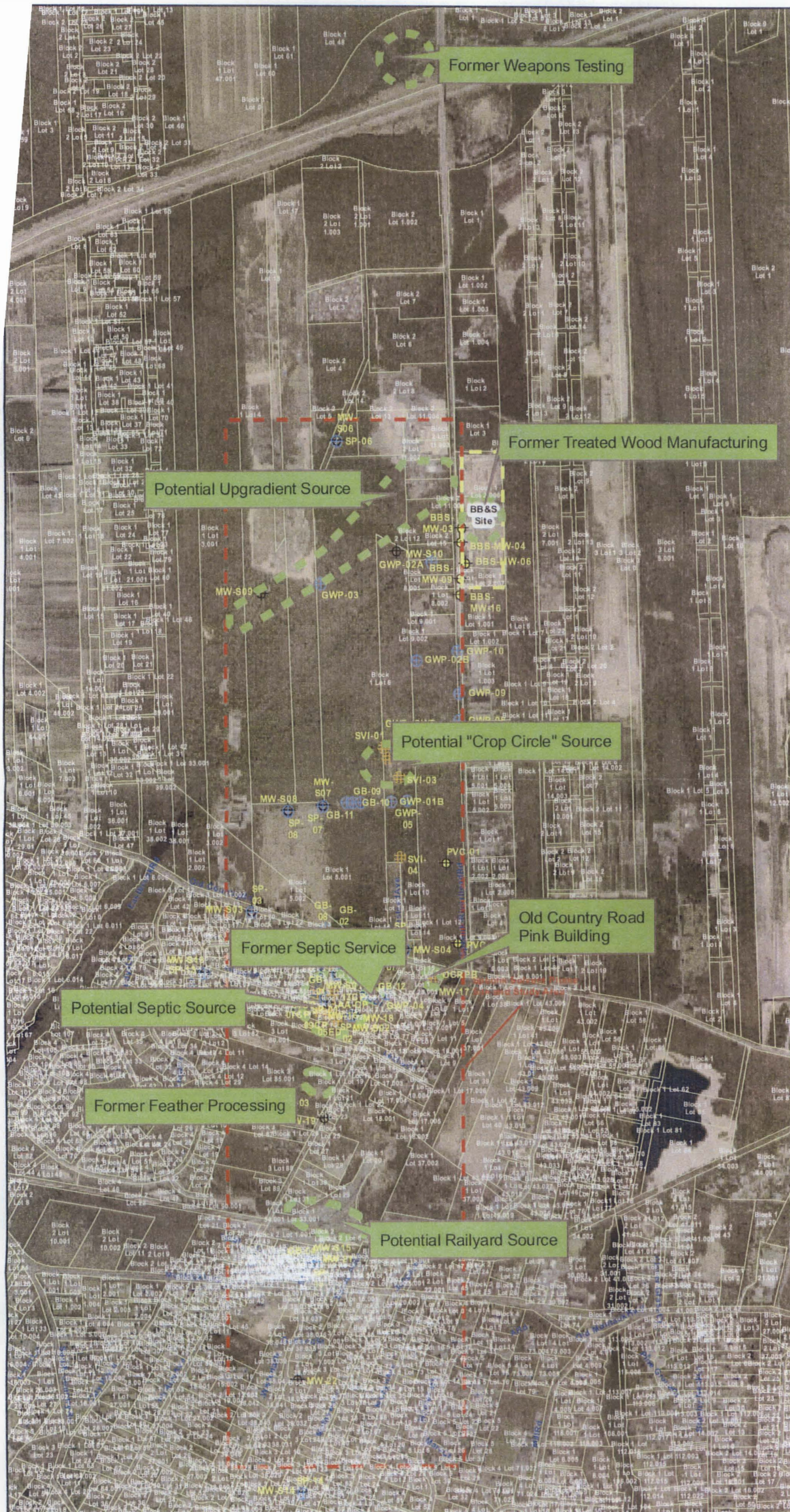
Existing Soil Vapor Sample

Source: ERM

Parcels
Source: Suffolk County Planning Department

Figure 2-2
Speonk Study Plume Site
Property Parcels
NYSDEC Site No. 1-52-185

CDM



0 400 800 1,600
Feet

Source: New York State Geographic Information Systems Clearinghouse, High Resolution Orthoimagery 2000 - 2005

N

Speonk Solvent Plume Site and Study Area

Parcels

Existing Monitoring Well

Existing Monitoring Well - Origin Unknown

Existing Groundwater Sample

Existing Soil Vapor Sample

Source: ERM

Parcels
Source: Suffolk County Planning Department

Figure 2-3
Speonk Study Plume Site
Potential Site Characterization
Areas of Interest
NYSDEC Site No. 1-52-185

CDM

Section 3
Project Schedule

The following tabulation provides the proposed project schedule and key milestones for this work assignment. As currently planned, field work will be initiated within two weeks of written receipt of final work plan approval. Field activity duration for the Site Characterization activities is indicated in the schedule below. This schedule assumes no delays are experienced due to inclement weather, site access problems, or for other unforeseen reason.

One-week hour turnaround time will be used for analytical samples during groundwater profiling (Task 2C). Monitoring well samples will be analyzed under standard turnaround time. The scheduled submittal dates for deliverables are based on standard laboratory turnaround times of four weeks, and turnaround for data validation of three weeks.

Project Milestone	Date
Issue Work Assignment (WA)	
Work Assignment Acceptance	
Submit Draft Work Plan	May 12, 2008
Submit Final Work Plan	May 30, 2008
DEC Notice to Proceed (NTP)	June 2, 2008
Submit Task 1B Groundwater Modeling Results Report	June 16, 2008 (1)
Submit Task 1C Records Search Results Report	June 30, 2008
Submit list of properties to be investigated	July 11, 2008
Commence Task 2 Field Work	August 11, 2008
Task 2A – Passive Soil Gas Survey complete	September 15, 2008
Task 2B – Geophysics Complete (more than one mobilization expected)	October 15, 2008
Task 2C Mud rotary soil borings/groundwater profiling complete	October 31, 2008
Task 2D Monitoring well drilling complete	November 31, 2008
Task 2E Monitoring well sampling complete	December 15, 2008
Task 2F Survey Complete	December 31, 2008
Task 2 G Data Validation Complete	February 10, 2009

Task 2H IDW Disposal Complete	January 15, 2009
Task 2 Field Work Completed	December 31, 2008
Task 3 Submit Draft Site Characterization Report	March 28, 2009
Approve Draft Report	35 Days after Draft Report Submitted
Task 3 Submit Final Site Characterization Report	45 Days after Approval of Draft Report
Task 4 Document Disposition and Data	Begin August 11, 2008
Task 5 Citizen Participation Plan	CPP provided May 28, 2008; attend meeting as requested

(1) This milestone date is contingent upon receipt of Suffolk County and NYSDEC County data no later than June 2, 2008.

Section 4
Staffing Plan

This project management organization for this project is to provide a clear delineation of functional responsibility and authority.

4.1 Program Manager – Michael A. Memoli, P.E., DEE

The primary responsibilities for program management activities rest with the Program Manager (PRM). The Program Manager, Mr. Memoli, will have ultimate contract responsibility for the project, including responsibility for the technical content of all engineering work. Mr. Memoli will direct, review and approve all project deliverables, schedule staff and resources, resolve scheduling conflicts and identify and solve potential program problems. He will be directly accountable to NYSDEC's Division of Hazardous Waste Remediation for program execution. He has authority to assign staff, negotiate and execute contracts and amendments, as well as execute subcontracts. The PRM will communicate directly with CDM's Project Manager.

4.2 Project Manager – Patricia Forgang, CHMM

The Project Manager, Ms. Patricia Forgang will have the overall responsibility for the technical and financial aspects of this project. She will assign technical staff, maintain control of the project budget and schedule, prepare monthly progress reports, review and approve project invoices, evaluate the technical quality of the project deliverables as well as the adherence to QA/QC procedures and manage subcontractors. She will serve as CDM's point of contact for this project.

4.3 Program Quality Assurance Manager – Jeniffer M. Oxford

The Program Quality Assurance Officer, Ms. Jeniffer Oxford, will monitor QC activities of program management and technical staff, as well as identify and report needs of corrective action to the Program Manager. He will also conduct an internal review of all project deliverables prepared by CDM staff and sign off on the final investigation reports.

4.4 Health and Safety Officer – Christopher S. Marlowe, C.I.H., Q.E.P

The Program Health and Safety Officer, Mr. Chris Marlow, will review and make recommendations to the Subcontractors on health and safety plans for compliance with OSHA requirements. He will develop a Health and Safety plan for CDM and NYSDEC employees, handle over-sight activities, evaluate the performance of health and safety officers and maintain required health and safety records. He will report to the Program Manager

4.5 Field Manager/Health and Safety Site Supervisor/Coordinator – Frank Robinson

The Field Manager, Mr. Frank Robinson, will be responsible for overseeing and coordinating field activities. This will include, but is not limited to: overseeing the sampling activities, coordinating drill work, coordinating work with other subcontractors and monitoring health and safety conditions in accordance with the approved Health and Safety Plan. He is directly accountable to the Project Manager.

As the Health and Safety Site Supervisor/Coordinator, he will be responsible for ensuring that the Health and Safety Plan is implemented during field activities and that a copy of the site-specific Health and Safety Plan are maintained at the site at all times. He is also responsible for upgrading or downgrading personnel protection based on actual conditions at the time of the investigation. The Coordinator must also present an overview of the Health and Safety Plan to field personnel prior to initiating any field activities and is responsible for insuring that field personnel sign off on this plan. The Coordinator will contact the Program Health and Safety Officer if any questions or issues arise during the field activities that he cannot answer.

4.6 Senior Geologist – Ricky Chenenko, P.G.

Ricky Chenenko, P.G. will be the senior geologist on this project. This will include providing direction on drilling, groundwater profiling, and related activities to the field manager, as well as interpreting field characterization data and reporting. He is directly accountable to the Project Manager. Ricky brings extensive experience in the collection and interpretation of hydrogeologic data, as he has worked extensively in the Atlantic Coastal Plain environment, fractured bedrock aquifers, and glacial sediments. Specifically, in addition to serving as a geologist on numerous projects involving soil and groundwater contamination, his responsibilities include characterization of site hydrogeology, characterization and delineation of contamination including delineation of chlorinated hydrocarbons in unconsolidated sediments and bedrock, as well as evaluating groundwater flow and contaminant transport, and real-time data collection.

4.7 Project Hydrogeologist – Dan O'Rourke

Dan O'Rourke will serve as the project hydrogeologist on this project, responsible for the groundwater modeling subtask. Mr. O'Rourke is a water resources scientist with practical experience in groundwater modeling using DYNFLOW and MODFLOW modeling systems. He has completed multiple groundwater analyses which necessitated groundwater and surface water sampling, monitoring well installation, groundwater discharge studies, use of an ultrasonic groundwater seepage meter, geophysical methodologies, and relevant modeling. He also has expertise in groundwater-surface water interactions and contaminant loading into surface water bodies from both point and non-point sources of groundwater contamination. As the final section of a comprehensive groundwater model of Suffolk County where the Speonk site is located, Mr. O'Rourke used the DYNFLOW system to assist in the development of a groundwater model of the South Fork of Long Island. This model is used for water resource management and other groundwater investigations.

Section 5
Subcontracting

CDM proposes to engage subcontractors to provide the following services for this work assignment:

5.1 Geophysical Survey (Utility Markout) - Radar Solutions Inc. (WBE)

At this time, CDM is proposing to use Radar Solutions Inc, to perform the geophysical survey work. They are located at 51 Riverview Avenue, Waltham, Massachusetts 02453; telephone (781) 891-4492.

5.2 Soil Gas Screening - Yu & Associates, Inc. (MBE).

CDM proposes to use Yu & Associates, Inc. as the soil gas screening subcontractor. They are located at 611 River Drive, Elmwood Park, New Jersey 07407; telephone (201) 791-0075.

5.3 Soil Boring and Groundwater Profiling Characterization- Summit Drilling Co., Inc. (WBE)

CDM will be using Summit Drilling Co., Inc. as the soil boring and groundwater profiling characterization drilling subcontractor. They are located at 9W Chimney Rock Road, Bound Brook, New Jersey 08805; telephone (800) 242-6648.

5.4 Well Drilling - Delta Well & Pump Co. (WBE)

CDM will be using Delta Well & Pump Co as the well drilling subcontractor. They are located at 97 Union Ave, Ronkonkoma, NY 11779-0760; telephone (631) 981-2255.

5.5 Analytical Laboratory - Test America (formerly known as Severn Trent)

At this time, CDM is proposing to use Test America as the analytical laboratory subcontractor. They are located at 777 New Durham Road, Edison, New Jersey 08817; telephone (732) 549-3900.

5.6 Data Validation - ChemWorld Environmental (WBE)

At this time, CDM is proposing to use ChemWorld Environmental (WBE) as the data validation subcontractor. She is located at ChemWorld Environmental Inc., Andrea Schuessler, 14 Orchard Way North, Rockville, Maryland 20854; telephone (301) 294-6144.

5.7 M/WBE Reporting - Kenneth Shider (MBE)

At this time, CDM is proposing to utilize Ken Shider (M/WBE consultant) to prepare the quarterly M/WBE reports that are required by NYSDEC.

5.8 Surveying/Field Support - Yu & Associates Inc. (MBE)

At this time, CDM is proposing to utilize Yu & Associates, Inc. as the surveying subcontractor. They are located at 611 River Drive, Elmwood Park, New Jersey 07407; telephone (201) 791-0075.

5.9 IDW Disposal - Miller Environmental Group, Inc.

At this time, CDM is proposing to utilize Miller Environmental Group, Inc. (MEG) as the IDW disposal subcontractor. They are located at 1300 Shames Drive, Westbury, New York 11590; telephone (516) 876-7940. A second location is at 538 Edwards Avenue in Calverton, New York; telephone (631) 369-4900.

Section 6
MBE/WBE Utilization Plan

To meet the requirements of the MBE/WBE program, CDM has prepared the following utilization plan:

MBE Percentage Goal	15%
WBE Percentage Goal	5%
Combined MBE/WBE Percentage Goal	20%

Minority and woman-owned firms are expected to participate as follows:

Services to be Provided	Description of Services	Subcontractor Name and Contact Information
WBE Geophysical Survey	Utility markout	Radar Solutions Inc. Doria Kutrubes (781)891-4492
WBE Drilling and Hydropunch®	Soil boring and groundwater profiling	Summit Drilling Co., Inc. Robert Kreilick (800)242-6648
WBE Drilling	Well Installation	Delta Well Chris Okon 631-981-2255
M/WBE Quarterly Reports	M/WBE Quarterly Reports	Kenneth Shider (518) 269-2207
MBE – Survey	Sample Location Survey	Yu & Associates, Inc. Andrew Leung 201-791-0075
MBE Field Services	Soil Gas Screening	Yu & Associates, Inc.
WBE - Data Validation	DUSR	ChemWorld Environmental Andrea Schuessler (301) 294-6144
		TOTAL

Section 7
Acronyms

ASP	Analytical Services Protocol
CCA	Chromated Copper Arsenate
CPP	Citizen Participation Plan
CDM	Camp Dresser and McKee
CVOC	chlorinated volatile organic compounds
EDD	Electronic Data Deliverable
EPA	United States Environmental Protection Agency
DCE	dichloroethene
DNAPL	dense non-aqueous phase liquid
ft/day	feet per day
HASP	health and safety plan
mg/L	micrograms per liter
mL/g	milliliter per gram
NYSDEC	New York State Department of Environmental Conservation
PCE	tetrachloroethylene
PID	photoionization detector
ppb	parts per billion
QA/QC	quality control/quality assurance
QAPP	quality assurance project plan
TCE	trichloroethylene
SPDES	State Pollutant Discharge Elimination System
SVOCs	semi-volatile organic compounds
µ/L	micrograms per liter
UV	ultraviolet
VOCs	volatile organic compounds
SVOCs	semi-volatile organic compounds
WA	Work Assignment

Appendix A

Health and Safety Plan (HASP)

HEALTH AND SAFETY PLAN FORM **CDM Health and Safety Program**	*This document is for the exclusive use of CDM and its subcontractors*	**CAMP DRESSER & McKEE INC.** **PROJECT DOCUMENT #:**

PROJECT NAME Speonk Solvent Plume
Site No. 1-52-185

JOBSITE ADDRESS Phillips Avenue and Old Country Road
Southampton Township, Suffolk County, NY

PROJECT# 0897-63563 **REGION** PSG NER

CLIENT NYSDEC

CLIENT CONTACT Robert DiCandia

CLIENT CONTACT PHONE # (518) 402-9261

( ) AMENDMENT TO EXISTING APPROVED H&SP

( ) H&SP AMENDMENT NUMBER?

( ) DATE EXISTING APPROVED H&SP

OBJECTIVES OF FIELD WORK:
(e.g. collect surface soil samples):

1) Perform site reconnaisance (as part of Records Search)
2) Site survey including all sample locations.
3) Geophyical surveys - oversite.
4) Passive gas sampling.
5) Soil and groundwater sampling and profiling.
6) Monitoring well installation

Type *Check as many as applicable*

Active	(X)	Landfill	( )	Unknown	( )
Inactive	( )	Uncontrolled	(X)	Military	( )
Secure	( )	Industrial	(X)	Other (specify)	(X)
Unsecure	(X)	Recovery	( )	Commercial and Residential	
Enclosed space	( )	Well Field	( )		

All requirements described in the CDM Health and Safety Assurance Manual for Hazardous Waste Operations are incorporated in this health and safety plan by reference.

DESCRIPTION AND FEATURES:

The Speonk Solvent Plume (the Site) occupies approximatley 600 acres of Southampton Township in Suffolk County, New York. The plume is approximatley 7,500 feet long running approximately north-south and is centered near the intersection of Phillips Avenue and Old County Road. North of Old Country Road the Site is generally undeveloped, while south of Old Country Road the Site composition varies from suburban residential to commercial and industrial. Notable properties in the area include: a sand and gravel pit and an asphalt plant both located at the north end of the Site, automobile junk yards near the northeast and southeast corners of the Site, a duck research facility just west of the Site, and a buildling supply distributor just east of the Site. Historic industries in the area include: a chromated copper arsenate (CCA) wood treatment plant near the northeast corner of the Site, a creosote wood treatment facility near the south end of the Site, a feather processing facility in the southwest portion of the Site, and a septic services company west of the Site.

SURROUNDING POPULATION: (x) Residential (X) Industrial (x) Commercial ( ) Rural ( ) Urban OTHER:

N

SITE MAP: *Show Exclusion, Contamination Reduction, and Support Zones. Indicate Evacuation and Reassembly Points*

See attached zfigure.

The exclusion zone will include all points within 10 feet of the investigation activities or a sampling location. The contamination reduction zone will consist of a ten foot radius outside of the exclusion zone. The support zone will be a 10 foot radius outside of the CRZ. All zones are mobile, established in consideration of the prevailing wind direction and will be established and moved as work crew advances to new locations.

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HISTORY: *Summarize conditions that relate to hazard. Include citizen complaints, spills, previous investigations or agency actions, known injuries, etc.*

The Speonk solvent plume was first discovered in December 2001 when a residential private well was sampled as part of a property transaction. Chlorinated volatile organics were detected in the sample, including 1,200 µg/l of PCE. Based upon these results, the suffolk County Departmetn of health Services (SCDHS) sampled additional wells in the area. PCE was found at another nearby residence at a concentration of 820 µg/l. The SCDHS subsequently installed 15 vertical groundwater profile borings, adn installed monitoring wells at each location. Additionally, 45 private potable wells were sampled. Results found that five potable wells contained CVOC including PCE, TCE, 1,1,1-trichloroethane; chloroform and carbon tetrachloride exceeding NYSDEC TOGS. Under contract to NYSDEC, Environmental Resource Management (ERM) perfomred a site characterization between February 2004 and Janaury 2007. Site characterization activites incldued passive gas sampling, soil vapor, sub-slab vapor and indoor air sampling, vertical groundwater profiling, monitoring well installation and sampling. Following the site characterizatrion the Draft Preliminary Asessment Report was released. Additional delineation was conducted however

WASTE TYPES: ( ) Liquid ( ) Solid ( ) Sludge ( ) Gas ( ) Unknown (X) Other, specify: contaminated groundwater

Check as many as applicable.

( ) Corrosive	( ) Flammable	( ) Radioactive
( ) Toxic	**(X) Volatile**	( ) Reactive
( ) Inert Gas	( ) Unknown	**(x) Other, specify: chlorinated volatile organic compounds**

WORK ZONES: *Describe the Exclusion, Contamination Reduction, and Support Zones in terms on-site personnel will recognize*

The exclusion zone will include all points within 30 feet of the investigation activities or a sampling location. The contamination reduction zone will consist of a ten foot radius outside of the exclusion zone. The support zone will be a 10 foot radius outside of the CRZ. All zones are mobile, established in consideration of the prevailing wind direction and will be established and moved as work crew advances to new locations.

HAZARDS OF CONCERN:

(X) Heat Stress	**(X) Noise**
(X) Cold Stress	( ) Inorganic Chemicals
( ) Explosive/Flammable	**(X) Organic Chemicals**
( ) Oxygen Deficient	**(X) Motorized Traffic**
( ) Radiological	**(X) Heavy Machinery:Drill Rig**
( ) Biological	**(X) Slips, Trips, & Falls**
( ) Other	

FACILITY'S PAST AND PRESENT DISPOSAL METHODS AND PRACTICES:

Unknown and believed to vary across properties.

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HAZARDOUS MATERIAL SUMMARY: *Circle waste type and estimate amounts by category.*

CHEMICALS: *Amount/Units:*	**SOLIDS:** *Amount/Units:*	**SLUDGES:** *Amount/Units:*	**SOLVENTS:** *Amount/Units:*	**OILS:** *Amount/Units:*	**OTHER:** *Amount/Units:*
Acids	Flyash	Paints	**Halogenated (chloro, bromo) Solvents**	Oily Wastes	Laboratory
Pickling Liquors	Mill or Mine Tailings	Pigments		Gasoline	Pharmaceutical
Caustics	Asbestos	Metals Sludges	Hydrocarbons	Diesel Oil	Hospital
Pesticides	Ferrous Smelter	POTW Sludge	Alcohols	Lubricants	Radiological
Dyes/Inks	Non-Ferrous Smelter	Aluminum	Ketones	PCBs	Municipal
Phenols	Metals	Distillation Bottoms	Esters	Polynuclear Aromatics	Construction
Halogens	Other *specify:*	Other *specify:*	Ethers	Other *specify:*	Munitions
Metals			Other *specify:* **PCE**		Other *specify:*
Dioxins					
Other *specify:*					

OVERALL HAZARD EVALUATION: ( ) High () Medium (x) Low ( ) Unknown *(Where tasks have different hazards, evaluate each.)*

JUSTIFICATION: The contamination is isolated to a sole source aquifer and the VOC concentration is considered low for human health hazards.

FIRE/EXPLOSION POTENTIAL: ( ) High ( ) Medium (x) Low ( ) Unknown

BACKGROUND REVIEW: (X) Complete ( ) Incomplete

KNOWN CONTAMINANTS	HIGHEST OBSERVED CONCENTRATION	PEL/TLV *ppm or mg/m3 (specify)*	IDLH *ppm or mg/m3 (specify)*	Warning Concentration *(in ppm)*	SYMPTOMS & EFFECTS OF ACUTE EXPOSURE	PHOTO IONIZATION POTENTIAL
Tetrachloroethylene (PCE)	1,400 ug/l-GW	25 ppm	150 ppm	47 ppm	Irritated eyes, nose, throat, flushed face & neck, dizziness	9.32
Trichloroethene (TCE)	500 ug/l-GW	50 ppm	1,000 ppm	82 ppm	Vertigo, visual disturbance, headache, drowsiness	9.45
1,1,1-trichloroethane (1,1,1-TCA)	76 ug/l-GW	350 ppm	700 ppm	400 ppm	Headache, CNS depression, loss of balance, eye irritation	11.00
1,1,2-trichloroethane	24 ug/l-GW	10 ppm	100 ppm	NA	Irritated nose, central nervous system depression	11.00
carbon tetrachloride	200 ug/l-GW	2 ppm	200 ppm	250 ppm	Central nervous system depression, nausea, liver damage	11.5
chloroform	1,100 ug/l-GW	2 ppm	500 ppm	192 ppm	Mental dullness, headaches, anesthesia, dizziness	11.40
xylene	51 ug/l-GW	100 ppm	900 ppm	5 ppm	Eye, nose & throat irritation, drowsiness, nausea, incoordination	8.44
1,1-dichlorothene	30 ug/l-GW	1 ppm	>500 ppm	1.1 ppm	No acute effects	<11.0
1,1-dichloroethane	9 ug/l-GW	100 ppm	3,000 ppm	120 ppm	Skin irritation, drowsiness	11.10
1,2-dichlorobenzene	12 ug/l-GW	10 ppm	150 ppm	0.7 ppm	Nose, eye irritation, skin blister, headaches, nausea, jaundice	9.10

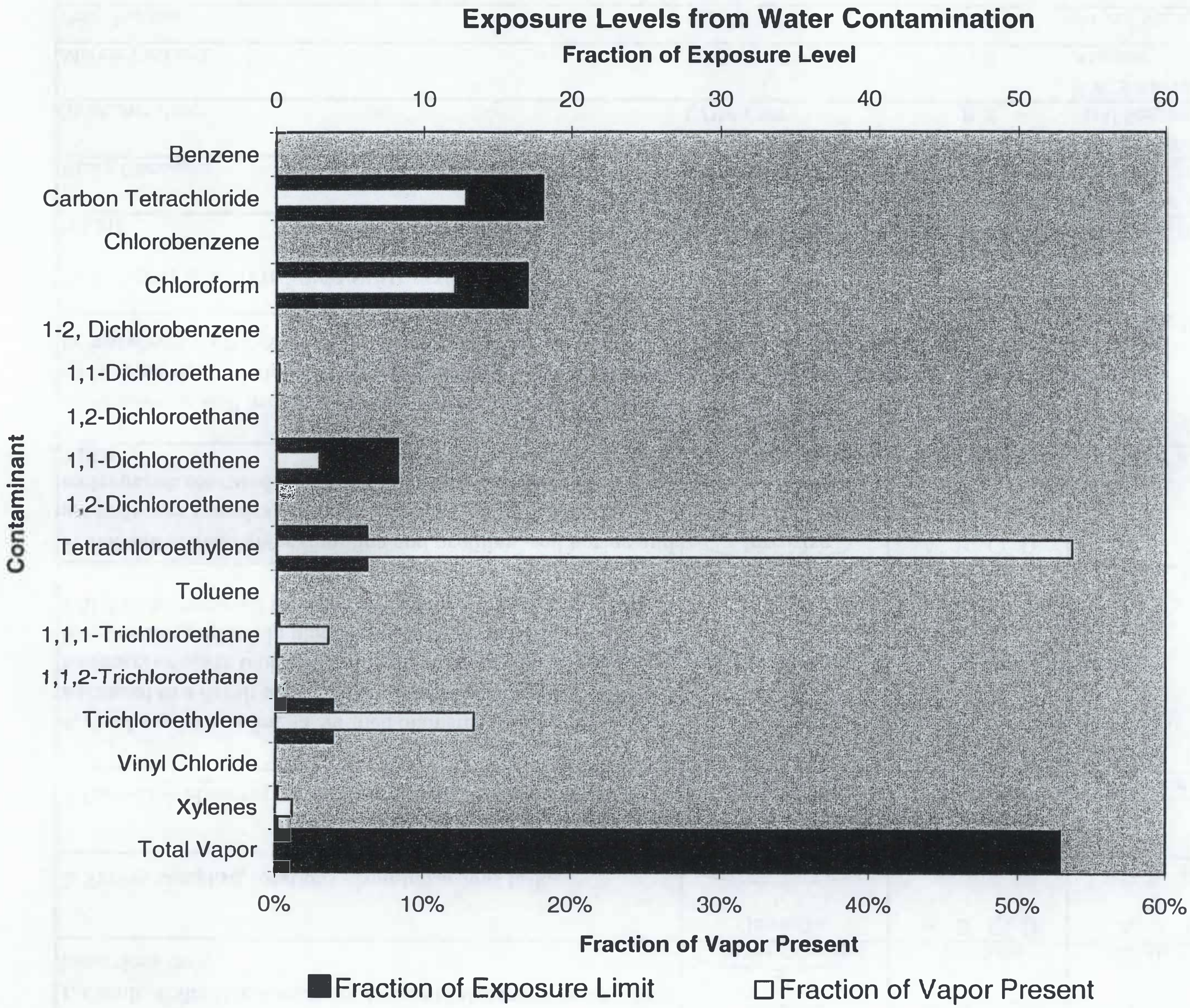
NA = Not Available **NE = None Established** **U = Unknown**

Attach, to this plan, an MSDS for each chemical you will use at the site.

S = Soil	SW = Surface Water	T = Tailings	W = Waste	TK = Tanks	SD = Sediment
A = Air	GW = Ground Water	SL = Sludge	D = Drums	L = Lagoons	OFF = Off-Site

* Known contaminatnts and concentrations are based on ERM's February 2007 Draft Preliminary Site Assessement Reports. VOCs detected from the permanent monitoring wells are reported.

Name of Site	Vapor Spreadsheet - for volatile compounds in water							
PARAMETER:	Maximum Concentr'n in site water	Water Solubility	Vapor Pressure	Henry's Law Constant	Worker Exposure Limit	Saturation Concentr'n in Air	Fraction of Total vapor in Air	Saturation Concentr'n in Air
CONTAMINANT	(ug/l)	mg/l	(torr)	(atm m3/mol)	(ppm)	(ppm)	(fraction)	frxn of PEL
Benzene	0.E+0	600.	95.2	5.55E-03	0.5	0.E+0	0.00%	0.00
Carbon Tetrachloride	200.	793.	115.	2.76E-02	2	35.89	12.89%	17.94
Chlorobenzene	0.E+0	498.	12.	3.77E-03	10	0.E+0	0.00%	0.00
Chloroform	1,100.	7,950.	197.	3.67E-03	2	33.82	12.15%	16.91
1-2, Dichlorobenzene	12.	156.	1.36	1.90E-03	25	.16	0.06%	0.01
1,1-Dichloroethane	9.	5,060.	227.	5.62E-03	100	.51	0.18%	0.01
1,2-Dichloroethane	0.E+0	8,524.	78.9	1.18E-03	1	0.E+0	0.00%	0.00
1,1-Dichloroethene	30.	2,250.	600.	2.61E-02	1	8.08	2.90%	8.08
1,2-Dichloroethene	0.E+0	3,500.	201.	4.08E-03	200	0.E+0	0.00%	0.00
Tetrachloroethylene	1,400.	200.	18.6	1.77E-02	25	149.43	53.67%	5.98
Toluene	0.E+0	526.	28.4	6.64E-03	20	0.E+0	0.00%	0.00
1,1,1-Trichloroethane	76.	1,500.	124.	1.72E-02	350	9.8	3.52%	0.03
1,1,2-Trichloroethane	24.	4,420.	23.	2.34E-04	10	.04	0.02%	0.00
Trichloroethylene	500.	1,100.	69.	9.85E-03	10	37.48	13.46%	3.75
Vinyl Chloride	0.E+0	8,800.	2,980.	2.78E-02	1	0.E+0	0.00%	0.00
Xylenes	51.	168.	8.	6.68E-03	100	3.21	1.15%	0.03
Total Vapor	3,402.					278.41		52.73
								52.73


Exposure Levels from Water Contamination
Fraction of Exposure Level
0
10
20
30
40
50
60
Contaminant
Benzene
Carbon Tetrachloride
Chlorobenzene
Chloroform
1-2, Dichlorobenzene
1,1-Dichloroethane
1,2-Dichloroethane
1,1-Dichloroethene
1,2-Dichloroethene
Tetrachloroethylene
Toluene
1,1,1-Trichloroethane
1,1,2-Trichloroethane
Trichloroethylene
Vinyl Chloride
Xylenes
Total Vapor
0%
10%
20%
30%
40%
50%
60%
Fraction of Vapor Present
Fraction of Exposure Limit
Fraction of Vapor Present

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TASK DESCRIPTION/SPECIFIC TECHNIQUE/SITE LOCATION *(attach additional sheets as necessary)*	Type	Primary	Contingency	HAZARD & SCHEDULE
1. Conduct Site Reconnaisance as part of Records Search - Non-hazardous task.	Intrusive Non-intrusive	A B C D Modified	A B C D Exit Area	Hi Med Low Spring 2008
2. Survey sampling locations - Non-hazardous task.	Intrusive Non-intrusive	A B C D Modified	A B C D Exit Area	Hi Med Low Fall 2008
3. Geophysical survey - over site - Non-hazardous task.	Intrusive Non-intrusive	A B C D Modified	A B C D Exit Area	Hi Med Low Fall 2008
4. Passive gas sampling -a 3/4-inch diameter hole will be advanced to a depth of up ~2-feet using a hammer drill, slide hammer, or other tool, and a BeSure sampler will be lowered into the hole and left in place for up to 2 weeks. The samplers will then be removed for laboratory analysis (locations TBD)	Intrusive Non-intrusive	A B C D Modified	A B C D Exit Area	Hi Med Low Fall 2008
5. Soil and groundwater sampling and profiling -soil boring and groundwater samples will be performed by mud rotary and hydropunch operated by a NY State licensed driller (locations TBD)	Intrusive Non-intrusive	A B C D Modified	A B C D Exit Area	Hi Med Low
6. Monitoring well installation -wells will be installed by hollow stem auger method and/or mud rotary drilling. The wells will be installed by a NY State licensed driller (locations TBD)	Intrusive Non-intrusive	A B C D Modified	A B C D Exit Area	Hi Med Low Fall 2008

PERSONNEL AND RESPONSIBILITIES

NAME	FIRM/DIVISION	CDM HEALTH CLEARANCE	RESPONSIBILITIES	On Site?
Ricky Chenenko	CDM/EMP	B-S	H & S Coordinator/ Field Manager	1-2-3-4-5-6
Stephanie Britch	CDM/EMP	B-S	H & S Alternate/ Field Scientist	1-2-3-4-5-6
Marcie Puskarik	CDM/EMP	B-S	H & S Alternate/ Site Assessor	1-2-3-4-5-6
Patty Forgang	CDM/EMP	B-S	Project Manager	1-2-3-4-5-6
Chris Marlowe	CDM/EMP	C	H&S Manager	No

Buddy system must be complied with either by client, CDM or contractor serving as buddy.

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CDM Health and Safety Program — **PROJECT DOCUMENT #:**

PROTECTIVE EQUIPMENT: *Specify by task. Indicate type and/or material, as necessary. Group tasks if possible. Use copies of this sheet if needed.*

BLOCK A - Primary

TASKS: 1 - 2 - 3 - 4 - 5 - 6 - 7 - 8
LEVEL: A - B - C - D - Modified
(x) Primary ( ) Contingency

Respiratory: (XX) Not needed
( ) SCBA, Airline
( ) APR
( ) Cartridge
( ) Escape Mask
( ) Other:

Head and Eye: ( ) Not needed
(x) Safety Glasses:
( ) Face Shield:
( ) Goggles:
(x) Hard Hat:
( ) Other:

Boots: ( ) Not needed
(x) Steel-Toe
( ) Rubber **(X) Leather**
( ) Overboots: Latex (optional)

Prot. Clothing: (x) Not needed
( ) Encapsulated Suit
( ) Splash Suit
( ) Apron
(X) Tyvek Coverall
( ) Saranex Coverall
( ) Cloth Coverall
(XX) Other: work clothes

Gloves: ( ) Not needed
(XX) Undergloves: latex
(X) Gloves: Nitrile Task 4 & 5
( ) Overgloves: Nitrile

Other: specify below
( ) Tick Spray
( ) Flotation Device
(X) Hearing Protection
(X) Sun Screen

BLOCK B-Contingency

TASKS: 1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10
LEVEL: A - B - C - D - Modified
( ) Primary (x) Contingency

Exit Area

Respiratory: ( ) Not needed
( ) SCBA, Airline
( ) APR
( ) Cart
( ) Esca
( ) Othe

Head and Eye: ( ) Not needed
( ) Safety Glasses
( ) Face Shield
( ) Goggles
( ) Hard Hat
( ) Oth

Boo d
( ) S hank
( ) Rubber ( ) Leather
( ) Overboots: Latex

Prot. Clothing: ( ) Not needed
( ) Encapsulated Suit
( ) S it
( ) A
( ) T
( ) S Co
( ) C ver
( ) Other:

Gloves: ( ) Not needed
( ) Undergloves: PVC
( ) Gloves: Cotton
( ) Overgloves: Nitrile

( ) Flotation Device
( ) Heating Protection
( ) Sun Screen

BLOCK C

TASKS: 1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10
LEVEL: A - B - C - D - Modified
(x) Primary ( ) Contingency

Respiratory: ( ) Not needed
( ) SCBA, Airline:
( ) APR:
( ) Cartridge:
( ) Escape Mask:
( ) Other:

Head and Eye: ( ) Not needed
( ) Safety Glasses:
( ) Face Shield:
( ) Goggles:
( ) Hard Hat:
( ) Other:

Boots: ( ) Not needed
( ) Steel-Toe ( ) Steel Shank
( ) Rubber ( ) Leather
( ) Overboots:

Prot. Clothing: ( ) Not needed
( ) Encapsulated Suit:
( ) Splash Suit
( ) Apron:
( ) Tyvek Coverall
( ) Saranex Coverall
( ) Cloth Coverall:
( ) Other:

Gloves: ( ) Not needed
( ) Undergloves:
( ) Gloves:
( ) Overgloves:

Other: specify below
( ) Tick Spray
( ) Flotation Device
( ) Heating Protection
( ) Sun Screen

BLOCK D

TASKS: 1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10
LEVEL: A - B - C - D - Modified
( ) Primary ( ) Contingency

Respiratory: ( ) Not needed
( ) SCBA, Airline
( ) APR
( ) Cartridge
( ) Escape Mask
( ) Other:

Head and Eye: ( ) Not needed
( ) Safety Glasses
( ) Face Shield
( ) Goggles
( ) Hard Hat
( ) Other:

Boots: ( ) Not needed
( ) Steel-Toe ( ) Steel Shank
( ) Rubber ( ) Leather
( ) Overboots

Prot. Clothing: ( ) Not needed
( ) Encapsulated Suit
( ) Splash Suit
( ) Apron
( ) Tyvek Coverall
( ) Saranex Coverall
( ) Cloth Coverall
( ) Other:

Gloves: ( ) Not needed
( ) Undergloves
( ) Gloves
( ) Overgloves

Other: specify below
( ) Tick Spray
( ) Flotation Device
( ) Heating Protection
( ) Sun Screen

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MONITORING EQUIPMENT: *Specify by task. Indicate type as necessary. Attach additional sheets if needed.*

INSTRUMENT	TASK	ACTION GUIDELINES		COMMENTS *(When and how will you use the monitor?)*
Combustible Gas Indicator	1-2-3-4-5-6-7-8	0-10% LEL 10-25% LEL >25% LEL 21.0% O2 <21.0% O2 <19.5% O2	*No explosion hazard* *Potential explosion hazard; notify SHSC* *Explosion hazard; interrupt task/evacuate* *Oxygen normal* *Oxygen deficient; notify SHSC* *Interrupt task/evacuate*	( ) Not Needed Needed for all drilling activities.
Radiation Survey Meter	1-2-3-4-5-6-7-8	3 x Background: >2mR/hr:	*Notify HSM* *Establish REZ*	(X) Not Needed
Photoionization Detector 10.6eV Lamp Type OVM	1-2-3-4-5-6-7-8	*Specify:* 0-5 ppm: Level D 1 - 5 ppm: Level D. Check with detector tubes > 5 ppm Leave Area . Call HSM		( ) Not Needed Monitor breathing zone continuously. Compare action levels to time-averaged breathing zone measurements.
Single Gas Type: Chloroform	1-2-3-4-5-6-7-8	*Specify:* 0-1 ppm: Level D > 1 ppm Leave Area . Call HSM		Team will draw chloroform detector tubes when PID readings rise.
Single Gas Type: Vinyl Chloride	1-2-3-4-5-6-7-8	*Specify:* 0-0.5 ppm: Level D > 0.5 ppm Leave Area . Call HSM		Team will draw vinyl chloride detector tubes to determine 1, 1-dichloroethylene concentrations when PID readings rise.
Respirable Dust Monitor Type	1-2-3-4-5-6-7-8	*Specify:* If team observes visible concentrations of airborne dust or dry, windy conditions that dust, team will leave area.		( ) Not Needed
Other *Specify:*	1-2-3-4-5-6-7-8	*Specify:* If team notices unusual odors or irritation of the eye or throat, they will leave the area.		

DECONTAMINATION PROCEDURES

ATTACH SITE MAP INDICATING EXCLUSION, DECONTAMINATION, AND SUPPORT ZONES AS PAGE TWO

Personnel Decontamination	Sampling Equipment Decontamination	Heavy Equipment Decontamination
Summarize below or attach diagram; Team members will remove their protective clothing in the following order: 1. Equipment drop. 2. Glove removal 3. Hand and face wash.	*Summarize below or attach diagram;* Sampling equipment will be decontaminated by: 1. Gross mechanical removal of dirt. 2. Alconox/Water wash. 3. Potable water rinse. 4. Distilled water rinse.	*Summarize below or attach diagram;* Drill rigs and/or geoprobes used for hydropunch and soil vapor sampling will be decontaminated by: 1. Gross mechanical removal of dirt. 2. Alconox/Water wash. 3. Potable water rinse. Heavily contaminated equipment will be steam cleaned
Containment and Disposal Method Disposable protective equipment will be disposed of in CDM dumpster, unless heavily contaminated. If heavily contaminated, disposable equipment will be contained in drums and left on site for proper disposal.	**Containment and Disposal Method** Sampling equipment cleaning water solutions will be allowed to drain to the groundwater. If heavily contaminated, disposable equipment will be contained in drums and left on site for proper disposal.	**Containment and Disposal Method** Decontamination fluids will be released to the ground, unless heavily contaminated. If heavily contaminated, contractor will contain the waste in drums, and left on site for proper disposal.

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CDM Health and Safety Program | **PROJECT DOCUMENT #:**

EMERGENCY CONTACTS	**NAME**	**PHONE**
Water Supply		
Site Telephone		NA
EPA Release Report #:		800-424-8802
CDM 24-Hour Emergency #:		732-539-8128
CHEMTREC Emergency #:		800-424-9300
Underground Utility	UFPO	800-962-7962

CONTINGENCY PLANS: *Summarize below*

If CDM work team observes hazards for which they have not prepared, they will withdraw from the area and call the CDM Project Manager

SHSC will designate evacuation routes. Teams will cease work if they see lightning or thunder storms in the area.

CDM may rely on instruments operated by contractor personnel only upon HSM approval. If contractor directs a higher level of protection than this plan does, CDM personnel will wear that level. CDM personnel may choose to wear more potection than directed by this plan.

Contractor will be expected to inspect its equipment and certify its suitability for the project to the CDM site health and safety coordinator.

*As per NYSDEC Draft DER-10 Technical Guidance for Site Investigation and Remediation, continuous monitoring at each borehole, monitoring well location, and soil vapor location will be sufficient to meet the requirements of the Community Air Monitoring Program.

HEALTH AND SAFETY PLAN APPROVALS

Prepared by Marcie Puskarik — Date April 2008

Date

HSM Signature Chris Marlowe — Date 4/16/08

EMERGENCY CONTACTS	**NAME**	**PHONE**
CDM Health and Safety Manager	Chris Marlowe	732-590-4632
CDM Field Manager	Ricky Chenenko	212-785-9160
CDM Site Safety Coordinator	Ricky Chenenko	212-785-9160
Client Contact	Rober Dicandia	518-402-9261
Other *(specify)*		
Environmental Agency	NYSDEC Region 1	631-444-0204
State Spill Number	New York	800-342-9296
Fire Department		911
Police Department		911
State Police		911
Health Department	Suffolk County	631-853-3000
Health Department	Emergency After 5pm	631-852-4820
Poison Control Center	Nationwide	800 / 222 - 1222
Occupational Physician	Jerry Berke	800/ 350 - 4511

HOSPITAL INFORMATION

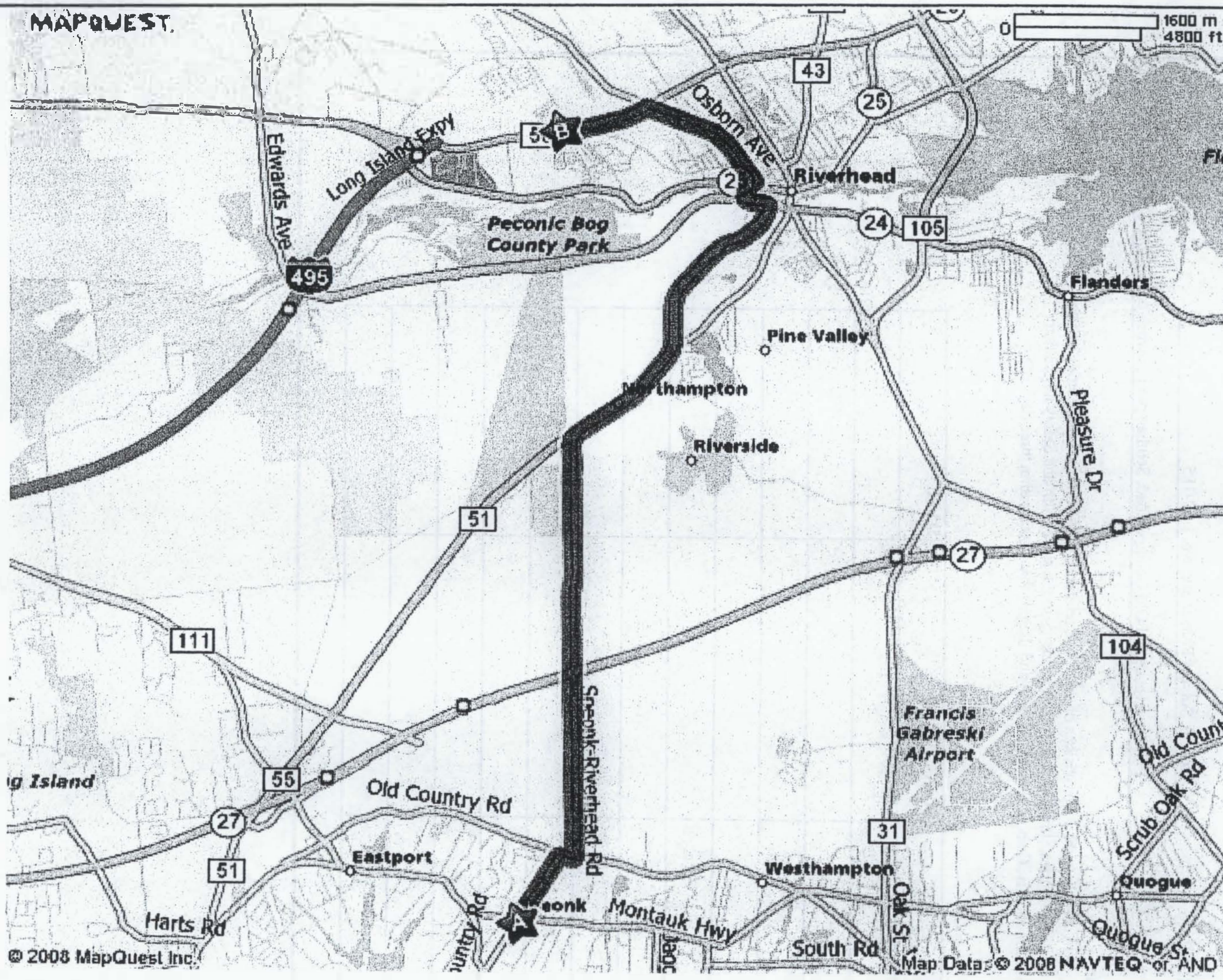
Name: Peconic Bay Medical Center

Phone: (631) 727 - 9654

Address: 34 Commerce Drive, Riverhead, NY 11901

Route: From the intersection of North Phillips Avenue and Old Country Road
Travel east on Old Country Road
Turn LEFT onto Speonk-Riverhead Road
Turn SLIGHT RIGHT onto CR-51 N/CenterDr S/E Moriches Riverhead Road.
Continue to follow CR-51 N/Center Dr S
Turn SLIGHT LEFT
Turn SLIGHT LEFT onto NY-24 W/CR-94 W/Nugent Dr
Turn SLIGHT RIGHT onto CR-94
CR-94 becomes Court Street
Turn LEFT onto Osborn Ave
Turn LEFT onto CR-58/Old County Rd
Turn RIGHT onto Commercial Dr
End at 34 Commerce Dr., Riverhead, NY

ROUTE TO HOSPITAL MAP:



HEALTH AND SAFETY PLAN SIGNATURE FORM

CDM Health and Safety Program

All site personnel must sign this form indicating receipt of the HASP. Keep this original on site or with the field manager. It becomes part of the permanent project files. Send a copy to the Health and Safety Manager (HSM).

SITE NAME/NUMBER: Speonk Solvent Plume/ Site No. 1-52-185

DIVISION/LOCATION: Phillips Avenue and Old Country Road, Southampton Townshipo, Suffolk County, NY

CERTIFICATION:
I understand, and agree to comply with, the provisions of the above referenced HASP for work activities on this project. I agree to report any injuries, illnesses or exposure incidents to the site Health and Safety Coordinator (SHSC). I agree to inform the SHSC about any drugs (legal and illegal) that I take within three days of site work.

PRINTED NAME	SIGNATURE	DATE

May 2007

Appendix B

Citizen Participation Plan (CPP)

CITIZENS PARTICIPATION PLAN
Speonk Solvent Plume
(Site No.:1-52-185)
Southampton, Suffolk County, New York

Prepared for

New York State Department of Environmental Conservation
Investigation and Design Engineering Services
Standby Contract No. D004437
Work Assignment No. D004437-10

Prepared by

Camp Dresser & McKee
Raritan Plaza I, Raritan Center
Edison, New Jersey

May 2008

CDM

Contents

Section 1
Introduction

This Citizens Participation Plan (CPP) for the Speonk Solvent plume (herein referred to as the "Site") located in Southampton Township, Suffolk County, New York was prepared by Camp Dresser and McKee Inc. (CDM) for the New York State Department of Environmental Conservation (NYSDEC) under the Engineering Services for Investigation and Design, Standby Contract No. D004437. All background and site information used in the development of this CPP was furnished by NYSDEC. The Site occupies approximately 600 acres of Southampton Township and is centered near the intersection of Phillips Avenue and Old County Road. The plume is approximately 10500 feet long, running in a north-south direction. The work plan was developed in accordance with the "State Superfund Standby Contract Work Assignment D004437-26, Site Characterization, Speonk Solvent plume, Site No. 1-52-185."

1.1 Purpose and Objectives of the CPP

The purpose of the CPP is as a tool to manage the project's citizen participation program. A major goal of citizen participation is to foster communication between the public and government agencies, facilitating the remedial process and enabling citizens to participate more fully in decisions that potentially affect their health. This provides opportunities for citizen involvement and encourages consultation with the public at various stages in the process before the Department forms or adopts final positions. Citizen participation also provides opportunities to gather the public's knowledge and information, which can be helpful to make informed decisions during the process. The CPP retains flexibility to allow for necessary changes during the process if deemed necessary.

1.2 Site Description and Background

1.2.1 Site Description

The Site occupies approximately 600 acres of Southampton Township, Suffolk County and is centered near the intersection of Phillips Avenue and Old Country Road. A site location map is provided as Figure 1-1. According to the United States Geological Survey (USGS) *Eastport, New York* 7.5-Minute topographic map (1984), the Site lies approximately 30 to 60 feet above mean sea level (msl).

Previous investigations have characterized the plume as approximately 7,500 feet long, running approximately north-south. North of Old Country Road the Site is generally undeveloped, while south of Old Country Road the Site is primarily comprised of suburban residential properties. Commercial and industrial properties present in the area include:

- Sand and Gravel pit at the north end of the Site

- Asphalt plant at the north end of the Site
- Automobile junk yards near the northeast corner of the Site and near the southeast corner of the Site
- A duck research facility just west side of the Site
- A building supply distributor just east of the Site.
- Freight railroad yard at southern portion of the Site.

Former industries in the area include:

- A chromated copper arsenate (CCA) wood treatment plant near the northeast corner of the Site (presently the building supply distributor).
- Creosote wood treatment facility near the south end of the Site.
- Feather processing facility in the southwest portion of the Site.
- Septic service company west of the Site.
- Former weapons test range at north end of the Site

1.2.2 Site History

The Speonk solvent plume was first discovered in December 2001 when a residential private well was sampled as part of a property transaction. Chlorinated volatile organics were detected in the sample, including 1,200 µg/l of PCE. Based upon these results, the Suffolk County Department of Health Services (SCDHS) sampled additional residential wells in the area. PCE was found at another nearby residence, at a concentration of 820 µg/l (ERM, 2007).

The SCDHS subsequently installed 15 vertical groundwater profile borings, and installed monitoring wells at each location. In addition, 45 private potable wells were sampled. The objective of this investigation was to delineate the impacted groundwater (ERM, 2007).

Five of the potable wells contained chlorinated volatile organic compounds (CVOC) exceeding New York State Groundwater Quality Standards. CVOCs exceeding the standards were PCE; TCE; 1,1,1-trichloroethane (1,1,1-TCA); chloroform and carbon tetrachloride. The highest total CVOC concentration was 1,673 µg/l (ERM, 2007).

Under contract to NYSDEC, Environmental Resources Management (ERM) performed a site characterization between February 2004 and January 2007. The following activities were performed during the ERM site assessment:

- Passive soil gas sampling
- Soil vapor, sub-slab vapor and indoor air sampling
- Vertical groundwater profiling by mud rotary drilling and Hydropunch®
- Monitoring well installation and sampling.

The findings were presented in a preliminary site assessment report (ERM, 2007). While additional delineation was performed, the source of the Speonk solvent plume could not be determined. The data collected during the Preliminary Site Assessment indicate the following:

- Groundwater is 20 to 45 feet deep at the Site, and flows south-southwest.
- The solvent plume is approximately 10,000 feet long.
- Primary contaminants of concern include TCE, PCE, chloroform and carbon tetrachloride
- Groundwater concentrations detected are generally on the order 100 µg/l. Local areas of elevated concentrations on the order of 1,000 µg/l, have also been detected. These areas include GB-04 in the Circle Place area (at the approximate midpoint of the plume length), and MW-18 and MW-21 near the intersection of Wisteria Drive and Montauk Highway (near the southern limit of the mapped plume).
- Based upon vertical contaminant distribution maps, groundwater concentrations generally increase with depth to maximum concentrations at an approximate elevation -50 to -75 msl. Based on the data reported, decreasing concentration trends were generally observed below these elevations.
- The solvent plume appears to be migrating toward the surface as it moves downgradient in a southerly direction. The maximum concentrations were found at approximate elevation -75 msl at the north (upgradient) end of the Site, and at approximate elevation -50 msl at the south (downgradient) end of the Site.
- Elevated passive soil gas results, compared to the surrounding area, were found in the Circle Place area (soil vapor probes SV-CO1, SV-CO2SV-E02 and), and at the Old Country Road Pink Building (soil vapor probe SV-F05-SV-21). Based upon the results, a CVOC source may be present in the vicinity of these sample locations.

1.3 Environmental Setting

The Speonk Solvent Plume Site lies between approximate elevations of 30 to 60 feet above mean sea level (msl). Local topography slopes from the northeast to the southwest in the vicinity of the Site (USGS *Eastport, New York* 7.5-Minute topographic map, 1984). In consideration of the size of the Site (600 acres, with a plume approximately 7,500 feet long), this reflects the relatively gentle topography of the glacial outwash deposits of that form the ground surface of southern Long Island.

1.3.1 Regional Geology

Long Island is comprised of Cretaceous and Pleistocene unconsolidated deposits overlying a southward sloping surface of Early Paleozoic to Precambrian bedrock. The hydrogeology of Long Island has been well documented over the years by the USGS (Doriski and Wilde-Katz, 1983; Smolensky et al, 1989). The resulting wedge of sediments thickens southeasterly from its thinnest point in northern Queens, to a maximum thickness of 2,000 feet in southeastern Long Island.

Three major aquifers are present on Long Island, in order of increasing depth: the upper glacial aquifer, the Magothy aquifer and the Lloyd aquifer. A major confining unit, the Raritan Clay, separates the Lloyd aquifer from the overlying Magothy aquifer. The upper glacial aquifer is a water table aquifer comprised of glacial drift and outwash. The upper glacial and Magothy aquifers are often in direct hydraulic communication; however, they may be separated locally by thinner geologic formations along the south shore. The geologic formations that comprise Long Island's aquifer system in the site area are discussed further below.

1.3.1.1 Bedrock

The bedrock beneath Long Island is comprised of Paleozoic to Precambrian mica schist, gneiss and granite. A veneer of saprolite (weathered rock) overlies the bedrock formations. The bedrock is poorly permeable to virtually impermeable, and forms the lower boundary or Long Island's groundwater system (Smolensky, et al. 1989). The groundwater system consists of the overlying unconsolidated Cretaceous and Pleistocene formations.

1.3.1.2 Cretaceous Sediments

The Cretaceous sediments on Long Island area comprised of, from oldest to youngest, the Raritan Formation, the Magothy Formation and the Monmouth Greensand. Each of these formations is discussed below.

The Raritan Formation is divided into the basal Lloyd Sand Member and the overlying Raritan Clay Member. The Lloyd Sand is composed of white and grey fine to coarse sand and gravel, commonly with a clayey matrix. It rests unconformably on bedrock and is about 300 feet thick in the vicinity of the Site. The top of the Lloyd Sand is found at approximately 1,400 feet below msl (Smolensky, et al. 1989.

The Raritan Clay Member is composed chiefly of bedded variegated clay and silt, locally containing interbedded sands. Lignite fragments and iron and pyrite nodules are common. The clay member is approximately 300 feet thick in the vicinity of the Site. The top of the Raritan Clay is found at approximately 1,100 feet below MSL at the Site (Smolensky, et al. 1989).

The Magothy Formation unconformably overlies the Raritan; the contact is commonly marked by a change from the solid clays of the Raritan Clay Member to coarse sands and gravels of the basal unit of the Magothy. The dominant Magothy lithology generally is fine to medium quartz sand, interbedded with coarse sand, sandy clay and solid clay. The thickness of the Magothy is approximately 800 to 900 feet at the Site (Smolensky, et al. 1989).

The Monmouth Group-Monmouth Greensand unconformably overlies the Magothy Formation along the south shore of eastern Long Island. This formation is composed of clay, silt and sand and is rich in glauconite. The Monmouth greensand ranges in color from dark gray to greenish gray to black (Smolensky, et al. 1989). The Site is in the vicinity of the northern limit of the Monmouth Greensand, therefore it is expected to be very thin (it increases in thickness to the south, and is approximately 100 feet thick beneath Fire Island). The top of the Monmouth greensand is approximately 150 feet below msl based upon published maps (Smolensky, et al. 1989). Evidence of the Monmouth greensand was found 200 feet below ground surface during the BB&S Pre-Design Investigation Report (Earth Tech Northeast, 2007), at MWPD-1D. Assuming a ground surface elevation of 60 feet, the reported occurrence of the Monmouth greensand at MWPD-1D is at 140 feet below msl, consistent with the elevation expected based upon Smolensky, et al. 1989.

1.3.1.3 Quaternary Sediments

Quaternary deposits unconformably overly the Cretaceous deposits. The Gardiners Clay is composed of grayish green and brown silt and clay, also contains a few layers of sand. This formation also contains marine shells and green glauconite. Based upon information published by the USGS, the Site is in the vicinity of the northern limit of the Gardiners Clay; therefore, if it is present it is expected to very thin, and approximately 150 feet below sea level (Smolensky, et al. 1989). The Gardiners Clay is not believed to be continuous in this area. As discussed in Section 1.4, Suffolk County Department of Health Services (SCDHS) reported encountering the Gardiner's Clay 85-90 below ground surface at the southern end of the Site, along Montauk Highway.

The reported lithologies of the Gardiners Clay and the Monmouth Greensand overlap, and they are expected to be in contact with each other if both are present. Therefore, it may be difficult to distinguish them with certainty at the Site.

The shallowest Pleistocene deposits are those of the upper glacial aquifer. These deposits are comprised of glacial till of the terminal moraines along the central axis of

Long Island, and outwash deposits between and south of the Moraines. The Site is near the south shore of Long Island, within the outwash deposits which are dominated by fine to coarse sand and gravel.

The upper glacial deposits are expected to be approximately 150 feet thick or more in the vicinity of the Site (Smolensky, et al. 1989). The base of the unit is expected to be at approximately 150 feet below msl.

1.3.2 Regional Hydrogeology

The hydrogeology of Long Island has been well documented over the years by the USGS and others. Three major aquifers are present on Long Island: the upper glacial aquifer, the Magothy aquifer and the Lloyd aquifer. One major confining layer, the Raritan Clay, also exists. These major hydrogeologic units are discussed below.

1.3.2.1 Lloyd Aquifer

The Lloyd aquifer overlies the saprolitic bedrock surface and is Long Island's deepest aquifer. The aquifer does not outcrop on Long Island and is believed to extend to the north beneath Long Island Sound in eastern Nassau County and in Suffolk County, and offshore to the south, beyond the barrier beaches. The Lloyd aquifer is confined in most places, except where the overlying Raritan clay has been eroded away (northern Long Island).

The average horizontal hydraulic conductivity is reported to be approximately 40 ft/day. Vertical anisotropy is estimated as 10:1 (Smolensky, et al. 1989). The Lloyd aquifer is approximately 300 feet thick at the Site; the top is found approximately 1,400 feet below msl.

1.3.2.2 Raritan Clay

Overlying the Lloyd aquifer is the Cretaceous age clay member of the Raritan Formation, referred to as the Raritan clay. The average vertical hydraulic conductivity is reported to be approximately 0.001 ft/day (Smolensky, et al. 1989). The Raritan Clay functions as a confining unit for the Lloyd aquifer. However, the clay is not present in northern Long Island.

The Raritan Clay is approximately 300 feet thick in the vicinity of the Site. The top of the Raritan clay is found at approximately 1,100 feet below msl.

1.3.2.3 Magothy Aquifer

The Magothy aquifer is the principal water supply aquifer in Nassau and Suffolk Counties, attributing to its thickness. Its average horizontal hydraulic conductivity is reported to be approximately 50 ft/day with a vertical anisotropy of 100:1 (Smolensky et al, 1989). It is generally unconfined and in direct connection with the overlying upper glacial aquifer. Confining conditions may exist locally, for example where the Gardiners Clay is present. The Magothy is approximately 800 to 900 feet thick at the Site.

1.3.2.4 Upper Glacial Aquifer

The upper glacial aquifer is the surficial water bearing unit on Long Island and is generally unconfined. However, local confining conditions may exist where local low-permeability layers are present within the formation.

The upper glacial aquifer is comprised of till deposits along the terminal moraine, and outwash deposits to the north and south. The estimated average horizontal hydraulic conductivity is 270 ft/day, with the till being about half as conductive as the outwash deposits. The vertical anisotropy is approximately 10:1 (Smolensky, et al. 1989).

The Site is located within the outwash deposits, which are moderately to highly permeable. As discussed in Section 1.4, the upper glacial aquifer ranges from 85 to 150 feet thick or more in the vicinity of the Site.

1.4 Local Hydrogeology

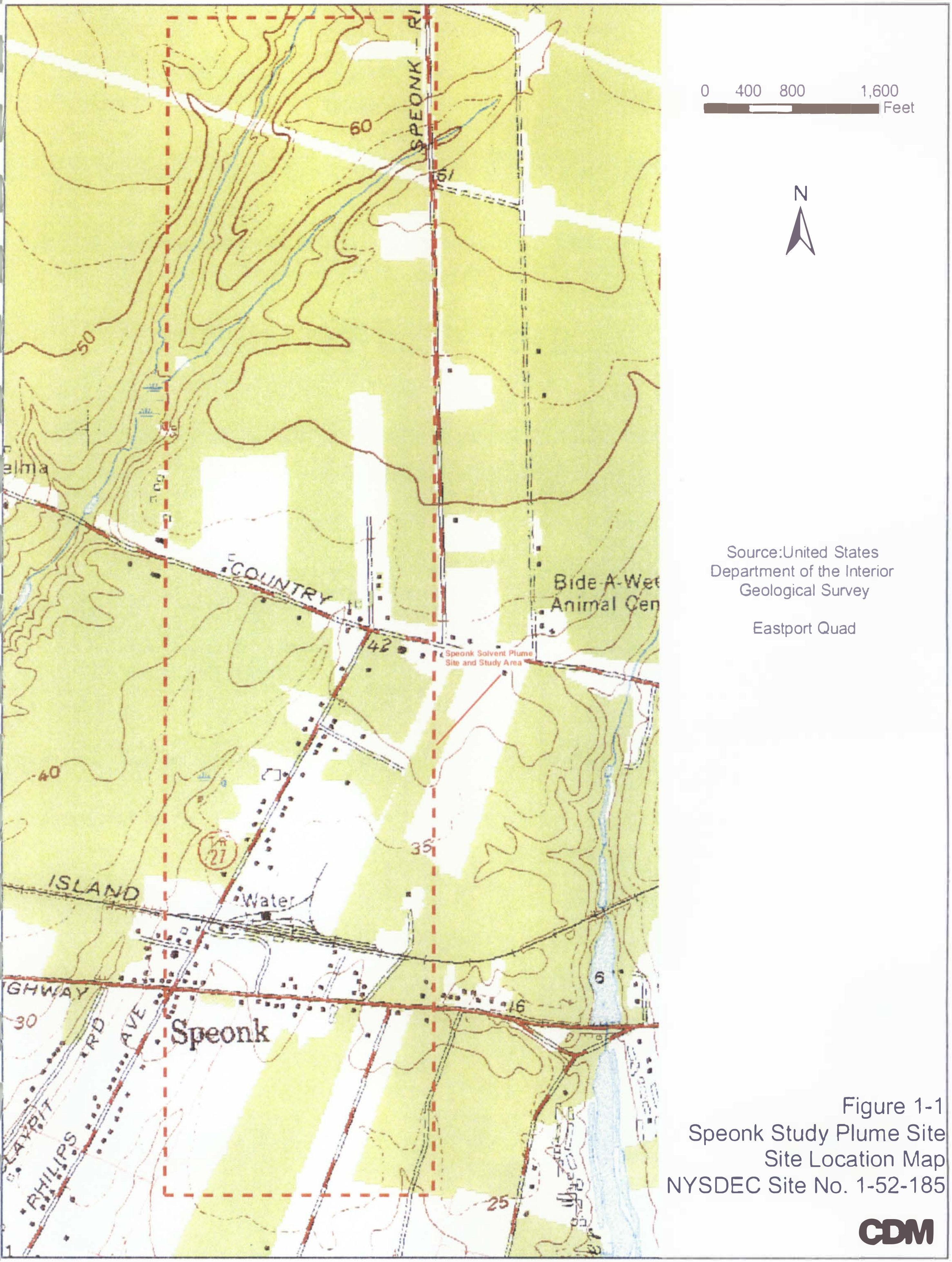
The upper glacial aquifer is estimated to be approximately 150 feet thick or more at the Site based upon published geologic reports, and was reported to be approximately 200 feet thick at MWPD-1D at the BB&S Site (Earth Tech Northeast, 2007). However, SCDHS reported encountering the Gardiner's Clay at depths of 85 to 90 feet below ground surface at the southern part of the Site, along Montauk Highway. Based upon this information, the upper glacial aquifer is much thinner in this area than in the northern part of the Site, where the Gardiner's Clay is believed to be absent.

The upper glacial aquifer and the Magothy aquifer are generally interconnected and behave as a single aquifer. The Magothy aquifer is expected to be approximately 800 to 900 feet thick at the Site. The Raritan Clay is a major confining layer that defines the bottom of the upper glacial/Magothy aquifer system. However, two intervening formations have been found below the upper glacial aquifer at the Site. The Gardiner's Clay has been reported to be present at the southern end of the Site, as discussed above. Its presence would cause local confining conditions in the Magothy Aquifer. The Monmouth Greensand has been reported to be present at a depth of approximately 200 feet at BB&S well MWPD-1D, at the northern portion of the Site (Earth Tech Northeast, 2007). Sandier strata within the Monmouth Greensand would not significantly affect the hydraulic relationship between the upper glacial and the Magothy aquifers.

The water table was reported to be approximately 19 to 40 feet below grade, at approximate elevations 5 to 19 feet msl. Groundwater flow is to the south-southwest

(ERM, 2007). The Site is centrally located between two north-south trending reaches of Moriches Bay and their accompanying streams (Seatuck Creek, Little Seatuck Creek and East River to the west; Speonk River to the East). The East River and a tributary stream flow southwesterly across the northern portion of the Site, into a wetland at their confluence at the head of East River. This wetland is at the western edge of the Site. East River continues southeasterly from the wetland into Moriches Bay (Figure 1-1).

Groundwater and surface water discharge to Moriches Bay, south of the site. In the vicinity of the streams and the northern reaches of Moriches Bay, local groundwater flow is likely diverted towards those surface water bodies.



Source:United States
Department of the Interior
Geological Survey

Eastport Quad

Figure 1-1
Speonk Study Plume Site
Site Location Map
NYSDEC Site No. 1-52-185

CDM

Section 2
Scope of Work

2.1 Task 1A – Site Visit and Work Plan Development

A site visit was conducted on January 31, 2008. Notable findings during the site visit include:

- Drum remnants were observed in the ground in the area of the so-called "crop circle".
- A representative at the duck research facility indicated that carbon tetrachloride was used at the former duck processing facility.
- A representative at the duck research facility also indicated that BB&S used creosote to preserve wood at their former location south of the railroad. BB&S moved to its former CCA treatment facility in the 1960s. It is not known for certain whether the creosote process was used at the new facility, prior to changing to the CCA process.

The Work Plan references procedures detailed in the CDM Generic Quality Assurance Project Plan (QAPP) dated March 2007, which has been provided to NYSDEC for Contract Number D-00437. CDM's Generic QAPP presents methods that will be used to collect field data including project samples, and focuses on the analytical methods and quality assurance/quality control (QA/QC) procedures that will be used to analyze project samples, ensure the data are of known and acceptable quality, and manage the resultant data. A copy of the pertinent Generic QAPP methods will be provided.

The Work Plan will include a site specific Health and Safety Plan (HASP) presented in Appendix A and a Citizen Participation Plan (CPP) presented in Appendix B. The HASP describes the site health and safety for the field activities that will be performed. The CPP provides the primary contacts for the Site as well as various public entities and provides ways for citizens to be involved in the project.

2.2 Task 1B – Preliminary Groundwater Modeling

CDM, the Suffolk County Department of Health Services (SCDHS) and NYSDEC met on January 31, 2008, at the offices of SCDHS. Based upon this meeting, SCDHS agreed to allow CDM to utilize the existing Suffolk County groundwater model as a tool in this NYSDEC work assignment. As a result of these discussions, the existing Suffolk County groundwater flow model will be used to evaluate potential source areas based upon existing data. The existing regional groundwater model will be refined around the study area (see Figure 2-1) as follows:

- Increase the nodal discretization of the model local to the Site. Nodes will be added around the study area to tighten horizontal discretization. In addition, two model levels will be added in the upper glacial aquifer to increase vertical discretization. The revised model grid will be intersected with the digital elevation model (DEM) to better represent local creeks.

- Run the model under steady state conditions using 2005-2006 precipitation data; compare to head measurements collected in May 2006.

Once the flow model has been updated, a solute transport model, DYNTRACK, will be used to evaluate potential source areas:

- Run a series of back-tracks from delineated hot spots within the plume to identify potential source areas. These back tracks will assume long-term average conditions of recharge and pumping (from community supply wells). Backtracks will simulate particle behavior in three dimensions, from its release position to the water table surface.

- Run hypothetical plumes from the potential source areas identified by the particle backtrack runs. Dispersive contaminant plumes will be run from various source areas to evaluate their migration and compare to the extent of the Speonk solvent plume, as presently delineated. Particle release from depth, to simulate movement of particles dissolving from a possible DNAPL mass, may also be included. Up to six (6) potential sources will be simulated.

Data provided by SCDHS and NYSDEC for use in this modeling task includes groundwater sample results, soil boring data, and groundwater well locations and depths, as well as private well sampling data, and data and soil boring data from the nearby BB&S state Superfund site. Although lithologic refinements to the model will be incorporated where appropriate, it is not anticipated that significant changes will be made. This task assumes attendance at one meeting by the groundwater modeler.

2.3 Task 1C – Records Search and Sample Location Mapping

CDM has compiled Suffolk County property tax map data (block/lot numbers) along with the Site study area limits to gain an understanding of how many separate parcels are included within the study area and developed a preliminary map (see Figure 2-2). As shown in Figure 2-2, there more than 200 separate property parcels included in this study area.

Based upon the results of the groundwater modeling exercise and other pertinent information, records searches of select properties (assumes a total of ten properties on not more than five Sanborn maps, for budgetary purposes) will be performed to meet the requirements of NYSDEC's *Draft DER-10 Technical Guidance for Site Investigation and Remediation* dated December 2002. The properties selected will be those considered most likely to be possible sources based upon the groundwater modeling exercise. Information collected during the records/ background search will be summarized in a Record Search Report as a stand alone document. This report will be utilized to develop and refine the site characterization sampling activities detailed in Task 2. Unless requested by NYSDEC, interviewing former or current property owners is not included. This task assumes one 2-day visit to local offices to gather records.

As part of this task, CDM will also prepare a proposed sample location map based on the findings of the preliminary groundwater model and the records search. This mapping will include not only the proposed sample locations, but the locations where previous NYSDEC and Suffolk County groundwater samples were collected.

2.4 Task 2 – Site Characterization Work Plan

This Work Plan references procedures detailed in the CDM Generic Quality Assurance Project Plan (QAPP) dated February 2008 which has been provided to NYSDEC for Contract Number D-00437. The Generic QAPP presents methods that will be used to collect field data and quality assurance/quality control (QA/QC) procedures that will be used to manage data quality. A copy of the Generic QAPP is included in Appendix C of this Work Plan.

This Work Plan also includes a site specific Health and Safety Plan (HASP) presented in Appendix A and a Citizen Participation Plan (CPP) presented in Appendix B. The HASP describes the site health and safety for the field activities that will be performed. The CPP provides the primary contacts for the site as well as various public entities and provides ways for citizens to be involved in the project.

Site Characterization will be conducted in order to determine the source of groundwater contamination at the Site. The investigation is ultimately being conducted to determine if a source can be identified and listed as a New York State Hazardous Waste Site.

- The field program will include geophysical surveys, passive soil gas screening, the installation of soil borings using mud rotary drilling and Hydropunch®, groundwater sampling using mud rotary drilling and Hydropunch®, the installation of groundwater monitoring wells using the hollow stem augers, and soil and groundwater sampling. The actual locations for this work are presently unknown, and well be determined based upon the results of Task 1B and Task 1C. However, potential areas of interest during site characterization are shown on Figure 2-3. If necessary, this work plan scope and budget may be revised following completion of Task 1B and Task 1C.

The site characterization will be performed in accordance with the Technical Guidance for Site Investigation and Remediation (Draft DER-10). VOC sample results will be used to determine potential source areas for groundwater contamination. In addition, soil VOC results collected during the investigation will be compared to applicable NYSDEC soil standards, such as Soil Cleanup Objectives and Cleanup Levels (TAGM 4046) and/or Part 375 subpart 6 (6 NYCRR Part 375) soil cleanup objectives. Groundwater sample data will be compared to New York State Groundwater Quality Standards (NYCRR Chapter X, Subchapter A, Article 2 Part 703, Section 703.5) for Class GA groundwater.

The following section presents the anticipated field activities proposed for the Speonk Solvent Plume site characterization. Refer to Figure 2-3 for potential areas of interest. Field documentation and sampling procedures are provided in the CDM Generic QAPP referenced above. Applicable procedures contained in the Generic QAPP will be followed.

2.4.1 Geophysical Survey

Surface geophysical surveys will be used for two purposes during the investigation. The first objective will be to investigate the subsurface soils for possible buried drums. The second objective will be to clear boring locations of utilities in areas where the one-call service does not mark out utilities (i.e., the interior portions of private property).

Geophysical surveys will be performed in accordance with the QAPP. The surveys will utilize ground penetrating radar (GPR) and electromagnetic conductivity (EC) or other applicable methods. Methods will be selected to identify underground utilities, water lines, buried drums, underground storage tanks and/or any large anomalies such as conduits. In the case of drilling locations, subsurface utilities will be marked within 15 feet of each proposed location to allow for the relocation of borings if necessary, for example due to refusal.

It assumed that up to three mobilizations will be required:

- Scan for buried drums
- Clear initial drilling locations
- Clear additional drilling locations if necessary.

For this activity, 5 field days are estimated to complete this work, assuming up to three areas totaling 2 acres will be scanned for buried drums (1.5-* 2 days), and a total of 18 drilling locations will be cleared for utilities (distributed over three one-day mobilizations) .

2.4.2 Passive Soil Gas Screening

Passive soil gas samplers will be deployed in grid patterns at potential source areas identified by either previous data and/or the groundwater modeling exercise. Additionally, passive soil gas screening may be conducted at the planned residential development north of Old Country Road. If the groundwater modeling exercise does not indicate specific source areas, field activities would be conducted in the areas shown in Figure 2-3. The samplers are left in the subsurface for approximately two weeks. Assuming similar deployment times and lithogic conditions, the amount of VOCs adsorbed is proportional to the amount of VOCs present in the vicinity of the sampler. Thus, analyzing samplers deployed in a grid pattern can help identify hot spots and potential VOC source areas.

Grid spacing depends upon the area to be investigated and the specific objective of each investigation. In this case, grid spacing of 25 to 100 feet is anticipated; larger grid spacing may also be appropriate depending upon the size the investigation area and the suspected source.

For budgetary purposes, it is assumed that 75 passive soil gas samplers can be deployed in two working days and retrieved in two working days. Once the site and grid spacing have been determined, the passive soil gas screening investigation is performed as follows:

Mark out all soil gas sample locations with stakes or flags (or chalk/paint on concrete/asphalt surfaces). Drill a 1-½-inch diameter hole to a depth of 12-inches using a hammer and a metal stake, or a hammer drill if necessary. For locations covered by asphalt or concrete surfacing, drill a 1-½ diameter hole with a hammer drill through the pavement and underlying substrate, to the underlying soils. In areas of very organic topsoil, the sleeve should be installed below the organic layer. In paved/concrete covered areas, the sleeve must penetrate the entire thickness of the gravel substrate typically installed beneath paved areas, in order to isolate the sampler from any vapors that may be migrating in the porous media directly beneath the pavement.

Line the hole with a 12-inch long sanitized metal pipe sleeve (provided in the passive soil gas kit). Tap the pipe one inch onto the soil, so that the top of the pipe is one inch below the ground surface.

Once the metal sleeve is set, install the passive soil gas sampler in the top four inches of the sleeve, in accordance with the manufacturer's procedure (summarized below):

- Remove sampler from glass vial and straighten the retrieval wire;
- Remove solid cap from vial and replace with sampling cap; save the solid cap;
- Lower the sampler, open end down into the sleeve approximately 4 inches so that retrieval wire sticks out of the he hole.
- Cover the open end of the sleeve with a ball of aluminum foil, pressing it tightly with a tapping dowel so it forms a seal;
- For soil surface installations: Cover the hole to grade with local soils or sand, leaving the retrieval wire exposed; collapse the soils above the sampler with the

hammer; coil the wire at ground surface and mark the location with a pin flag or wood stake.

- For paved/concrete surface installations: bend the retrieval wire over the top of the sleeve, plug the top of the hole with aluminum foil so that it seals the sleeve and rests ¼-inch below the surface, then cover the hole with ¼-inch thick concrete.
- Note date and time of deployment on Field Deployment Sheet.

Following the 10-day exposure period, collect the samplers and ship them to the laboratory with a trip blank. Retrieve samplers in the following manner:

- While holding onto the retrieval wire, remove the aluminum foil plug with vice grips or scratch awl;
- Retrieve sampler;
- Clean sides of vial with clean towel
- Remove sampling cap, cut wire from vial and clean threads with gauze
- Screw on the solid cap; clean vial with gauze;
- Record sample number corresponding to grid location on cap label with ballpoint pen;
- Place sealed and labeled vial into small plastic bag (sampler bag);
- Note date and time of retrieval on Field Deployment Sheet.
- Place up to 25 sampler bags and one trip blank into larger "return shipment bag"
- Ship samples to laboratory with Field Deployment Sheet and Chain of Custody form – no cooling of samples;
- Patch sample holes as necessary.

2.4.3 Soil Boring Investigation

A soil boring investigation will be performed to investigate potential source areas for residual soil contamination in the vadose zone, and investigation of the deeper strata to determine the bottom of the upper glacial aquifer. Test boring locations will be selected based upon the existing body of data, up to and including the results of Task 1 of this work plan. Potential areas to perform soil borings and soil sampling for VOC are listed below. Based upon the results Task 1B and Task 1C, areas may be removed from or added to this list:

- The area on Circle Place in the vicinity of MW-S01 (former Gore Sorber SV-CO1).

- Former treated wood manufacturing facilities.
- Old Country Road Pink Building (SV-F05-SV-21).
- Former feather processing facility
- Former Septic Service company.
- Vicinity of drums observed in so-called "crop circle" area.
- Potential upgradient sources

Refer to Figure 2-3 for potential areas of interest. Soil borings will be advanced by mud rotary drilling methods. Drilling and sampling will be performed in accordance with the Generic QAPP. Each soil sample will be characterized by an on-site CDM geologist. Depth, soil type, moisture, evidence of contamination (photoionization detector readings, visual evidence etc.) will be recorded. Soil samples will be collected to the water table; if gross contamination is observed then soil samples will continue into the water table until near background readings are observed. For budgetary purposes, it is assumed that two vadose zone soil samples in each of 15 groundwater profiling boreholes will be analyzed for VOC. In addition, up to three additional soil samples collected from near the bottom of the upper glacial aquifer will be analyzed for VOC from each of 3 soil borings that will be advanced to a depth of 200 feet. These soil boring samples will be collected at the same time as the groundwater profiling activities (see 2.4.4.1 below).

In addition to VOC analysis, up to 6 soil samples will be analyzed for total organic TOC. TOC samples will be biased toward strata that do not exhibit evidence of contamination, so that the results will reflect the natural organic carbon content of the soils. TOC samples can also be collected during well installation (Section 2.4.2.2).

2.4.4 Groundwater Investigation

The groundwater investigation will be performed in three phases:

- Perform groundwater profiling at 10-foot depth intervals following vadose zone soil sampling performed during the soil investigation.
- Install a total of six permanent monitoring wells at three well cluster locations, for long term monitoring and evaluating vertical head relationships.
- Sample 6 new monitoring wells and up to six pre-existing monitoring wells

2.4.4.1 Groundwater Profiling

Groundwater profiling will be performed by mud rotary drilling and Hydropunch® methods. Potential areas of interest are shown in Figure 2-3. The borehole will be advanced to the predetermined depth and a Hydropunch® sampler will be driven beyond the bottom of the borehole into the geologic formation. The sampler will then be opened, allowed to fill, and retrieved. Groundwater samples will then be collected from the sampler. Groundwater samples will be collected at 10-foot intervals moving down the borehole. For budgeting purposes it is assumed that profiles will be 200 feet in depth (approximate base of the upper glacial aquifer). Groundwater samples will be collected at 10-foot sample intervals. Field screening (e.g., head space) will be performed on each sample collected. As an economical measure, only fifty percent of the samples collected at each groundwater profile location will be submitted to the laboratory for VOC analysis. It is assumed that each water sample collected will be visually clear within 1 hour of purging. Drilling and sampling will be conducted in general accordance with the Generic QAPP. However, the QAPP requirement that turbidity be less than 50 NTU will not be applied if purging time exceeds one hour.

For locations where the Gardiner's Clay is known to be present at depths of 100 feet or less, groundwater profiling may be performed by direct push drilling. Using this method, the borehole will be advanced to the predetermined depth and groundwater samples will be collected at 10-foot intervals moving up the borehole. Drilling and sampling will be collected in accordance with the Generic QAPP.

- For this activity, 45 field days are estimated to complete groundwater profiling along with soil boring sampling.

2.4.4.2 Groundwater Monitoring Well Construction

For budgetary purposes, it is assumed that six monitoring wells will be constructed of 2-inch diameter PVC screen and casing for groundwater sampling and monitoring purposes. If gross contamination (evidence of non-aqueous phase liquid) is found, it may be necessary to construct one or more monitoring wells of stainless steel. Drilling and sampling will be conducted in general accordance with the Generic QAPP. Potential areas of interest are shown in Figure 2-3.

Wells will be installed in shallow and deep clusters. For budgetary purposes, average well depths are assumed to be 100 feet and 200 feet deep. For budgetary purposes, it is expected that wells will be installed by hollow stem auger method. However, there is also a possibility that mud rotary drilling will be required for the deep wells if running sands are encountered.

Split spoon samples will be collected at 5-foot intervals at each of the deep wells to characterize stratigraphy and screen the deeper soils for VOC in the field. Split spoon sampling beneath the water table may require the use of drilling mud inside the augers to prevent running sands. If drilling mud is used, it will be flushed out of the augers with water prior to installation of the well. The CDM geologist will record the characteristics of each split spoon sample, including lithology, moisture and evidence of contamination (PID headspace readings). If evidence of contamination is noted, VOC soil samples will be collected. For budgetary purposes, a total of six soil samples are assumed to be collected during well drilling. Samples exhibiting little or no contamination may be submitted for TOC analysis (if fewer than 6 were collected during the borings).

Final well depths and screen settings will be based upon lithology, PID headspace readings, available groundwater profiling data and other pertinent factors. The wells will be developed after installation and will be allowed to stabilize for at least two weeks prior to sampling.

A total of 15 field days are estimated for groundwater sampling, assuming that each well requires no more than 1 hour of purging to satisfy the generic QAPP sampling requirements (i.e. turbidity is less than 50 NTU).

2.4.4.3 Groundwater Sampling

The 6 monitoring wells to be installed during this investigation, as well as up to six preexisting monitoring wells will be sampled. Prior to groundwater sampling, a synoptic round water level measurements will be performed for hydraulic head mapping and interpretation.

Groundwater sampling procedures are detailed in the Generic QAPP. Prior to sampling, three well volumes will be purged from each well. Groundwater samples will be submitted to a NYSDOH-certified laboratory for analysis for VOC analysis.

For this activity, 7 field days are estimated to complete well sampling.

2.4.5 Site Survey

The locations of all sample points will be surveyed. It is assumed that six survey mobilizations will be required. The following will be surveyed:

- Surface Geophysics Transects
- Passive soil gas sample locations (a total of up to 75 locations at up to 3 locations)
- Up to 15 new temporary groundwater profiling locations (two mobilizations)
- Up to six newly installed monitoring wells
- Up to 12 additional groundwater profiling locations recently installed by SCDHS.

The horizontal and vertical positions will be tied into the North American Datum 1983 (NAD83) coordinate system. The vertical positions will be tied to the North American Vertical Datum 1988 (NAVD88). The measuring point associated with the monitoring wells will be recorded to an accuracy level of 0.01 feet vertically. The coordinates will be used to map the locations on aerial photography. The well elevations will be used to evaluate the groundwater flow direction. Sample locations will be shown on the New York State GIS Clearinghouse ortho imagery aerial photography.

2.4.6 Investigative Derived Waste

Soil cuttings, drilling mud and purge water from each sampling location will be containerized in drums or other appropriate vessels and disposed off-site if they cannot be released to the ground surface. Investigative derived waste may be released to the ground surface if the following conditions are met: 1) the area is non-residential; 2) liquids can percolate into the ground and 3) field indicators (visual, olfactory, PID readings) do not indicate the material is contaminated.

It is assumed that approximately 15 cubic yards (60 drums) of non-hazardous soil and 20 drum of non-hazardous drilling mud will require off-site disposal. Well development and purge water is estimated at 5,000 gallons. Investigation-derived waste containers will be stored on-site at a location determined by NYSDEC until it is characterized and can be removed by a licensed waste hauler.

For this activity, one field day is estimated.

2.4.7 Decontamination Procedures

Non-dedicated equipment and tools used to collect samples for chemical analysis will be decontaminated prior to and between each sample interval using an Alconox wash and potable water rinse prior to reuse. Additional cleaning of the equipment with steam may be needed under some circumstances. Decontamination fluids will either be contained or discharged to the ground surface, using the same criteria set forth in Section 2.4.6 Contained fluids will be disposed of off-site by a licensed transportation and disposal services firm.

2.5 Task 3 - Field Documentation and Reporting

2.5.1 Field Documentation Procedures

Bound field notebooks will be used during all on-site work. A dedicated field notebook will be maintained by the field technician overseeing the Site activities. In addition to the notebook, any and all original sampling forms (e.g lithologic logs, well construction diagrams), and purge forms used during the field activities, will be submitted to the NYSDEC as part of the final report. Field and sampling procedures, including installation of the sample boreholes, existing monitoring wells, etc., will be photo-documented.

2.5.2 Sample Identification

Each sample collected will be designated by an alphanumeric code that will identify the type of sampling location, matrix sampled, and the specific sample designation (identifier). Each sample shall begin with the NYSDEC Site Number for the Speonk Solvent Plume site (152185). The following terminology shall be used for the samples collected during this investigation:

Passive Soil Gas: 152185-PSG- Location-Interval ("S" for shallow, "D" for deep)
e.g. sample collected from the shallow soil vapor point SV-1 would be 152185-SV-1S

Water:	152185-Profiling ID-GW 152185-Monitoring Well ID-GW
Soil:	152185-Boring ID – S – Depth
Field Blanks:	152185-FB-DATE
Trip Blanks:	152185-TB-DATE

2.5.3 Sample Location

The field conditions at each sample location will be documented in the bound field log book.

2.5.4 Reporting

A total of four copies of a draft report will be submitted to NYSDEC for review and comment. The report will document the work conducted and will present the results of the sample analysis and provide recommendations for further investigation should it be warranted. Upon receipt of the comments, CDM will revise the draft report and print the four final copies and submit to NYSDEC. One copy of the final report; text, tables, maps, photos, etc., will be submitted as a single pdf file. The electronic files will be submitted to NYSDEC on a compact disc. The site investigation data will be submitted in the most recent version of the NYSDEC Electronic Data Deliverable (EDD) with the final report submission. Currently this is the USEPA Region 2 EDD dated December 2003.

2.5.5 Laboratory Analysis and Validation

All samples, with the exception of passive soil gas samples, will be analyzed by a NYSDOH-approved, ELAP-certified laboratory. Groundwater samples will be analyzed for Target Compound List volatile organic compounds (TCL VOCs) by EPA 8260B. Should groundwater profile samples need special extraction methods due to excessive silt (i.e., extract by hand instead of with the autosampler), this may result in an analytical method surcharge not currently included. Soil samples will be analyzed for TCL VOCs by EPA method 8260B. A NYSDEC ASP Category B data deliverable will be provided for these analyses (Table 2-1).

All samples collected, with the exception of passive soil gas samples will be validated in accordance with NYSDEC Data Usability Summary Report (DUSR) guidance by a party that is independent of the laboratory which performed the analyses and CDM. A usability analysis will be conducted by a qualified data validator and a DUSR will be submitted to the NYSDEC.

It is assumed for Task 3 that no meetings or site visits are needed.

2.6 Task 4 – Document Disposition and Data

CDM will make recommendations as to the proposals for future activities in a transmittal letter to the NYSDEC that accompanies the draft report. The necessary number of report copies and the EDD will be provided under Task 3 above.

As part of this task, CDM will compile a list of owner names, addresses and tax map numbers for the properties to be investigated. This list will be submitted to the NYSDEC no later than 28 days prior to the start of field work. This list will be updated by CDM when the final reports are submitted to the NYSDEC.

CDM will also submit monthly reports discussing project progress, and quarterly M/WBE utilization reports to the NYSDEC as part of this task.

It is assumed for Task 4 that no meetings or site visits are needed.

2.7 Task 5 – Citizen Participation Plan

CDM will develop a Citizen Participation Plan (this document) which will identify the groups, individuals, and officials that may be interested in the Site investigation activities that will take place. This plan will involve determining the addresses of adjacent property owners, local officials, and advocacy groups. CDM may be called upon to provide information and assist at a public meeting, and generate a fact sheet to be distributed to the addresses that are compiled.

For Task 5, it is assumed that CDM will attend one meeting.

Table 2-1
Analytical Program Summary
Speonk Solvent Plume Site
Speonk, Suffolk County, New York

Analytical Parameter	Sample Matrix	Number of Samples	Analytical Method	Field Duplicates (a)	Field Blank (b)	Trip Blanks (c)	Container	Sample Preservation	Holding Time
SOIL SAMPLES									
TCL Volatile Organic Compounds	Soil	45	EPA 8260B	5	2	0	4 oz clear glass jar	None	14 days
GROUNDWATER PROFILING SAMPLES									
TCL Volatile Organic Compounds	Groundwater	128	EPA 8260B	7	15	18	3 - 40ml clear glass vial with Teflon septum	HCl to pH <2; Cool to 4oC	14 days
GROUNDWATER SAMPLES									
TCL Volatile Organic Compounds	Groundwater	12	EPA 8260B	1	3	3	3 - 40ml clear glass vial with Teflon septum	HCl to pH <2; Cool to 4°C	14 days
Passive Soil Gas Screening Samples									
TCL Volatile Organic Compounds	Passive Soil Gas	75	EPA 8260B	3	0	3	hydrophobic adsorbent cartridge	None	14 days

Notes:
a) Ten percent of soil samples and 5 percent of groundwater samples should be duplicates; one duplicate shall be collected per 25 passive soil gas samples
b) Two percent of soil samples should be field blanks; groundwater field blanks shall be at the rate of one per two days for profiling, and one per day for monitoring wells
c) Trip blanks shall be included in every cooler for groundwater sampling, and at a rate of approximately one per 25 samples for passive soil gas

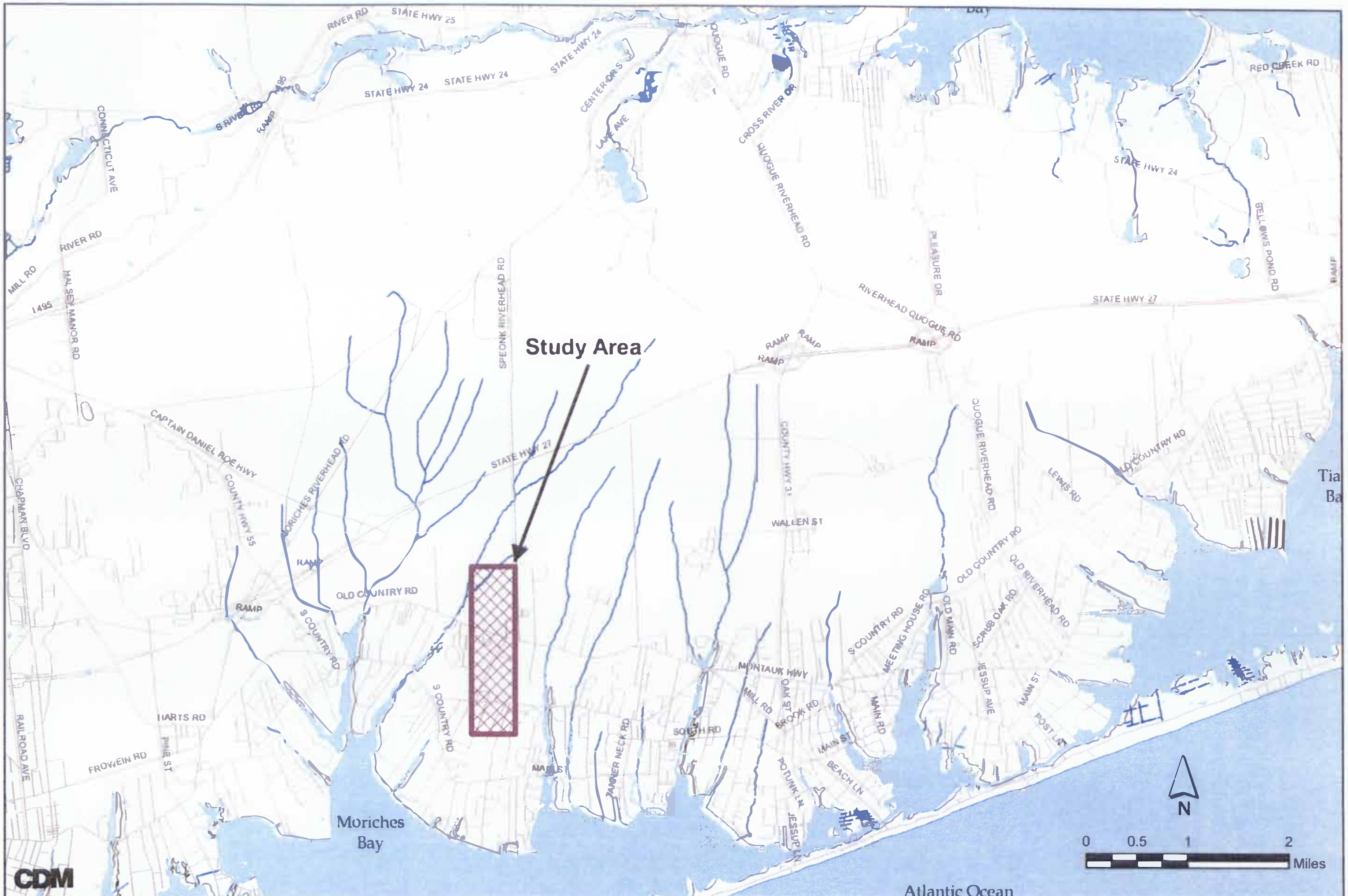


Figure 2-1
Speonk Solvent Plume Site
Study Area
NYSDEC Site No.: 1-52-185

0 400 800 1,600
Feet

Source: New York State Geographic Information Systems Clearinghouse, High Resolution Orthoimagery 2000 - 2005

N

Speonk Solvent Plume Site and Study Area

Parcels

Existing Monitoring Well

Existing Monitoring Well - Origin Unknown

Existing Groundwater Sample

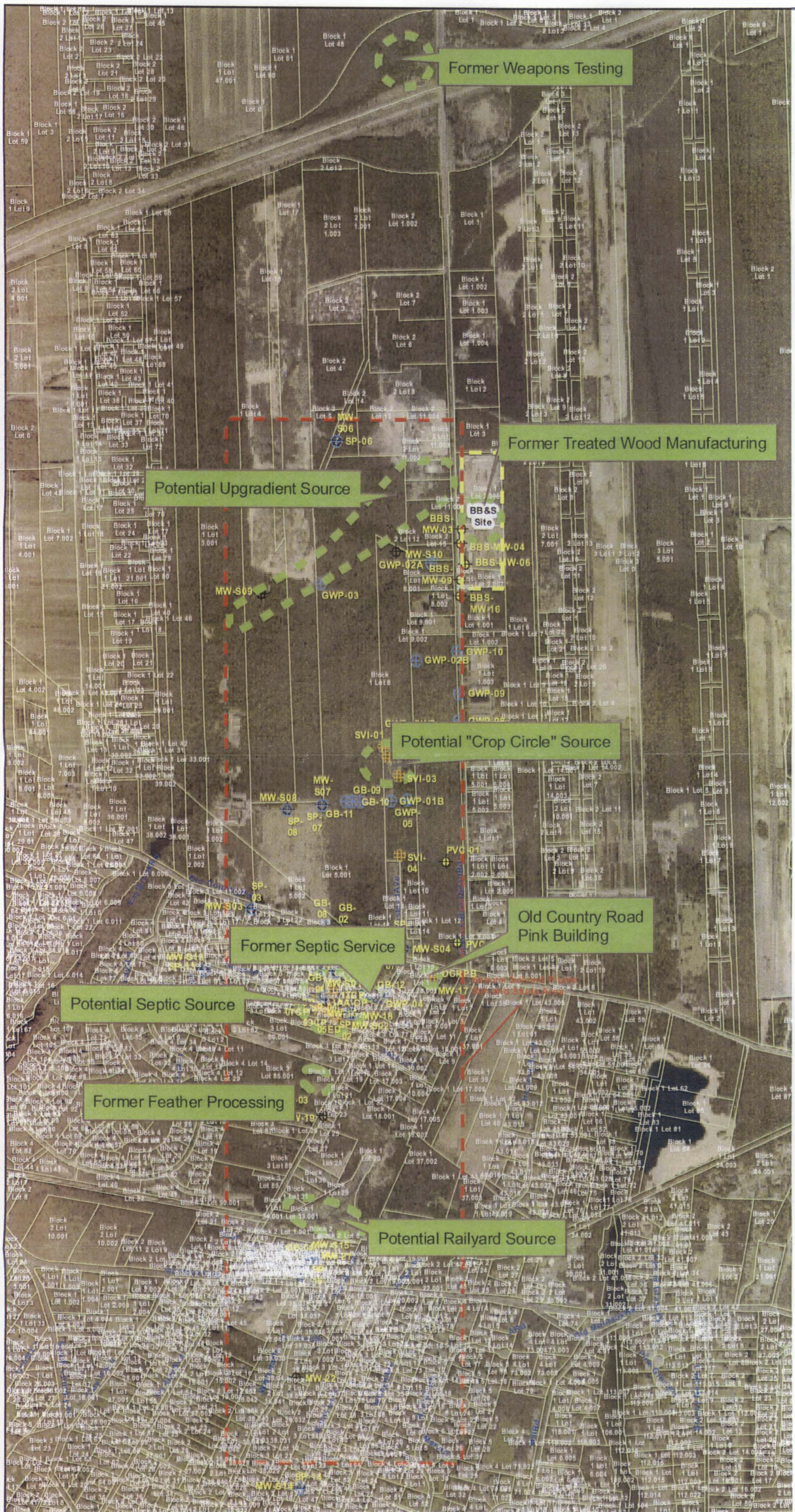
Existing Soil Vapor Sample

Source: ERM

Parcels
Source: Suffolk County Planning Department

Figure 2-2
Speonk Study Plume Site
Property Parcels
NYSDEC Site No. 1-52-185

CDM



Source: New York State Geographic Information Systems Clearinghouse, High Resolution Orthoimagery 2000 - 2005

Speonk Solvent Plume Site and Study Area

Parcels

Existing Monitoring Well

Existing Monitoring Well - Origin Unknown

Existing Groundwater Sample

Existing Soil Vapor Sample

Source: ERM

Parcels
Source: Suffolk County Planning Department

Figure 2-3
Speonk Study Plume Site
Potential Site Characterization
Areas of Interest
NYSDEC Site No. 1-52-185

CDM

Section 3
Project Schedule

The following tabulation provides the proposed project schedule and key milestones for this work assignment. As currently planned, field work will be initiated within two weeks of written receipt of final work plan approval. Field activity duration for the Site Characterization activities is indicated in the schedule below. This schedule assumes no delays are experienced due to inclement weather, site access problems, or for other unforeseen reason.

One-week hour turnaround time will be used for analytical samples during groundwater profiling (Task 2C). Monitoring well samples will be analyzed under standard turnaround time. The scheduled submittal dates for deliverables are based on standard laboratory turnaround times of four weeks, and turnaround for data validation of three weeks.

Project Milestone	Date
Issue Work Assignment (WA)	
Work Assignment Acceptance	
Submit Draft Work Plan	May 12, 2008
Submit Final Work Plan	May 30, 2008
DEC Notice to Proceed (NTP)	June 2, 2008
Submit Task 1B Groundwater Modeling Results Report	June 16, 2008 (1)
Submit Task 1C Records Search Results Report	June 16, 2008
Submit list of properties to be investigated	July 11, 2008
Commence Task 2 Field Work	August 11, 2008
Task 2A – Passive Soil Gas Survey complete	September 15, 2008
Task 2B – Geophysics Complete (more than one mobilization expected)	October 15, 2008
Task 2C Mud rotary push soil borings/groundwater profiling complete	October 31, 2008
Task 2D Monitoring well drilling complete	November 31, 2008
Task 2E Monitoring well sampling complete	December 15, 2008
Task 2F Survey Complete	December 31, 2008
Task 2 G Data Validation Complete	February 10, 2009
Task 2H IDW Disposal Complete	January 15, 2009

Task 2 Field Work Completed	December 31, 2008
Task 3 Submit Draft Site Characterization Report	March 28, 2009
Approve Draft Report	35 Days after Draft Report Submitted
Task 3 Submit Final Site Characterization Report	45 Days after Approval of Draft Report
Task 4 Document Disposition and Data	Begin August 11, 2008
Task 5 Citizen Participation Plan	CPP provided May 28, 2008; attend meeting as requested

(1) This milestone date is contingent upon receipt of Suffolk County and NYSDEC County data no later than June 2, 2008.

Section 4
Contacts

4.1 Key Project Contacts

It is the expressed intent of NYSDEC to provide information to the public in a timely, complete, and accurate manner. Towards this end, the State has compiled a list of individuals to whom the public can address specific requests for information. These contacts are both local and state public officials and are knowledgeable of the proposed investigative activities. This list of contacts is provided below:

Environmental Concerns

Robert DeCandia
Project Manager
NYSDEC Division of Environmental Remediation
Bureau of Program Management, Room 1224
625 Broadway
Albany, NY 12233-7015
(518) 402-9621

Health Related Concerns

Sharon McLelland
New York State Department of Health
Public Health Specialist
Bureau of Environmental Exposure Investigation
Flanigan Square, Room 300
547 River Street
Troy, NY 12180-2216
(518) 402-7870

Citizen Participation

Bill Fonda
New York State Dept. of Environmental Conservation (NYSDEC)
Region 1 Headquarters
SUNY at Stony Brook
50 Circle Road
Stony Brook, NY 11790-3409
(631) 444-0345

4.2 Repository

Three document repositories have been established to provide the public with convenient access to important project documents and other information. A copy of the documents relevant to the Site Characterization, including the Work Plan, will be placed in the repositories to allow interested citizens and groups to review these documents.

All documents pertaining to this site will be available for public review at the following repository locations:

1) ***NYSDEC Division of Environmental Remediation***
625 Broadway, 11th Floor
Albany, NY 12233-7017
Mon-Fri 8:30 am – 4:45 pm
By appointment only
(518) 402-9621

2) ***NYSDEC Region 1 Office – Division of Environmental Remediation***
SUNY Campus, Bldg 40
Stony Brook, NY 11790-2356
Mon-Fri 8:30 am – 4:45 pm
By appointment only
(631) 444-0240

3) ***Westhampton Free Library***
7 Library Avenue
Westhampton Beach, NY 11978
Monday-Friday 9:30 am -9:00 pm
Saturday 9:30 am – 5:00 pm
Sunday 1:00 pm-5:00 pm
(631) 288-3335

Section 5
Citizen Participation Activities

5.1 Fact Sheet and Mailing List

A Fact Sheet detailing the Site Characterization Work Plan and beginning of field activities will be sent out to the residents and other interested parties on the mailing list. This mailing will include information about the document repositories, the name and address of NYSDEC Citizen Participation Specialist, NYSDEC Project Manager and NYS Department of Health contact. Parties who express interest in being placed on or removed from the mailing list will be added or removed as requested.

Additional citizen participation activities such as a public meeting and/or Fact Sheet after the completion of the site characterization activities will be added as appropriate.

Appendix C

Generic (QAPP)

CDM

CDM GENERIC QUALITY ASSURANCE PROJECT PLAN (QAPP) FOR NYSDEC STANDBY CONTRACT NO. D-004437

Prepared for

New York State Department of Environmental Conservation
Investigation and Design Engineering Services

Prepared by

Camp Dresser & McKee
Raritan Plaza I, Raritan Center
Edison, New Jersey

Revised February 2008

CDM

Contents

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List of Attachments

Section 1
Introduction

This Generic Quality Assurance Project Plan (QAPP) is the documentation of the quality assurance/quality control (QA/QC) procedures required to complete projects under New York State Department of Environmental Conservation (NYSDEC) under the Engineering Services for Investigation and Design, Standby Contract No. D004437. Site specific procedures will be included as an attachment to the site specific Work Plan for that site.

1.1 Purpose

The principal purpose of this document is to specify quality assurance/quality control (QA/QC) procedures for the collection, analysis, and evaluation of data that will be legally and scientifically defensible.

1.2 Objectives

The QAPP provides general information and procedures applicable to the activities and analytical program detailed in each site-specific Work Plan. This information includes definitions and generic goals for data quality and required types and quantities of QA/QC samples. The procedures address field documentation; sample handling, custody, and shipping; instrument calibration and maintenance; auditing; data reduction, validation, and reporting; corrective action requirements; and QA reporting specific to the analyses performed by the laboratories subcontracted by CDM.

Section 2
Project Organization and Responsibility

2.1 Overview

The project management organization for each project is to provide a clear delineation of functional responsibility and authority. The project manager for CDM is the primary point of contact with the regulatory agency. He/she is responsible for development and completion of the site-specific investigation, project team organization and supervision of all project tasks. In this role, he/she will communicate directly with NYSDEC staff.

For the fieldwork, field teams consisting of CDM personnel and subcontractors will be assembled and will be responsible for implementing all aspects of the fieldwork. Several key activities will be performed as part of the field and analytical work. These activities include:

- Ensuring that sample collection, testing and data collection procedures are performed according to DEP-10 requirements
- That health and safety procedures as outlined in the site-specific health and safety plan (HASP) are followed
- That the field QA/QC procedures are implemented
- That laboratory analysis, data validation, data processing, and data QC activities are performed in accordance with NYSDEC guidelines.
- That minority business enterprise/women business enterprise (MBE/WBE) goals are achieved.

2.2 Responsibility

The primary responsibilities for program management activities rest with the Program Manager (PRM). The Program Manager will have ultimate contract responsibility for the project, including responsibility for the technical content of all engineering work. The program manager will direct, review and approve all project deliverables, schedule staff and resources, resolve scheduling conflicts and identify and solve potential program problems. He will be directly accountable to NYSDEC's Division of Hazardous Waste Remediation for program execution. He has authority to assign staff, negotiate and execute contracts and amendments, as well as execute subcontracts. The PRM will communicate directly with CDM's Project Manager.

The Project Manager will have overall responsibility for the technical and financial aspects of this project. He/she will assign technical staff, maintain control of the project budget and schedule, prepare monthly progress reports, review and approve project invoices, evaluate the technical quality of the project deliverables as well as the adherence to QA/QC procedures and manage subcontractors. He/she will serve as CDM's point of contact for this project.

The Program Quality Assurance Officer will monitor QC activities of program management and technical staff, as well as identify and report the needs for corrective action to the Program Manager. She will also conduct an internal review of all project deliverables prepared by CDM staff and sign off on the final investigation reports.

The Program Health and Safety Officer will review and make recommendations to the Subcontractors on health and safety plans for compliance with OSHA requirements. He will develop a Health and Safety plan for CDM and NYSDEC employees, handle over-sight activities, evaluate the performance of health and safety officers and maintain required health and safety records. He will report to the Program Manager.

The Health and Safety Site Supervisor/Coordinator will be responsible for ensuring that the Health and Safety Plan is implemented during field activities and that a copy of the site-specific Health and Safety Plan are maintained at the site at all times. He/she is also responsible for upgrading or downgrading personnel protection based on actual conditions at the time of the investigation. The Coordinator must also present an overview of the Health and Safety Plan to field personnel prior to initiating any field activities and is responsible for insuring that field personnel sign off on this plan. He/she will contact the Program Health and Safety Officer if any questions or issues arise during the field activities that he/she cannot answer.

2.3 Subcontractors

The following subcontractor services may be required as part of the site investigations and performed by subcontractors under CDM's supervision:

- Geophysical Survey
- Geoprobe Installation
- Drilling
- Well Installation
- Groundwater Sampling
- Chemical Analytical Services
- Site Survey
- Investigation Derived Waste Removal

Section 3
Field Procedures

CDM's points of contact for the field investigation are the Site Manager and the onsite NYSDEC representative. Any minor changes in sampling activities that are within the proposed scope of the project will be documented each day in the field logbook and signed by both representatives. Any modifications that are inconsistent with the approved work plan are to be approved by NYSDEC prior to implementation.

3.1 Documentation (Field Log Book)

Information recorded in field log books include observations, data, calculations, time, weather, description of the data collection activity, methods, instruments, and results. Additionally, the logbook may contain descriptions of wastes, biota, geologic material, and site features including sketches maps, or drawings as appropriate.

3.1.1 Preparation

In addition to this QAPP, site personnel responsible for maintaining logbooks must be familiar with other site specific standard operating procedure (SOPs). These should be consulted as necessary to obtain specific information about equipment and supplies, health and safety, sample collection, packaging, decontamination, and documentation.

Prior to use in the field, each logbook should be marked with a specific control number. The field notebook will then be assigned to an individual responsible for its care and maintenance.

Field logbooks will be bound with lined, consecutively numbered pages. All pages must be numbered prior to initial use of the logbook. The following information will be recorded inside the front cover of the logbook:

- Field logbook document number
- Activity (if the log book is to be activity-specific)
- Person and organization to whom the book is assigned, and phone number(s)
- Start date

3.1.2 Operation

The following is a list of requirements that must be followed when using a logbook:

- Record work, observations, quantities of materials, calculations, drawings, and related information directly in the log book. If data collection forms are specified by an activity-specific plan, this information need not be duplicated in the logbook. However, any forms used to record site information must be referenced in the logbook.

- Do not start a new page until the previous one is full or has been marked with a single diagonal line so that additional entries cannot be made. Use both sides of each page.

- Do not erase or blot out any entry at any time. Before an entry has been signed and dated, any changes may be made but care must be taken not to obliterate what was written originally. Indicate any deletion by a single line through the material to be deleted.

- Do not remove any pages from the book.

- Record as much information as possible.

- Specific requirements for field logbook entries include:

  - Initial and date each page.
  - Initial and date all changes.
  - Multiple authors must sign out the logbook by inserting the following:

- Above notes authored by:

  - (Sign name)
  - (Print name)
  - (Date)

- A new author must sign and print his/her name before additional entries are made.

- Draw a diagonal line through the remainder of the final page at the end of the day.

- Record the following information on a daily basis:

  - Date and time
  - Description of activity being conducted including station (i.e., well, boring, sampling location number) if appropriate
  - Weather conditions (i.e., temperature, cloud cover, precipitation, wind direction, and speed) and other pertinent data
  - Level of personnel protection to be used

Entries into the field logbook will be preceded with the time (written in military units) of the observation. The time should be recorded at the point of events or measurements that are critical to the activity being logged. All measurements made and samples collected must be recorded unless they are documented by automatic methods (e.g., data logger) or on a separate form. In these cases, the logbook must reference the automatic data record or form.

Other events and observations that should be recorded include:

- Changes in weather that impact field activities.
- Deviations from procedures outlined in any governing documents. Also record the reason for any noted deviation.
- Problems, downtime, or delays.
- Upgrade or downgrade of personnel protection equipment.

3.1.3 Post-Operation

To guard against loss of data due to damage or disappearance of logbooks, copies of completed pages will be made periodically (weekly, at a minimum) and submitted to the project manager. Documents that are separate from the logbook will be copied and submitted regularly and as promptly as possible to the project manager. This includes all automatic data recording media (printouts, logs, disks or tapes) and activity-specific data collection forms required by other SOPs.

At the conclusion of each activity or phase of site work, the individual responsible for the log book will ensure all entries have been appropriately signed and dated, and that corrections were made properly (single lines drawn through incorrect information, then initialed and dated). The completed logbook will be submitted to the records file.

3.2 Sample Collection, Documentation and Identification

The following procedures describe proper sample collection, and documentation to be included in field notebooks. Documentation includes describing data collection activities, logging sample locations, sample IDs, container labeling and chain-of-custody forms. Procedures for sample classification to insure proper labeling of samples are also included.

3.2.1 Responsibilities

The field manager and/or field technician is required to oversee drilling of the boreholes, collection of vapor, groundwater, and air samples, fill out field book logs, submit samples for analysis, COC forms and labeling of any waste-containing drums, if required. Also, the field manager and/or field engineer is required to adhere to the Site-Specific Health & Safety Plan. Field book entries should state starting time of monitoring, equipment used and results.

3.2.2 Sample Collection

3.2.2.1 Water Samples

- VOCs, if analyzed, are to be sampled first. Pour water slowly into the 40-ml vial, tipping the vial and allowing water to run down the side to prevent aeration. Fill until a meniscus forms and tightly seal the vial. Invert the vial and check for bubbles. If bubbles are present, add water and repeat. It may be necessary to discard the vial and use another if bubbles continue to appear.

- Remaining bottles should then be filled, again preventing aeration.

- If filtering is required (filtering is sometimes requested when samples are to be analyzed for metals and turbidity is high), use a dedicated 0.45 micron filter for each sample and filter prior to preservation.

- Label bottles with sample designation, project, date, time, preservative and required analysis. Clear tape may be used to cover the completed label.

- Place sample in a cooler with ice to maintain temperature at 4°C +/- 2°C. Samples will be maintained at this temperature throughout the sampling and transportation period. Chain of Custody and shipping procedures are discussed in See Section 3.3.

3.2.2.2 Soil/Sediment/Sludge Samples

- VOCs, if analyzed, are to be sampled first. Fill the jar completely such that there is no air space. VOCs must not be homogenized.

- For the remaining parameters, homogenize the samples with a decontaminated stainless bowl (Section 3.12) and trowel prior to filling the remaining bottles. Use of dedicated disposable trowels is permitted.

- Label bottles with sample designation, project, date, time, preservative and required analysis. Clear tape may be used to cover the completed label.

- Place sample in a cooler with ice to maintain temperature at 4°C +/- 2°C. Samples will be maintained at this temperature throughout the sampling and transportation period. Chain of Custody and shipping procedures are discussed in Section 3.3.

3.2.2.3 Soil Vapor/Ambient Air Samples

- Soil Vapor samples will be collected with 1.4-liter summa canisters, with 2-hour flow controllers (regulators) and particulate filters (if required). Flow rate shall not exceed 200 ml/min.

- Sub slab soil vapor samples will be collected with 6-liter summa canisters, with 24-hour flow controllers (regulators) and particulate filters (if required). Sample flow rate shall not exceed 200 ml/minute.

- Soil Vapor samples will be collected with 6-liter summa canisters, with flow controllers (regulators) and particulate filters (if required). Sample flow rate shall not exceed 200 ml/minute.

- Indoor and outdoor ambient air samples will be collected with 6-liter summa canisters, with flow controllers (regulators) and particulate filters (if required). Sample flow rate shall not exceed 200 ml/minute.

- Instantaneous grab samples may also be collected, as permitted by NYSDEC.
- Record vacuum prior to and at conclusion of sampling. Prior to sampling, vacuum should be 28-30 inches.
- At conclusion of sampling, vacuum should be 5 inches Hg +/- 1 inch Hg.
- Label summa canister and prepare for shipping. Summa canisters are not chilled or otherwise preserved.

3.2.3 Field Notebooks

Complete thorough notes of all field events are essential to a timely and accurate completion of this project. The field manager and/or field engineer is responsible for accounting for particular actions and times for these actions of the subcontractor while in the field. Also, identification (numbers and description) of field samples duplicates samples, and blank samples should also be noted in the field book. For a particular workday, the field book should contain the following:

- Field personnel name, contractors name, number of persons in crew, equipment used, weather, date, time, and location at start of day (boring number).
- Sample identification number, depth, amount of sample recovery, PID readings and soil descriptions.
- Description of any unusual surface or subsurface soil conditions
- Record of Health and Safety monitoring; time, equipment and results
- Record of site accidents or incidents
- Record of any visitors
- Potential of delays
- Materials and equipment used during borehole installation
- Final daily summary of work completed including list of samples obtained
- Completion of daily QA/QC log sheet
- Contractor downtime, decontamination time, equipment breakdowns, movement tracking throughout the day, etc.
- Any other data that may be construed as relevant information at a later date.

The field logs should confirm the subcontractor's data. Field notes should be photocopied weekly and returned to the project manager.

If a borehole is completed as a monitoring well, simply note this on the form, and complete the monitoring well log. Examples of completed boring logs should be reviewed and adequate blank log forms obtained.

Monitoring well logs are required in addition to the boring log form if the borehole is completed as a monitoring well. These are to be completed in the field after a monitoring well is installed. They should include data such as screen length, riser length, materials used, etc. Examples of monitoring well logs should be reviewed and adequate blank log forms obtained.

3.2.4 Drum Labeling

Labeling of drums is essential for tracking hazardous materials. The responsibility of the contractor is to collect, handle, and store the drums, but the responsibility of field personnel is to label these drums appropriately. There is a significant cost implication if drums are not property labeled. Unknown material must be disposed of as hazardous waste if any hazardous waste is found on-site.

The following drum labeling procedures are to be adhered to:

- Field staff shall secure packing list envelopes to the side of the drum(s) at the completion of a boring.

- Field staff shall print with an indelible marker on information cards all information pertaining to the contents of the drum(s). If more than one drum is collected from the same borehole, each information card shall be numbered sequentially in parenthesis starting with the number one after the boring number. The information shall include:

  - Program Area
  - Boring No.(s)
  - Date collected
  - Description of contents (i.e., soil cuttings, well water, etc.)
  - Amount of water (specify in inches)
  - Fullness of drum (not including free liquid, specify in fractional form)

- Field staff shall insert information card into packing list envelope. The packing list envelope shall be sealed at this time.

- Field staff shall record in field book all information pertaining to the contents of the drum that was printed on the information card.

- Program manager, upon receipt of the analytical data for the drums, shall prepare a summary table of the analytical results on a weekly basis, and provide the designated coordinator.

- Based on the tabulated information the designated coordinator will determine and prepare the appropriate storage labels required:

    - Hazardous Waste label
    - Non-hazardous label

- The designated coordinator will fill out these labels.

- Field staff shall attach these labels to the appropriate drums. If the information cards inside the packing list envelopes are damaged, they shall be reprinted at this time.

It is noted that waste material is expected to be transported off-site during excavation. No investigation derived wastes are expected to be drummed.

3.2.5 Sample Identification

Each sample collected will be designated by an alphanumeric code that will identify the type of sampling location, matrix sampled, and the specific sample designation (identifier). The sample identification for all samples will begin with the Site ID for the site.

The following terminology shall be used for the **soil** sample identification:

SITE ID - BORING/SAMPLE LOCATION ID - DEPTH

The sample ID for the soil vapor and groundwater samples will then include the sample type designation, followed by the sample number. The following terminology shall be used for the **soil vapor** sample identification:

SITE ID - SV- #
SITE ID – SV - #

Where there are shallow and deep samples at a location, the shallow samples will be designated "S" and the deep samples designated "D".

The following terminology shall be used for the **groundwater** sample identification:

SITE ID - MONITORING WELL ID - DEPTH (for monitoring well samples)
SITE ID – GW - BORING ID - DEPTH (for temporary well point or hydro-punch samples)

For sub-slab and indoor air samples, the site ID will be followed by the sample type designation, the sample number and then the date. The following terminology shall be used for the **structure** sample identification:

SITE ID-SS-xx-DATE (for sub-slab locations)

SITE ID-IA-xx-DATE (for indoor ambient air)
SITE ID-A-xx-DATE (for outdoor ambient air)

Field blank and **trip blank** samples will be designated as follows:

SITE ID-FB-DATE (for field blanks)
SITE ID-TB-DATE (for trip blanks)

Field **duplicates** will be designated by using the next consecutive sample number for the site.

3.3 Chain-of-Custody Procedures

This section describes the procedures used to ensure that sample integrity and chain-of-custody are maintained throughout the sampling and analysis program. Chain-of-custody (COC) procedures provide documentation of sample handling from the time of collection until its disposal by a licensed waste hauler. This documentation is essential in assuring that each sample collected is of known and ascertainable quality.

The COC begins at the time of sample collection. Sample collection is documented in the field notebooks in accordance with the specified SOP. At the same time, the sampler fills out the label on the sample container with the following information:

- Sample ID code
- Required analyses
- Sampler initials
- Date and time of sample collection

3.3.1 Chain-of-Custody Forms

The COC forms are a paper trail system that follows the samples collected and indicates which laboratory analyses are to be performed on which samples. Each sample should be clearly labeled and listed on the COC. The laboratory will only perform analyses on samples indicated and all other samples should be indicated with a "HOLD" designation. By labeling a sample "HOLD", the laboratory will store the sample until further instruction is given. Do not check the request for analysis blocks on the COC for samples designated with "HOLD" Status. Never indicate duplicate or blank samples on a COC.

It is the responsibility of the field manager to coordinate COC forms and supply copies of all COC to the project manager for data management use.

A COC form is filled out for each sample type at each sampling location. Each time the samples are transferred to another custodian or to the laboratory, the signatures of the people relinquishing the sample and receiving the sample, as well as the time and date, are documented. Labels will be filled out with an indelible, waterproof, marking pen.

3.3.2 Chain-of-Custody Records

The COC record is a three-part form. The laboratory retains the original form and the person relinquishing the samples keeps a copy of the form at the time of sample submittal. This form is then returned to the project manager or person in charge of data coordination.

The COC Record will be placed in a Ziplock bag and placed inside of all shipping and transport containers. All samples will be hand delivered or shipped by Federal Express to the laboratory specified by the field manager. Samples should be packed so that no breakage will occur (e.g. placed upright in the cooler surrounded by packing materials). Sample vials may be placed on their sides if frozen. Custody seals will be placed on all coolers/packages containing laboratory samples during shipment.

3.4 Field Quality Control Samples

In order to maintain QA/QC in both the field and the laboratory, additional samples such as trip blanks, duplicates, field blanks, performance evaluation samples and background samples will be collected. Each type of QA/QC sample is described below. Details of the QA/QC samples collected will be provided to the project data validator for use in their evaluation.

3.4.1 Quality Control for Soil Sampling

Approximately twenty percent of all soil samples analyzed should be QA/QC samples. These samples act as a verification of appropriate field and laboratory procedures. These samples should be recorded in the field book but should not be identified on the Chain-of-Custody (COC) form other than with an MD (Miscellaneous Discrete). All QA/QC samples should be numbered sequentially with other field samples on the soil log form. The following is a breakdown of types of QA/QC samples that are to be taken:

3.4.1.1 Duplicate Samples

Approximately ten percent of all soil samples analyzed should be duplicate samples. Soil duplicates shall be field-homogenized samples. To ensure laboratory "blind" analyses, duplicate samples will be identified with the next sequential sample number on sample containers and the COC forms. The actual identification of the duplicate samples shall be recorded in the field book. Duplicate samples are collected from the same split spoon sampler, homogenized in the field and analyzed for the same compounds.

3.4.1.2 Field Blanks

Approximately two percent of all soil samples analyzed should be field blanks. Rinsate blanks are collected after a sample is taken and the equipment used (i.e., split spoon sampler) has been decontaminated. Distilled water is then poured over the decontaminated sampling equipment and collected in sample jars for analysis. It should be documented in the field book which soil sample preceded the field blank and which soil sample followed the field blank for the equipment used.

3.4.2 Quality Control for Soil Vapor and Air Sampling

Approximately five percent of all soil vapor (including sub-slab soil vapor) samples analyzed should be duplicate samples. Soil vapor duplicates will be collected in a manner so that the sample and duplicate are being collected simultaneously from the same sample location. One duplicate indoor air sample will be collected per site where indoor air sampling is being conducted. Duplicate outdoor air samples will be collected only at the sites where indoor air sampling is also being conducted. Duplicate samples are analyzed for the same compounds. All summa canisters must be certified to be free of contaminants in accordance with QA/QC protocol.

3.4.3 Quality Control for Groundwater Sampling

Approximately twenty percent of all groundwater samples analyzed should be QA/QC samples. These samples act as a verification of appropriate field and laboratory procedures. These samples should be recorded in the field book but should not be identified on the COC form as a QA/QC sample. All QA/QC samples should be numbered sequentially with other field samples. The following is a breakdown of types of QA/QC samples that are to be taken:

3.4.3.1 Duplicate Samples

Approximately five percent of all groundwater samples analyzed should be duplicate samples. To ensure laboratory "blind" analysis, duplicate samples will be recorded with the well I.D. number and the next sequential sample number on sample containers and the COC forms. Duplicate samples are collected from the same bailer and analyzed for the same compounds.

3.4.3.2 Trip Blanks

Each cooler packed and shipped for aqueous VOC analysis should also contain a trip blank. Trip blanks are VOA vials filled with distilled water. These pre-filled vials are to be carried with the sample bottles and samples and should remain sealed the entire time. It should be documented in the field book which aqueous samples were collected and transported with the trip blank.

3.4.3.3 Field Blanks

One field blank sample will be collected per day of sampling. Field blanks are collected after a sample is taken and the equipment used (i.e., bailer) has been decontaminated. Distilled water is then poured over the decontaminated sampling equipment and collected in sample jars for analysis. It should be documented in the field book which groundwater sample preceded the field blank and which sample followed the field blank for the equipment used.

3.5 Premobilization

Prior to initiating fieldwork, the following preparatory activities will be completed:

- Project mobilization.
- Utility clearance and permitting. The drilling subcontractor is responsible for contacting the appropriate local utility or "one-call" service to locate subsurface and aboveground utilities in the vicinity of the soil gas survey area.
- Site specific issues resolved.
- Sample analysis will be scheduled with the laboratory.
- Appropriate sample containers and preservatives for the various sample parameters will be obtained. Extra containers will be obtained to account for possible breakage.
- Field blank water will be obtained from the laboratory performing the analysis.
- Necessary field sampling and monitoring equipment will be obtained. Prior to use, the equipment will be checked to confirm that it is in good working condition, properly calibrated, and decontaminated. **The field equipment for the procedures detailed in Sections 3.6 through 3.27 is listed in Table 3-1.**
- Materials necessary for personal protection and decontamination will be obtained.
- Coordinate with subcontractors.

3.6 Direct Push Groundwater Sampling

3.6.1 Macro Core Sampling

Direct push methods will be used to collect 48 or 60-inch macro-core samples continuously at each of the groundwater sample locations. The samples will be used by the CDM engineer to determine the depth to groundwater at each location. Once saturated soil is verified, a screen point groundwater sampler will be set approximately 5 feet into the water table. The depth to water will be used to determine the depth of the soil vapor probes.

Table 3-1
Equipment List

Equipment List \ Field Procedure	Soil Vapor Sampling	Temporary Port Sub-Slab Soil Vapor Sampling	Permanent Port Sub-Slab Soil Vapor Sampling	Indoor (Ambient) Air Sampling	Outdoor (Ambient) Air Sampling	Direct Push Groundwater Sampling	Low Flow Groundwater Sampling	Monitoring Well Purging	Groundwater Sampling by Bailer	Tap Water Sampling	Surface Water Sampling	Sediment/Sludge Sampling	Subsurface Soil Sampling	Surface Soil Sampling	Investigative Derived Waste	Water Level/NAPL Measurement	Rock Coring	Packer Testing	Aquifer Performance Test	Membrane Interface Probe	Fish Sampling	Benthic Macroinvertibrate Sampling
¼-inch flush mount hex socket plug, Teflon coated			x																			
¼-inch OD Teflon tubing	x	x	x				x															
¼-inch outside diameter (OD) stainless steel tubing			x																			
¼-inch Swagelock™ female and male connector			x																			
½- to ¾-inch braided nylon line or Teflon-coated wire rope									x		x	x										
1.4 or 6 Liter summa canisters	x	x	x	x	x																	
1-gallon buckets with foam along the rim	x	x																				
5-gallon bucket							x	x	x	x											x	x
60 cm^3 syringe	x	x	x																			
6-ft Engineers Scale																	x					
Aluminum foil												x									x	
Anchoring cement			x																			
Auger, rotary, air hammer or other drilling method (provided by subcontractor)																	x	x				
Bailer (sampler) and rope or wire line								x	x		x											
Boat (as needed for deep water)												x										
Bricks (or equivalent)	x																					
Camera	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Cement (to patch floor)		x																				
Check valve																			x			
Clear waterproof tape												x										
Composite Liquid Waste Sampler (COLIWASA) or sample thief for liquid sampling in a container															x							
Coolers/Sample shipping containers with ice packs						x	x		x	x	x	x	x	x	x			x			x	x
Core Barrel (provided by subcontractor)																	x					
Data logger and laptop																x			x			
Decontamination supplies						x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
Direct-push drill rig or rotary drill rig (for split-spoon/split barrel or direct push sampling)													x									
Discharge Hosing/piping								x											x			
Electrical conduit putty or modeling clay		x	x																			
Field parameters meters (Temperature, conductivity, pH, dissolved oxygen, Redox, turbidity)							x		x	x	x							x				
Flow meter with totalizer																		x	x			
Generator/electric supply source							x	x											x			
Hammer Drill with 1.25-inch bit		x																				
Hammer Drill with 3/8,1-inch bit			x																			

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Hand auger and extension rods (for manual sampling)												x	x									
Helium, regulator and detector	x	x																				
Indelible black ink pen or marker	x	x	x	x	x	x	x		x	x	x	x	x	x	x		x	x				
Inflatable Packers (provided by subcontractor)																		x				
Kimwipe or paper towels						x	x	x	x		x	x	x	x	x	x					x	x
Labels and shipping products	x	x	x	x	x	x	x		x	x	x	x	x	x	x	x		x			x	x
Large, wide-mouth breakers for measuring field parameters							x		x	x	x							x				
Lift pipe (provided by subcontractor)																		x				
Logbook	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
low-flow air pump	x	x	x																			
low-flow groundwater pump							x															
Nitrogen																		x				
Personal protective equipment per Health and Safety Plan	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Photoionization detector (PID)	x	x	x			x	x		x	x		x	x	x	x			x				
Plastic Zip-top bag									x	x		x	x	x							x	x
Polyethylene or plastic sheeting						x	x	x	x		x	x	x	x	x			x		x	x	x
Ponar sampler/ Eckman grab												x										
Pond sampler											x											
Pressure Gauges																		x				
Sample containers and preservatives (supplied by laboratory)						x	x		x	x	x	x	x	x	x			x				
Sampling port/valve																		x	x			
Scale																					x	x
Slide Hammer with extension rods (for manual sampling)													x									
Stainless steel push tubes (as needed)												x										
Stainless steel trowels, spoons, pan, tray, or bowls												x	x	x	x							
Stop watch										x									x			
Submersible pump								x										x	x			
Surveyor's stand (or equivalent to place canister on)				x																		
Tap and deionized water						x			x		x	x	x	x	x	x	x	x				
Tape Measure (100+ ft)	x	x	x	x	x	x	x				x	x	x	x				x	x		x	x
Locating device (GPS)	x	x	x	x	x	x	x		x		x	x	x	x			x	x		x		
Tedlar™ sample bags	x	x	x																			
Teflon thread tape			x																			
T-handle (extension rod) and hand auger													x									
three-way valve	x	x	x																			
trowel or putty knife			x																			
Tubing cutter	x	x	x				x	x														
Water level indicator						x	x	x	x							x		x	x			

Table 3-1
Equipment List

Equipment List \ Field Procedure	Soil Vapor Sampling	Temporary Port Sub-Slab Soil Vapor Sampling	Permanent Port Sub-Slab Soil Vapor Sampling	Indoor (Ambient) Air Sampling	Outdoor (Ambient) Air Sampling	Direct Push Groundwater Sampling	Low Flow Groundwater Sampling	Monitoring Well Purging	Groundwater Sampling by Bailer	Tap Water Sampling	Surface Water Sampling	Sediment/Sludge Sampling	Subsurface Soil Sampling	Surface Soil Sampling	Investigative Derived Waste	Water Level/NAPL Measurement	Rock Coring	Packer Testing	Aquifer Performance Test	Membrane Interface Probe	Fish Sampling	Benthic Macroinvertibrate Sampling
Water spray bottle						x	x				x	x	x	x	x							
Water storage container (if necessary)					x	x	x											x	x			
Wrenches and pliers	x	x	x	x	x		x	x	x				x									

3.6.2 Purge and Sampling

Standard purge techniques will be utilized to purge and sample groundwater. Standard purge and sampling techniques consist of using a check valve and tubing to purge the well at a low flow rate. The check valve intake is set approximately in the middle of the screen. The well is purged at the low rate until the water flows clear or the turbidity is reduced to 50 nephelometric turbidity units (NTUs) or less or to a level deemed acceptable by NYSDEC. The sample is then collected directly from tubing or bailer.

3.6.3 Groundwater Sampling Procedure

Personal protective equipment will be donned in accordance with the requirements of the Site Health and Safety Plan (HASP).

- Assemble the screen point groundwater sampler.
- Attach the Mill-slotted screen point groundwater sampler, onto the leading probe rod.
- Thread the drive cap onto the top of the probe rod and advance the sampler using either the hydraulic hammer or hydraulic probe mechanism. Replace the 30-centimeter (cm) rod with the 90-cm rod as soon as the top of the sampler is driven to within 15 cm of the ground surface.
- Advance the sampler to the interval to be sampled using the hydraulic hammer. Add additional probe rods as necessary to reach the specified sampling depth.
- Move the probe unit back from the top of the probe rods and remove the drive cap.
- Attach the pull cap to the top probe rod, retract the probe rods, push the screen into the formation, remove extension rods from the probe rods, and measure and record the water level, allowing time for the water level to reach equilibrium.
- Purge the groundwater until the water flows clear or the turbidity has been reduced to 50 NTUs or less. If the well is purged dry, the sample may be collected after the well recharges.
- Collect the samples using a check valve and flexible tubing system or a dedicated bailer.
- Label and store samples. Samples will be preserved, labeled, and placed immediately into a cooler and maintained at 4°C throughout the sampling and transportation period. Samples should be labeled, recorded on the chain-of-custody and shipped according to the proper procedures. Custody seals will be placed on all coolers/packages containing laboratory samples during shipment.

3.7 Soil Vapor Sampling

Soil vapor sampling will be conducted in accordance with the NYSDOH *"Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York, dated October 2006"* and the NYSDEC *"Draft Division of Environmental Remediation (DER)-10 Technical Guidance for Site Investigation and Remediation, dated December 2002".*

3.7.1 Soil Vapor Probe Installation

A Soil vapor probe installation at all locations will be performed according to the following procedures:

- At each location, a Geoprobe will be used to drive stainless steel rods equipped with detachable stainless steel drive points to the desired depth (approximately 8 feet bgs).
- Once the probe is in place, retract the drive rod slightly to expose a 6-inch sampling screen and sampling port. Insert Teflon-lined tubing through the rods and attach it to the soil gas probe just above the tip.
- Seal the probe at the surface using electrical conduit putty or non-shrink bentonite grout.
- The borehole will then be backfilled with sand to a minimum depth of 6 inches above the screen interval.
- Bentonite slurry will then be placed from approximately 6 inches above the screen to the ground surface and immediately hydrated. The bentonite will be allowed to set-up for a minimum of 24 hrs.
- Repeat steps 1 through 4 at a second co-located borehole to the second depth (~2 feet above the water table).

3.7.2 Tracer Testing

Tracer tests will be conducted at all soil vapor locations to verify the integrity of the soil vapor probe seal. Tracer tests will be conducted according to the following procedures:

- Set up the tracer test apparatus by first sealing the open area around the tubing with wax or bentonite.
- A bucket is then placed upside down over the borehole with the tubing coming out through a hole at the top.
- Helium will then be injected through a hole near the bottom of the bucket to enrich the atmosphere to at least 80 percent helium. The concentration of helium

inside the bucket will be monitored by a helium detector located at a second hole near the bottom of the bucket.

- Once the atmosphere is enriched to the appropriate concentration, the helium detector will then be used to check the concentration coming out of the tubing from the borehole located at the top of the bucket. If the reading is below 10 percent tracer gas, the probe seal is sufficient; proceed with sampling, as described in the following sections. If the reading is above 10 percent tracer gas, the probe seal is not sufficient; reseal the probe surface with bentonite and repeat the tracer test until the reading is below 10 percent tracer gas.

3.7.3 Soil Vapor Sampling Procedures for Offsite Analysis

Once the soil gas probe is installed and a tracer test is conducted, soil gas samples for off site analysis will be collected according to the following procedures:

- The soil vapor samples will be collected using a laboratory-certified clean summa canister with a two-hour regulator ensuring that the sample flow rate less than 200 milliliters per minute (ml/min) to minimize outdoor air infiltration during sampling. The summa canisters will have a vacuum of 28 inches mercury (in Hg) ± 2 inches prior to the collection of the soil vapor sample.

- Calculate the volume of the tubing including the screen interval as part of the volume. The tubing has an inside diameter of ¼ inch and a volume of 9.65 ml/foot.

- Attach the vacuum pump and purge at least 3 tube volumes from the tubing. Syringes will be utilized to purge the tubing if obtaining a flow rate of 200 ml/min is difficult with vacuum pump.

- A Tedlar™ bag will be filled toward the end of the purge volume to be screened using the PID meter. The PID readings will be observed and recorded on the appropriate field form.

- After purging is complete, the tubing will be connected to the summa canister.

- Record the initial pressure in the stainless steel summa canister to be used for the sample prior to connecting the tubing. The samples will be collected using laboratory-certified clean summa canisters with flow regulators and a vacuum of 28 inches Hg ± 2 inches. Vacuum readings in the canister should be approximately 28-30 inches Hg. If no vacuum reading is obtained, use a different canister as this indicates the canister was not properly evacuated.

- Connect the end of the tubing directly to the summa canister intake valve.

- Collect the sample into the summa canister, which will be provided by CDM's laboratory. An additional canister and regulator will be ordered as backup. Sample flow rate will not exceed 200 ml/min.

- When the vacuum gauge reads 5 inches Hg, close the valve. Sampling is complete. A vacuum of 5 inches Hg ± 1 inch must be present when sample collection is terminated to prevent contamination during transit. Record the final pressure reading in the summa canister.

- CDM personnel will label, pack and ship the samples to an NYSDOH ELAP-approved laboratory. The serial numbers for the summa canisters and the regulators will be recorded on the chain of custody. Custody seals will be placed on all coolers/packages containing laboratory samples during shipment.

- The field sampling team will maintain a sample log sheet summarizing the following:
  - sample identification.
  - date and time of sample collection
  - sampling height
  - serial numbers for summa canisters and regulators
  - sampling methods and devices
  - purge volumes
  - volume of soil vapor extracted
  - vacuum of summa canisters before and after sample collection
  - apparent moisture content (dry, moist, saturated, etc.) of the sampling zone
  - chain of custody protocols and records used to track samples from sampling point to analysis.

It is critical to ensure that moisture does not enter the summa canister which can compromise the analytical results.

3.8 Temporary Port Sub-Slab Soil Vapor Sampling Procedures for Offsite Analysis

Sub-slab soil gas samples for off site analysis will be collected according to the following procedures:

- Prior to installation of the sub-slab vapor probe, the building floor should be inspected and any penetrations (cracks, floor drains, utility perforations, sumps, etc.) should be noted and recorded. Probes should be installed at locations where the potential for ambient air infiltration via floor penetrations is minimal.

- After the slab has been inspected and the location of any subsurface utilities determined, the ambient air surrounding the proposed sampling location will be screened with a PID.

- A hammer drill with a 1.25-inch diameter drill bit will be used to advance a boring to a depth of approximately three to six inches beneath the slab. When drilling is complete, clean around drilled area.

- Insert probe constructed with 3/8-inch outer diameter, ¼-inch inner diameter Teflon® tubing. The tubing should not extend further than 2 inches into the sub-slab material

- The annular space between the borehole and the sample tubing will be filled and sealed with electrical conduit putty (or equivalent) at the surface.

- Conduct tracer testing in accordance with the procedures detailed in Section 3.7.2 above.

- The tubing will be connected to a low-flow sample pump. A three-way valve will be used to allow purging of all the lines. Flow rates for both purging and collection must not exceed 200 milliliters per minute to minimize the ambient air infiltration during sampling.

- Approximately 1 liter of gas will be purged from the subsurface probe and captured in a Tedlar™ bag using the low-flow pump. PID readings will be observed from this sample and the highest reading shall be recorded on the appropriate field form.

- Record the initial pressure in the stainless steel SUMMA canister to be used for the sample prior to connecting the tubing. The samples will be collected using laboratory-certified clean summa canisters with flow regulators and a vacuum of 28 inches Hg ± 2 inches. Vacuum readings in the canister should be approximately 28-30 inches Hg. If no vacuum reading is obtained, use a different canister as this indicates the canister was not properly evacuated.

- The end of the tubing will be connected directly to the summa canister's regulator intake valve via the three-way valve. Flexible silicone tubing will be used at a minimum and as a tubing adapter only. The sample shall be collected with a 6 Liter laboratory-certified summa canister with dedicated regulator set for a 24-hour sample collection.

- Collect the sample into the Summa canister, which will be provided by CDM's laboratory. An additional canister and regulator will be ordered as backup. Sample flow rate will not exceed 200 ml/min.

- When the vacuum gauge reads 5 inches Hg, close the valve. Sampling is complete. A vacuum of 5 inches Hg ± 1 inch must be present when sample collection is terminated to prevent contamination during transit. Record the final pressure reading in the summa canister.

- CDM personnel will label, pack and ship the samples to an NYSDOH ELAP-approved laboratory. The serial numbers for the SUMMA canisters and the regulators will be recorded on the chain of custody. Custody seals will be placed on all coolers/packages containing laboratory samples during shipment.

- Remove the sample port and patch the floor with concrete.

When sub-slab vapor samples are collected, the following actions should be taken to document conditions during sampling and ultimately to aid in the interpretation of the sampling results:

- historic and current storage and uses of volatile chemicals should be identified, especially if sampling within a commercial or industrial building (e.g., use of volatile chemicals in commercial or industrial processes and/or during building maintenance);

- the use of heating or air conditioning systems during sampling should be noted;

- floor plan sketches should be drawn that include the floor layout with sampling locations, chemical storage areas, garages, doorways, stairways, location of basement sumps or subsurface drains and utility perforations through building foundations, HVAC system air supply and return registers, compass orientation (north), footings that create separate foundation sections, and any other pertinent information should be completed;

- outdoor plot sketches should be drawn that include the building site, area streets, outdoor air sampling locations (if applicable), compass orientation (north), and paved areas;

- weather conditions (e.g., precipitation and indoor and outdoor temperature) and ventilation conditions (e.g., heating system active and windows closed) should be reported; and

- any pertinent observations, such as spills, floor stains, smoke tube results, odors and readings from field instrumentation (e.g., vapors via PID, Jerome Mercury Vapor Analyzer, etc.), should be recorded.

Additional documentation that could be gathered to assist in the interpretation of the results includes information about air flow patterns and pressure relationships obtained by using smoke tubes or other devices (especially between floor levels and between suspected contaminant sources and other areas), the barometric pressure and photographs to accompany floor plan sketches.

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

- sample identification,
- date and time of sample collection,
- sampling depth,
- identity of samplers,
- sampling methods and devices,
- soil vapor purge volumes,
- volume of soil vapor extracted,
- if canisters used, vacuum of canisters before and after samples collected,
- apparent moisture content (dry, moist, saturated, etc.) of the sampling zone, and
- chain of custody protocols and records used to track samples from sampling point to analysis.

3.9 Permanent Port Sub-Slab Soil Vapor Sampling Procedures for Offsite Analysis

Sub-slab soil gas samples for off site analysis will be collected from permanent sub-slab ports according to the following procedures:

- Prior to installation of the sub-slab vapor probe, the building floor should be inspected and any penetrations (cracks, floor drains, utility perforations, sumps, etc.) should be noted and recorded. Probes should be installed at locations where the potential for ambient air infiltration via floor penetrations is minimal.

- After the slab has been inspected and the location of any subsurface utilities determined, the ambient air surrounding the proposed sampling location will be screened with a PID.

- A hammer drill with a 3/8-inch diameter drill bit will be used to drill an inner pilot hole into the concrete slab to a depth of approximately two inches.

- Using the pilot hole as the center, drill an outer hole to an approximate depth of 1 3/8 inch using the one-inch diameter drill bit.

- Clean any cuttings out of the hole.

- Using the 3/8 inch drill bit, continue to drill the pilot hole through the slab and several inches into the sub-slab material.

- Assemble the stainless steel probe:

- Determine the length of stainless steel tubing required to reach from the bottom of the outer hole, through the slab, and into the open cavity below the slab. To avoid obstruction of the probe tube, insure that it does not contact the sub-slab material.
- Attach the measured length of ¼-inch OD stainless tubing to the female connector with the swagelock™ nut and tighten the nut.
- Insert the ¼-inch hex socket plug into the female connector. Tighten the plug. Do not over tighten.
- Place the completed probe into the outer hole. The probe tubing should not contact the sub-slab material and top of the female connector should be flush with the surface of the slab and centered in the outer hole.
- Fill the space between the probe and the inside of the outer hole with anchoring cement and allow to cure.

- Wrap one layer of Teflon thread tape onto the NPT end of the male connector
- Remove the ¼-inch hex socket plug from the female connector
- Screw and tighten the male connector into the female connector.
- A length of Teflon tubing is attached to the probe assembly and connected to the sample system using for purging and sample collection.
- A three-way valve will be used to allow purging of all the lines. Flow rates for both purging and collection must not exceed 100 milliliters per minute to minimize the ambient air infiltration during sampling.
- Purge at least 3 volumes from the subsurface probe and captured in a Tedlar™ bag using a 60 cc syringe. PID readings will be observed from this sample and the highest reading shall be recorded on the appropriate field form.
- Record the initial pressure in the stainless steel summa canister to be used for the sample prior to connecting the tubing. The samples will be collected using laboratory-certified clean summa canisters with flow regulators and a vacuum of 28 inches Hg ± 2 inches. Vacuum readings in the canister should be approximately 28-30 in Hg. If no vacuum reading is obtained, use a different canister as this indicates the canister was not properly evacuated.
- The end of the tubing will be connected directly to the SUMMA canister's regulator intake valve via the three-way valve. Flexible silicone tubing will be used at a minimum and as a tubing adapter only. The sample shall be collected with a 6 Liter laboratory-certified summa canister with dedicated regulator set for a 24-hour sample collection.
- Collect the sample into the summa canister, which will be provided by the subcontracted laboratory.

- When the vacuum gauge reads 5 inches Hg, close the valve. Sampling is complete. A vacuum of 5 inches Hg ± 1 inch must be present when sample collection is terminated to prevent contamination during transit. Record the final pressure reading in the summa canister.

- CDM personnel will label, pack and ship the samples to an NYSDOH ELAP-approved laboratory. The serial numbers for the summa canisters and the regulators will be recorded on the chain of custody. Custody seals will be placed on all coolers/packages containing laboratory samples during shipment.

When sub-slab vapor samples are collected, the following actions should be taken to document conditions during sampling and ultimately to aid in the interpretation of the sampling results:

- historic and current storage and uses of volatile chemicals should be identified, especially if sampling within a commercial or industrial building (e.g., use of volatile chemicals in commercial or industrial processes and/or during building maintenance);

- the use of heating or air conditioning systems during sampling should be noted;

- floor plan sketches should be drawn that include the floor layout with sampling locations, chemical storage areas, garages, doorways, stairways, location of basement sumps or subsurface drains and utility perforations through building foundations, HVAC system air supply and return registers, compass orientation (north), footings that create separate foundation sections, and any other pertinent information should be completed;

- outdoor plot sketches should be drawn that include the building site, area streets, outdoor air sampling locations (if applicable), compass orientation (north), and paved areas;

- weather conditions (e.g., precipitation and indoor and outdoor temperature) and ventilation conditions (e.g., heating system active and windows closed) should be reported; and

- any pertinent observations, such as spills, floor stains, smoke tube results, odors and readings from field instrumentation (e.g., vapors via PID, Jerome Mercury Vapor Analyzer, etc.), should be recorded.

Additional documentation that could be gathered to assist in the interpretation of the results includes information about air flow patterns and pressure relationships obtained by using smoke tubes or other devices (especially between floor levels and between suspected contaminant sources and other areas), the barometric pressure and photographs to accompany floor plan sketches.

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

- sample identification,
- date and time of sample collection,
- sampling depth,
- identity of samplers,
- sampling methods and devices,
- soil vapor purge volumes,
- volume of soil vapor extracted,
- if canisters used, vacuum of canisters before and after samples collected,
- apparent moisture content (dry, moist, saturated, etc.) of the sampling zone, and
- chain of custody protocols and records used to track samples from sampling point to analysis.

3.10 Indoor (Ambient) Air Sampling Procedures for Offsite Analysis

All indoor air samples will be collected with a 6 Liter laboratory-certified summa canister regulated for a 24-hour sample collection. Sample collection will be similar to outdoor ambient air sample collection. The summa canister will be placed in such a location as to collect a representative sample from the breathing zone at four or six feet above the floor. Personnel should avoid lingering in the immediate area of the sampling device while samples are being collected.

The New York State Department of Health *Indoor Air Quality Questionnaire and Building Inventory* shall be completed for each structure where indoor air testing is being conducted. The following actions should be taken to document conditions during indoor air sampling and ultimately to aid in the interpretation of the sampling results:

- historic and current uses and storage of volatile chemicals should be identified, especially if sampling within a commercial or industrial building (e.g., use of volatile chemicals in commercial or industrial processes and/or during building maintenance);

- a product inventory survey documenting sources of volatile chemicals present in the building during the indoor air sampling that could potentially influence the sample results should be completed;

- the use of heating or air conditioning systems during sampling should be noted;

- floor plan sketches should be drawn that include the floor layout with sampling locations, chemical storage areas, garages, doorways, stairways, location of basement sumps or subsurface drains and utility perforations through building foundations, HVAC system supply and return registers, compass orientation (north), footings that create separate foundation sections, and any other pertinent information should be completed;

- outdoor plot sketches should be drawn that include the building site, area streets, outdoor air sampling locations (if applicable), compass orientation (north), and paved areas;

- weather conditions (e.g., precipitation and indoor and outdoor temperature) and ventilation conditions (e.g., heating system active and windows closed) should be reported; and

- any pertinent observations, such as spills, floor stains, smoke tube results, odors and readings from field instrumentation (e.g., vapors via PID, etc.), should be recorded.

Additional documentation that could be gathered to assist in the interpretation of the results includes information about air flow patterns and pressure relationships obtained by using smoke tubes or other devices (especially between floor levels and between suspected contaminant sources and other areas), the barometric pressure and photographs to accompany floor plan sketches.

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

- sample identification,
- date and time of sample collection,
- sampling height,
- identity of samplers,
- sampling methods and devices,
- volume of air sampled,
- vacuum of canisters before and after samples collected, and
- chain of custody protocols and records used to track samples from sampling point to analysis.

3.11 Outdoor (Ambient) Air Sampling Procedures for Offsite Analysis

All outdoor air samples will be collected with a laboratory-certified summa canister regulated for a 24-hour sample collection using a 6 Liter summa canister. The summa canister will be placed in such a location as to collect a representative sample from the breathing zone at four or six feet above the ground.

Personnel will avoid lingering in the immediate area of the sampling device while samples are being collected. Ambient air samples will be collected in a location of as far away as possible from any boring or dust generating activities.

The following actions will be taken to document conditions during ambient air sampling:

- Outdoor plot sketches will be drawn that include the building site, area streets, ambient air sample locations, the location of potential interferences, compass orientation, and paved areas.

- Weather conditions (e.g. precipitation, temperature, wind direction and barometric pressure)

- Any pertinent observations, such as odors, reading from field instruments, and significant activities in the vicinity (e.g. operation of heavy equipment) will be recorded.

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

- sample identification,
- date and time of sample collection,
- sampling height,
- identity of samplers,
- sampling methods and devices,
- volume of air sampled,
- vacuum of canisters before and after samples collected, and
- chain of custody protocols and records used to track samples from sampling point to analysis.

3.12 Decontamination

All non-dedicated, non-disposal sampling equipment and tools used to collect samples for chemical analysis will be decontaminated prior to and between each sample interval using an Alconox rinse and potable water rinse prior to reuse. Unless disposable sampling equipment is used, the equipment will be decontaminated by the following procedure:

- Wash with the non-phosphate detergent
- Tap water rinse
- Deionized water rinse
- Air dry and wrap in aluminum foil, shiny side out

Additional cleaning of the drilling equipment with steam may be needed under some circumstances if elevated levels of contamination appear to be present using field monitoring equipment or visible stained soils. Decontamination fluids will be discharge to the ground surface unless visible sheen or odor is detected either on the equipment or the fluids, at which point the decontamination water will be contained in a 55-gallon drum, staged and properly disposed.

3.13 Investigative Derived Waste

Soil cuttings and purge water will be placed and dispersed on the ground unless visible contamination or elevated PID readings are observed. If contamination is present, investigative derived waste (IDW) will be contained and analyzed to determine the appropriate disposal methods.

3.13.1 Waste Sampling

Waste classification sampling will occur before the completion of site investigation activities. Representative soil samples (5 grab samples) will be collected from waste containers with a decontaminated stainless steel trowel. The aliquots will be homogenized in a stainless steel bowl and transferred to the sample container(s) for subsequent analysis. Grab samples will be collected from each container containing aqueous wastes.

The requirements for waste characterization will be determined by the disposal facility. The containers of waste will be stored in an area designated by NYSDEC until the analytical results are received and the waste can be characterized for disposal.

3.13.2 Waste Sampling Procedure

Soil Waste

- Scan the sample with the OVM and record readings.
- Collect a sample of the soil from the container using a decontaminated stainless steel trowel in and place the sample in a stainless steel bowl. Homogenize the soil using the trowel. Several samples will be collected and homogenized in the steel bowl to represent each drum.
- Remove the cap from the container
- Fill the sample container as completely as possible by transferring the sample to the container immediately after collected the sample with a stainless steel trowel, and screening the sample with the OVM.
- Close the sample container tightly.
- Label the container and place it into in a cooler with bagged ice sufficient to cool the samples to 4°C.
- Maintain Chain-of-Custody forms for samples.
- Log the description and depth of the sample sent for analysis in the field book.
- Record field information and sample location, including measurements from fixed points in logbook.

Aqueous Waste

- Remove the cap from the drum containing the aqueous waste.
- Fill a sample container(s) as completely as possible by transferring liquid sample from the waste container to the sample container with the COLIWASA (or similar), and screening the sample with an OVM.
- Close the sample container(s) tightly.

- Place sample container(s) in cooler with bagged ice sufficient to cool the samples to 4°C.
- Maintain Chain-of-Custody forms.

3.14 Soil Boring Logs/Geoprobe

Geological logging includes keeping a detailed record of drilling (or excavating) and a geological description of materials on a prepared form. Geological logs are used for all types of drilling and exploratory excavations and include descriptions of both soil and rock. Accurate and consistent descriptions are imperative.

3.14.1 Log Form

When drilling in soils or unconsolidated deposits, the log should be kept on a standard Soil Boring Log Form. The following basic information should be entered on the heading of each log sheet:

- Project name and number
- Boring or well number
- Locations (approximate in relation to an identifiable landmark; will be surveyed)
- Elevations (approximate at the time; will be surveyed)
- Name of drilling contractor
- Drilling method and equipment
- Water level
- Start and finish (times and date)

The following technical information is recorded on the logs:

- Depth of sample below surface
- Sample interval
- Sample type and number
- Length of sample recovered
- Standard penetration test (ASTM-D1586) results if applicable
- Soil description and classification
- Graphic soil symbols
- PID readings

In addition to the items listed above, all pertinent observations about drilling rate, equipment operation, or unusual conditions should be noted. Such information might include the following:

- Size of casing used and method of installation
- Rig reactions such as chatter, rod drops, and bouncing
- Drilling rate changes
- Material changes
- Zones of caving or heaving

3.14.2 Soil Classification

The soil description should be concise and should stress major constituents and characteristics. Soil descriptions should be given in a consistent order and format. The following order is as given in ASTM D2488:

- Soil name. The basic name of the predominant constituent and a single-word modifier indicating the major subordinate constituent.
- Gradation or plasticity. For granular soil (sand or gravel) that should be described as well graded, poorly graded, uniform, or gap-graded, depending on the gradation of the minus 3-inch fraction. Cohesive soil (silts or clays) should be described as non-plastic, slightly plastic, moderately plastic, or highly plastic, depending on the results of the manual evaluation for plasticity as described in ASTM D2488.
- Particle size distribution. An estimate of the percentage and grain-size range of each of the soil's subordinate constituents with emphasis on clay-particle constituents. This description may also include a description of angularity. This parameter is critical for assessing hydrogeology of the site and should be carefully and fully documented.
- Color. The color of the soil using Munsell notation.
- Moisture content. The amount of soil moisture, described as dry, moist, or wet.
- Relative density or consistency. An estimate of density of a granular soil or consistency of a cohesive soil, usually based on standard penetration test results (see Table 3-2 and 3-3).
- Local geologic name. Any specific local name or a generic name (i.e., alluvium, loess). Also use of Unified Soil Classification System of symbols.

The soil logs should also include a complete description of any tests run in the borehole; placement and construction details of piezometers, wells, and other monitoring equipment; abandonment records; geophysical logging techniques used; and notes on readings obtained by air monitoring instruments.

- Additional data in sedimentary rocks includes:
  - Sorting
  - Cementation
  - Density or compaction
  - Rounding

The core should be logged as quickly as possible after removal from the hole. Some materials may degrade rapidly upon exposure, resulting in apparently poor rock, which was not actually present in the subsurface.

Check carefully each core end and try to determine if the fracture is natural or mechanical in origin. Mechanical fractures often can be identified by their orientation, the absence of secondary coatings or filling and slickensides, and its fit with the adjacent core piece. If doubt exists, consider it a natural fracture. If it is determined that the fracture is mechanical, ignore it and consider the two pieces of core as a single piece.

Table 3-2
Relative Density of Noncohesive Soil

Blows/Ft	**Relative Density**	**Field Test**
0-4	Very Loose	Easily penetrated w/ ½-inch steel rod pushed by hand
5-10	Loose	Easily penetrated w/ ½-inch steel rod pushed by hand
11-30	Medium	Easily penetrated w/ ½-inch steel driven with a 5- lb hammer
31-50	Dense	Penetrated one foot with a ½-inch steel road driven with 5-lb hammer
>50	Very Dense	Penetrated only a few inches with a ½-inch steel rod driven with a 5-lb hammer

Blows/Ft= Blows per foot
lb = pound

Table 3-3
Relative Consistency of Cohesive Soil

Blows/Ft	**Consistency**	**Pocket Penetrometer (TSF)**	**Torvance (TSF)**	**Field Test**
<2	Very Soft	<0.25	<0.12	Easily penetrated several inches by fist
2-4	Soft	0.25-0.8	0.12-0.25	Easily penetrated several inches by thumb
5-8	Firm	0.50-1.0	0.25-0.5	Can be penetrated several inches by thumb with moderate effort
9-15	Stiff	1.0-2.0	0.5-1.0	Readily indented by thumb but penetrated only with great effort
16-30	Very Stiff	2.0-4.0	1.0-2.0	Readily indented by thumbnail
>30	Hard	>4.0	>2.0	Indented with difficulty by thumbnail

TSF= Tons per square foot

3.15 Monitoring Well Installation

This section provides procedures for well design and well construction to aid in the development of drilling subcontracts. Drilling operation and well development guidelines are presented to aid the reader in the oversight of the installation of monitoring wells.

The principal reason that monitoring wells are constructed is to collect groundwater samples that, upon analysis, can be used to delineate a contaminant plume and track movement of specific chemical or biological constituents. A secondary consideration is the determination of the physical characteristics of the groundwater flow system to establish flow direction, transmissivity, quantity, etc. The spatial and vertical locations of monitoring wells are important. Of equal importance are the design and construction of monitoring wells that will provide easily obtainable samples and yield reliable, defensible, meaningful information. In general, monitoring well design and construction follows production well design and construction techniques. However, emphasis is placed on the effect these practices may have on the chemistry of the water samples being collected rather than on maximizing well efficiency.

From this emphasis, it follows that an understanding of the chemistry of the suspected pollutants and of the geologic setting in which the monitoring wells are constructed plays a major role in determining the drilling technique and materials used.

3.15.1 Well Siting

The following procedures should be followed:

- Review and be familiar with pertinent proposal sections, specifications, and subcontractor's contracts. Review and be familiar with any regulations governing how, where or when the well is drilled. Review and be familiar with data (supplied by the Client, or any other data available) used for program planning.

- Identify well site on a topographic map or other suitable project base map. Contact landowner at the beginning of well siting. Inquire whether the proposed drill locations will interfere with the landowner's established land use. Unless the property is owned by the client, the landowner is always contacted before entering the property, even if he is leasing back the property from the client.

- Check route to insure a drill rig can access the proposed well site. Plan routes that require the least disturbance of natural vegetation or natural countryside conditions and which would not require grading or other types of work by i.e., backhoes, etc.

- The well site should be reasonably level and absent of large boulders or other hazardous obstructions.

- Check to insure absence of buried high-pressure gas, oil or water lines. If any lines are present relocate the well site a safe distance away from them. Be sure to check with the subcontractor to insure his/her agreement.
- Check to insure absence of overhead power transmission lines. If any overhead power lines are present, relocate the well site a safe distance away from them. Be sure to check with the subcontractor to insure his/her agreement.
- Consult landowner about water source and access, and then notify the driller of these decisions.
- Explain to the driller the need for care and accurate retrieval of drill cuttings and, if necessary, placement and accounting of materials during well completion.
- If necessary, request access agreement to the well site.

3.15.2 Well Design

The following procedures should be followed:

- Examine the geophysical log and determine the exact interval(s) and depth(s) of the completion zone(s). Calculate the quantity of slotted casing or screen, blank casing, sealing materials, gravel pack and cement necessary to complete the well.
- Calculate the quantities of gravel pack, sealing materials and cement figuring the volume of the bore hole [borehole radius squared time the length of the borehole (r_B^2 x L)] minus the volume of the casing [radius of the casing squared times the length of the casing (r_C^2 x L)] which will yield the volume per linear foot.

  A cubic foot of silica sand weighs 100 pounds. Frequently silica sand is packaged in 100-pound sacks but should be purchased and delivered in bulk quantities. A five-gallon bucket is equal to 0.67 cubic feet. Dividing the determined or calculated volume between the well bore and the outside of the casing(s) into 0.67 cubic feet per bucket will yield approximately the number of feet per bucket of silica sand. Dividing the total interval of the intended gravel pack by the number of feet per bucket of gravel pack will yield approximately how many buckets of gravel will be required. This same method can be used if the silica sand arrives in 1-cubic foot sacks (100 pounds) except the final value is approximately the number of feet per sack of silica sand.

  Cement usually comes in 94 pound sacks and can be mixed in the field to obtain volumes between 0.88 cubic feet per sack to 1.50 cubic foot per sack. See Table 3-4 for the most common cement slurry mixtures.

  Clay seals are routinely placed in a well completion above the gravel or filter pack and below the cement or grout cap or plug. The clay seals are generally a bentonite clay and before swelling (in the borehole) has the form of ¼ inch to ½ inch pellets. The pellets generally come in plastic containers of 20 and 50 pounds but can also arrive in boxes or cloth sacks.

Table 3-4
Monitoring Well Grout

Water-Cement Ratio (Gallons water per sack)	Weight per Gallon of Slurry (pounds)	Volume of Mixture per sack (cubic feet)
7 1/2	14.1	1.50
7	14.4	1.43
6 1/2	14.7	1.35
6	15.0	1.28
5 1/2	15.4	1.21
5	15.8	1.14
4 1/2	16.25	1.08
4	16.50	1.00
3 1/2	17.35	0.95
3	18.1	0.88

The volume of the bentonite tablets needed for a specific seal thickness is calculated in the same manner as was done for the gravel pack and cement requirements.

Measure all materials twice during the well construction. First, when estimating the quantity of supplies needed for the completion, second, during well construction. Keep the first estimate in the daily log book record the actual (second measurement) intervals (tops and bottoms), quantity and type of materials placed in the well recorded on the appropriate forms.

3.15.3 Well Construction

The following procedures should be followed:

3.15.3.1 Final Design of Casing - Screen/Slotted Casing String(s)

If there is any doubt about the final design of the casing string, based on data from the pilot hole or the individual drill holes scheduled for completion, verify the design with the hydrogeologist in charge.

It is the rig hydrogeologist's responsibility to insure adequate supplies are maintained at each well site even though it may be the contractor's responsibility for supplying the materials.

3.15.3.2 Installing Casing (Slotted/Screen Casing String(s))

- Plastic or Polyvinylchloride (PVC) Casing - Join all 5 or 10 foot lengths of casing (blank and screen) by flush-joint threading. All pipe is to be cut with a cutting tool which leaves a smooth, square end.

- Both the hydrogeologist and the contractor keep a complete casing-slotted/screen casing string tally. Seal the bottom on the casing-slotted/screen casing string with a cap, glued and screwed permanently in place.

3.15.3.3 Installing Filter Material (Gravel Pack)

- Place the filter material downhole by gravity feed.

- The filter material shall be installed to levels pre-determined by the hydrogeologist. The exact depth for each well is determined from the final well design. However, generally the top of the filter material will be 5 feet above the top of the highest slotted/screened interval.

- Following placement of the filter material "sound" or "tag" this depth with the tremie pipe to insure it is at the prescribed level.

3.15.3.4 Installing Bentonite Pellet Seals (Blanket)

Following the installation of the filter material place a bentonite pellet blanket seal on top of the filter material to prevent contamination of the filter pack by the grout.

The actual amount of the annulus that is filled with bentonite pellets may vary from completion to completion but a minimum of 6 inches of the annulus should be filled with bentonite by gravity feed from the surface. The tremie pipe remains in the bore hold during gravity feed of the bentonite pellets. Calculate the exact volume of pellets needing placement.

3.15.3.5 Grouting

- Grout the annular space above the bentonite pellets as directed by the hydrogeologist.

- The grouted volume of annular space will vary from completion to completion, and sometimes within the same completion. Generally, if the annular space exceeds approximately 20 feet then the grouting is done in more than one stage. Take care to insure that the grout does not displace the bentonite seal or exceed (in weight) the collapse strength of the casing.

- The methods of mixing grout in the field are numerous. The first concern is that the slurry mixture is fluid enough for placement by tremie pipe and heavy enough to give the desired strength and sealing properties required. Reference the table from Halliburton Cementing Tables, 1979 or some other suitable source for the amount of water per sack, and then measure accurately into a large tub (water trough) or steel pit. Mix the correct number of bags of cement with the water at a rate which prevents, clotting or settling out of dry, unmixed cement. Usually this procedure is accomplished with a portable pump that sucks the water or cements mixtures in and then expels it under pressure through a hose that is used in a jetting fashion at the opposite end of the tank, pit or trough.

  Grout also can be mixed using a shovel or hoe. Generally, the grout is placed on the side of the tub, the bag is ruptured, and the cement is slowly added to the water. If the cement has hard spots place on a screen of approximately ¼ inch mesh attached to some type of frame that is placed across the mixing tub. The cement is then "filtered" for the larger; hard pieces or blocks.

- Pumping or Pouring Grout

  Place the mixed grout above the bentonite pellets. The time between placement of the bentonite pellets and the grout should not be less than 15 to 20 minutes. This allows the pellets to settle to the top of the gravel pack and to begin to swell, while not allowing the grout to harden.

  - The grout can either be pumped down the tremie pipe by same pump used for jetting or it can be poured by buckets through a funnel into the tremie pipe. Displacement of the bore hole fluid is almost certain because the grout slurry weighs more than the residual borehole fluid (10 or 11 pounds per gallon for the mud versus 14 to 18 pounds per gallon for the grout).

  - Except under rare circumstances, grout is never poured from the surface nor is it ever poured into standing water.

  - Grout the remainder of the hole by gravity feed from the surface as directed by the hydrogeologist. The quantity of grout placed from the surface should not exceed the collapse strength of the casing and should not be initiated prior to the curing of the grout seal above the bentonite pellets.

3.16 Monitoring Well Development

All completed wells, whether the production or monitoring type, must be developed in order to facilitate unobstructed and continuous groundwater flow into the well. Well development is the process of cleaning the fines from the face of the borehole and the formation near the well screen. During any drilling process the side of the borehole becomes smeared with drilling mud, clays or other fines. This plugging action substantially reduces the permeability and retards the movement of water into the well screen. If these fines are not removed, especially in formations having low permeability, it then becomes difficult and time consuming to remove sufficient water from the well before obtaining a fresh groundwater sample because the water cannot flow easily into the well.

The development process is best accomplished for monitoring wells by causing the natural formation water inside the well screen to move vigorously in and out through the screen in order to agitate the clay and silt, and move these fines into the screen. The use of water other than the natural formation water is not recommended.

3.16.1 Development Methods

The following well development methods may be used including:

- Surge Block - A surge block is a round plunger with pliable edges such as belting that will not catch on the well screen. Moving the surge block forcefully up and down inside the well screen causes the water to surge in and out through the screen accomplishing the desired cleaning action. Surge blocks are commonly used with cable-tool drilling rigs, but are not easily used by other types of drilling rigs.

- Bailer - A bailer sufficiently heavy that it will sink rapidly through the water can be raised and lowered through the well screen. The resulting agitating action of the water is similar to that caused by a surge block. The bailer, however, has the added advantage of removing the fines each time it is brought to the surface and dumped. Bailers can be custom-made for small diameter wells, and can be hand-operated in shallow wells.

- Surging and pumping - Starting and stopping a pump so that the water is alternately pulled into the well through the screen and backflushed through the screen is an effective development method. Periodically pumping to the surface will remove the fines from the well and permit checking the progress to assure that development is complete.

Well development should continue until the water becomes free of sediment or contains sediment in a lesser amount than was initially present. Conductivity, pH, temperature and turbidity (as measured by a turbidity meter) of the development water must all have stabilized prior to ceasing development. Disposal of development water is site specific and should be discussed in the Sampling and Analysis Plan or Work Plan.

3.17 Low Flow Groundwater Sampling

Low-flow purge and sampling is appropriate at locations where disturbance of the media around the well screen needs to be minimized. A common concern is turbidity in the monitoring wells and the consequent undesirable effects on metals sampling results.

The low-flow purge and sample method creates less disturbance and agitation in the well, and therefore excess turbidity is not generated during the purging and sampling process. The result is a more rapid stabilization of turbidity and other parameters (pH, temperature, specific conductivity, and dissolved oxygen), and a sample more representative of conditions in the formation is collected.

The low flow purge and sample method consists of using a submersible or bladder pump to purge the well at a very low flow rate (0.5 to 1.5 liter/minute). The pump intake is set approximately in the middle of the well screen, with a stagnant water column over the top of the pump. The well is purged at the low rate until the field parameters (temperature, pH, specific conductivity, turbidity, dissolved oxygen, and Eh) have stabilized. The sample is then collected directly from the pump discharge at a low flow rate.

- Check and record the condition of the well for any damage or evidence of tampering.

- Remove the well cap.

- Measure well headspace with a PID and record the reading in the field logbook. For wells installed on a landfill, also measure the headspace with a combustible gas indicator.

- Measure and record the depth to water with an electronic water level device and record the measurement in the field logbook. Do not measure the depth to the bottom of the well at this time (to avoid disturbing any sediment that may have accumulated). Obtain depth to bottom information from installation information in the field logbook or drilling logs. Calculate volume of the water column by depth of water column times the cross-sectional area of the well.

- Lower pump to desired sampling depth. During purging, monitor the water level and field parameters (temperature, pH, turbidity, specific conductance and dissolved oxygen) approximately every 3 to 5 minutes. Continue monitoring until the water level stabilizes and field parameters have stabilized to within 10 percent (plus or minus 5 percent) over a minimum of three readings. Turbidity and dissolved oxygen are typically the last parameters to stabilize. Note: once turbidity readings get below 10 NTUs, then the stabilization range can be amended to 20 percent (plus or minus 10 percent) over a minimum of three readings.

Readings should be taken in a clean container (preferably a less beaker) and the monitoring instrument allowed to stabilize before collection of the next sample. The Horiba instrument takes the readings consecutively and therefore the process to record all the measurements may take longer than five minutes. If so, measurements should be taken as often as practicable.

- Once the water level and field parameters have stabilized, collect the samples from the pump. Collect samples per Section 3.2.2.1.

- Decontaminate equipment in accordance with Section 3.12.

3.18 Monitoring Well Purging

Well purging can be performed on a volume basis or on a field parameter stabilization basis. In both cases, field parameters are recorded; however, for the former case purging is concluded after a target number of well volumes (typically 3 to 5) regardless of whether parameters have stabilized. In the latter case, purging continues until field parameters stabilize within 10 percent.

3.18. 1 Volumetric Method of Well Purging

The following steps should be followed when purging a well by the volumetric method:

- Don personal protective clothing and equipment as specified in the site-specific health and safety plan.

- Open the well cover and check the condition of the wellhead, including the condition of the surveyed reference mark, if any.

- Monitor the air space at the wellhead, using a PID or equivalent, as soon as well cover is removed according to health and safety requirements.

- Calibrate the required field parameter meters according to manufacturer's specifications.

- Determine the depth to static water level and depth to bottom of well casing. Calculate the volume of water within the well bore based on the following well volumes

Table 3-5 Well Volumes	
Well Diameter (inches)	**Gallons per foot**
2	0.16
4	0.65
6	1.5
8	2.6
10	4.1
12	5.9

Note: Record all data and calculations in the field logbook.

- Set up field parameter probes at the discharge orifice or dedicated probe port of the pump assembly or within the flow-through chamber.
- Prepare the pump and tubing, or bailer, and lower it into the casing.
- Remove the number of well volumes specified in the site-specific plans. Generally, three to five well volumes will be required. Field parameters should be measured and recorded, if required by site-specific plans. In low recharge aquifers, the well commonly will be pumped or bailed to dryness before three well volumes of water are removed. If this is the case, there is no need to continue with purging operations. Record pertinent data in the field logbook.
- Remove the pump assembly or bailer from the well, decontaminate it (if required), and clean up the site. Lock the well cover before leaving. Containerize and/or dispose of development water as required by the site-specific plan.

3.18.2 Indicator Parameter Method of Well Purging

- Don personal protective clothing and equipment as specified in the site-specific health and safety plan.
- Open the well cover and check the condition of the wellhead, including the condition of the surveyed reference mark, if any.
- Monitor the air space at the wellhead, using a PID or equivalent, as soon as well cover is removed according to health and safety requirements.
- Calibrate the required field parameter meters according to manufacturer's specifications.

- Determine the depth to static water level and depth to bottom.
- Set up field parameter probes at the discharge orifice or dedicated probe port of the pump assembly or within the flow-through chamber.
- Assemble the pump and tubing, or bailer, and lower into the casing.
- Begin pumping or bailing the well. Record indicator parameter readings for every purge volume. Maintain a record of the approximate volumes of water produced.
- Continue pumping or bailing until indicator parameter readings remain stable within ±10 percent for three consecutive recording intervals, or in accordance with site-specific plans. Purging should continue until the discharge stream is clear or turbidity becomes asymptotic-low or meets project requirements. In a low recharge aquifer, the well may pump or bail to dryness before indicator parameters stabilize. In this case, there is no need to continue purging. Record pertinent data in the field logbook.
- Remove the pump assembly or bailer from the well, decontaminate (if required), and clean up the site. Lock the well cover before leaving. Containerize and/or dispose of development water as required by the site-specific plans.

3.19 Groundwater Sampling by Bailer

Groundwater is typically sampled by bailer after purging 3 to 5 well volumes per Section 3.18.

- Don personal protective clothing as specified in the site-specific health and safety plan.
- Prepare the area for sample acquisition. If required, cover ground surface around well head with plastic sheeting.
- Open well head and immediately check for organic vapors with PID or flame ionization detector as appropriate.
- Determine static water level and calculate water volume in well.
- Purge well in accordance with Section 3.18.
- Allow water level to recover to a depth at least sufficient for complete submergence of the bailer without contacting well bottom. Ideally, water level should recharge to 75 percent of static level. Samples shall be collected within 3 hours of purging if recharge is sufficient. Wells with a low recharge rate must be collected within 24 hours of purging.

- Securely attach the bailer to the line and test the knot. The opposite end of the line should be secured to prevent loss of bailer into well.
- Lower bailer slowly into the water to prevent aeration, particularly when VOC samples are collected.
- Retrieve filled bailer and fill sample bottles in accordance with Section 3.2.2.1.
- Collect required field parameters and depth to water.
- Decontaminate non-disposable sampling equipment in accordance with Section 3.12.
- Secure well, clean up area.

3.20 Well Abandonment

Once it is deemed that the temporary or permanent monitoring well is no longer needed, the well will be abandoned by a New York State certified well driller as follows:

- The well will be sounded (its depth measured with a weighted line or appropriate method) immediately before it is destroyed to make sure that it contains no obstructions that could interfere with filling and sealing.
- Where possible, remove all material within the original borehole - including the well casing, filter pack and annular seal. If the casing, filter pack and annular seal materials cannot be removed, they may be left in place
- The casing left in place may require perforation or puncturing to allow proper placement of sealing materials. Where the casing is left in the hole, the casing may be cut at the surface.
- Fill well screen with sand per NYSDEC specifications.
- The monitoring well should be filled to the surface with cement grout, or within 20 feet of the surface with bentonite grout. After the placement of the bentonite grout (if used), the remaining portion of the well then should be sealed with a Portland Type I, II or Type I/II cement with 2 percent to 5 percent bentonite.

3.21 Surface Water Sampling

Four surface water sampling scenarios are provided below. These include 1) shallow surface water samples for VOC analysis (preserved and unpreserved), 2) shallow surface water samples for non-VOC or inorganic compound analysis (preserved and unpreserved), 3) deep surface water samples using a weighted bottle sampler and 4) deep surface water samples using a peristaltic pump.

The following steps should be taken when preparing for sampling surface water:

- Don the appropriate personal protective clothing as dictated by the site-specific health and safety plan.
- Select stream/river sampling locations as directed in work plan.
- Prepare sampling site by laying out clean plastic sheeting on the ground or any flat, level surfaces near the sampling area and place equipment to be used on the plastic.
- Make field measurements as required by the project plans in physical, chemical, and biological characteristics of the water (e.g., temperature, dissolved oxygen, conductivity, pH).
- The samples shall be collected from areas of least to greatest contamination (when known) and, when collecting several samples in 1 day, always collect from downstream to upstream.
- The sampler should be facing upstream when sampling.
- Document the sampling events, recording all information in the designated field logbook and take photographs if required or if possible. Document any and all deviations from this SOP and include rationale for changes.

3.21.1 Collecting Shallow Surface Water Samples

The following steps must be taken when collecting shallow surface water samples:

- Approach the sample location from downstream; do not enter the sample area. Slowly submerge VOA vials completely into an area of gently flowing water and fill. Do not disturb bottom sediments. The sampler and open end of the vials should be pointed upstream. If wading is necessary, approach the sample location from downstream; do not enter the actual sample area. When using gasoline-powered vessels, make sure the engine is turned off.
- Collect samples per Section 3.2.2.1 If preserved bottles are used, collect sample in a dedicated non-preserved bottle and transfer to the preserved bottle.

Note: When collecting samples for VOC analysis, avoid collecting from a surface water point where water is cascading and aerating. Cap the VOC vial while it is under water. After the vial is capped, check the vial to see if there are any air bubbles trapped in it. If air bubbles are present discard the sample.

3.21.2 Collecting Deep Surface Water Samples at Specified Depth Using a Weighted Bottle Sampler

The following steps must be followed when collecting surface water samples at specific depths using a weighted bottle sampler:

- Lower the weighted bottle sampler to the depth specified in the site-specific plan.
- Remove the stopper by pulling on the sampler line; allow the sampler to fill with water.
- Release the sampler line to reseat the stopper and retrieve the sampler to the surface.
- Wipe the weighted bottle sampler dry with a Kimwipe or clean paper towel.
- Remove the stopper slowly. Collect samples per Section 3.2.2.1.
- Decontaminate equipment according to the Section 3.12.

3.21.3 Collecting Deep Surface Water Sample Collection Using a Peristaltic Pump

The following steps must be followed when collecting deep surface water samples using a peristaltic pump:

- Install clean silicon or Teflon tubing on the pump head. Leave sufficient tubing on the discharge side for convenient dispensing of liquid directly into sample containers.
- Select the appropriate length of Teflon intake tubing necessary to reach the specified sampling depth. Attach the intake sampling tube to the intake pump tube.
- Lower the intake tube into the surface water at the specified sampling location to the specified depth; make sure the end of the intake tube does not touch underlying sediments.
- Start the pump and allow at least three tubing volumes of liquid to flow through and rinse the system before collecting any samples. Do not immediately dispense the purged liquid back to the surface water body. Instead, collect the purged liquid and return it to the source after sample collection is complete.
- Fill the specified number of sample containers directly from the discharge line, in accordance with Section 3.2.2.1.
- Drain the pump system, rinse it with deionized water, and wipe it dry. Replace all tubing with new tubing before sampling at another sampling location. Place

all used tubing in plastic bags to be discarded or decontaminated according to the Section 3.12.

3.22 Sediment/Sludge Sampling

The following steps should be taken when preparing for sampling sediment/sludge:

- Don the appropriate personal protective clothing as dictated by the site-specific health and safety plan.
- Select stream/river sampling locations in accordance with the site-specific work plan.
- Prepare sampling site by laying out clean plastic sheeting on the ground or any flat, level surfaces near the sampling area and place equipment to be used on the plastic.
- The samples shall be collected from areas of least to greatest contamination (when known) and, when collecting several samples in 1 day, always collect from downstream to upstream.
- When sampling sediment and surface water from the same surface water body, collect surface water samples prior to sediment samples.

3.22.1 Sediment/Sludge Sample Collection from Shallow Waters

- Use a decontaminated stainless steel or Teflon, long-handled scoop, corer, push tube, or dredge to collect the entire sample in one grab. If wading is necessary, approach the sample location from downstream. Do not enter the actual sample area.
- Retrieve the sampling device and slowly decant off any liquid phase.
- Collect samples in accordance with Section 3.2.2.2.

3.22.2 Subsurface Sediment/Sludge Sample Collection Using a Corer or Auger from Shallow Waters

- At the specified sampling location, force or drive the corer to the specified depth.
- Twist and withdraw the corer in a smooth motion.
- Retrieve the sampling device, remove the corer nosepiece (if possible), and extrude the sample into the specified sampling container(s). Use a clean stainless steel or Teflon spoon or spatula to completely fill the container(s), ensuring no headspace.
- Collect samples in accordance with Section 3.2.2.2.

3.22.3 Sediment/Sludge Sample Collection Using a Dredge from Deep Waters

- Attach a clean piece of 12- to 19-mm (½- to ¾-inch) braided nylon line or Teflon-coated wire rope to the top of the sampler. The line must be of sufficient length to reach sediment or sludge and have enough slack to release the mechanism. Mark the distance to the bottom on the line.

- Attach the free end of the sampling line to a fixed support to prevent loss of the sampler.

- At the specified sampling location, open the sampler jaws and slowly lower the sampler until contact with the bottom (sediments/ sludge) is felt.

- Release tension on the line; allow sufficient slack for the mechanism (latch) to release. Slowly raise the sampler.

- Once the sampler is above the water surface, place the sampler in a stainless steel or Teflon lined tray or pan. Open the sampler.

- Collect samples in accordance with Section 3.2.2.2.

3.22.4 Restrictions/Limitations

Core sampling devices may not be usable if cobbles exist in the sediment/ sludge. Bumping of core sampling devices and Ponar dredge samplers may result in the loss of some of the sample.

For VOC analysis or for analysis of any other compound(s) that may be degraded by aeration grab sampling is necessary to minimize sample disturbance and, hence, analyte loss. The representativeness of this sample, however, is difficult to determine because the collected sample represents a single point, is not homogenized, and has been disturbed.

3.23 Subsurface Soil Sampling

Subsurface soil samples may be collected using a hand auger at depths of up to 10 feet (typical). In such cases, CDM typically performs the boring and collects the samples for analysis. For deeper depths, a drilling subcontractor is typically used to perform a boring and collect subsurface soil samples by split spoon or Shelby tube via rotary drilling methods, or by direct push methods. In such cases, the driller provides the soil samples to CDM, and CDM then collects the laboratory samples.

The following steps should be taken when preparing for subsurface soil sampling:

- Don the appropriate personal protective clothing as dictated by the site-specific health and safety plan.

- Locate sampling location(s) in accordance with project documents (e.g., work plan) and document pertinent information in the appropriate field logbook. When possible, reference locations back to existing site features such as buildings, roads, intersections, etc.
- Processes for verifying depth of sampling must be specified in the site-specific plans.
- Clear away vegetation and debris from the ground surface at the boring location.
- Prepare an area next to the sample collection location for laying out cuttings by placing plastic sheeting on the ground to cover the immediate area surrounding the borehole.

The following general steps must be followed when collecting all subsurface soil samples:

- VOC samples or samples that may be degraded by aeration shall be collected first and with the least disturbance possible.
- Sampling information shall be recorded in the field logbook and on any associated forms.
- Describe lithology, including color, grains size, moisture, odor and other observations.

3.23.1 Manual (Hand) Augering

The following steps must be followed when collecting hand-augered samples:

- Auger to the depth required for sampling. Place cuttings on plastic sheeting or as specified in the site-specific plans. If possible, lay out the cuttings in stratigraphic order.
- Throughout the augering, make detailed notes concerning the geologic features of the soil or sediments in the field logbook.
- Cease augering when the top of the specified sampling depth has been reached. If required, remove the auger from the hole and decontaminate the auger or use a separate decontaminated auger, then obtain the sample.
- Scan sample with organic vapor meter as appropriate.
- Collect samples in accordance with Section 3.2.2.2. Collect VOCs quickly to minimize loss of volatiles.

- When all sampling is complete, dispose of cuttings, plastic sheeting, etc., as specified in the site specific plans.
- Decontaminate all equipment in accordance with Section 3.12

3.23.2 Split-Spoon/Split Barrel Sampling

Note: the first 15 bullets describe activities to be performed by a licensed drilling contractor, not CDM personnel.

The following steps must be followed when collecting split-spoon samples:

- Remove any pavement and subbase material from an area of twice the bit diameter, if necessary.
- The drilling rig will be decontaminated at a separate location prior to drilling.
- Attach the hollow-stem auger with the cutting head, plug, and center rod(s) to the drill rig.
- Begin drilling and proceed to the first designated sample depth, adding auger(s) as necessary.
- Upon reaching the designated sample depth, slightly raise the auger(s) to disengage the cutting head, and rotate the auger without advancement to clean cuttings from the bottom of the hole.
- Remove the plug and center rods.
- If required by the site-specific sampling plan, install decontaminated liners in the splitspoon/split barrel sampler.
- Install a decontaminated split-spoon on the center rod(s) and insert it into the hollow-stem auger. Connect the hammer assembly and lightly tap the rods to seat the drive shoe at the top of undisturbed soil or sediment.
- Mark the center rod in 15-centimeter (6-inch) increments from the top of the auger(s).
- Drive the split-spoon using the hammer. Use a full 76-cm (30-inch) drop as specified by the American Society for Testing and Materials (ASTM) Method D-1586. Record the number of blows required to drive the spoon or tube through each 15-cm (6-inch) increment.
- Cease driving when the full length of the spoon has been driven or upon refusal. Refusal occurs when little or no progress is made for 50 blows of the hammer.

ASTM D1586-99 § 7.2.1 and 7.2.2 defines "refusal" as >50 blows per 6-inch advance or a total of 100 blows.

- Pull the split-spoon free by using upswings of the hammer to loosen the sampler. Pull out the center rod and split-spoon.
- Unscrew the split-spoon assembly from the center rod and place it on the plastic sheeting.
- Remove the drive shoe and head assembly. If necessary, tap the split-spoon assembly with a hammer to loosen threaded couplings.
- With the drive shoe and head assembly off, open (split) the split-spoon, being careful not to disturb the sample.
- Scan sample with organic vapor detector as appropriate.
- Collect samples in accordance with Section 3.2.2.2. Collect VOCs quickly to minimize loss of volatiles.
- When all sampling is complete, dispose of cuttings, plastic sheeting, etc., as specified in the site specific plans.
- Decontaminate all equipment in accordance with Section 3.12.

3.23.3 Direct Push Drilling

Note: The first six bullets describe activities to be performed by a licensed drilling contractor, not CDM personnel.

- Decontaminate equipment.
- Install acetate sleeve in direct push sampler (no acetate sleeve required for split spoon).
- Drive samples from the surface to the desired depth, using either 4-foot or 5-foot long direct push samplers, or 2-foot split spoons.
- Use discrete interval sampling (sampler end is plugged while driving to top of desired sample interval to exclude soil from non-desired depths) when appropriate (for example, deeper than 8 feet or below the water table).
- At top of sampling interval, release plug (if used) and drive sampler across desired sample interval.
- Retrieve sample and provide to CDM.

- Cut open acetate sleeve with two parallel slices, scan with organic vapor meter as appropriate.
- Collect samples in accordance with Section 3.2.2.2.
- At the conclusion of the boring, grout the borehole and decontaminate equipment in accordance with Section 3.12.

3.23.4 Restrictions/Limitations

- Basket or spring retainers may be needed for split-spoon sampling in loose, sandy soils.

3.24 Surface Soil Sampling

The following steps must be followed when preparing for sample collection:

- Don the appropriate personal protective clothing as dictated by the site-specific health and safety plan.
- Locate sampling location(s) in accordance with project documents (e.g., work plan) and document pertinent information in the appropriate field logbook. When possible, reference locations back to existing site features such as buildings, roads, intersections, etc.
- Processes for verifying depth of sampling must be specified in the site-specific plans.
- Carefully remove vegetation, stones etc. from the ground surface to expose soil.
- Pace clean plastic sheeting on a flat, level surface near the sampling area, if possible, and place equipment to be used on the plastic; place the insulated cooler(s) on separate plastic sheeting.
- A clean, decontaminated trowel, scoop, or spoon will be used for each sample collected. Other equipment may be used (e.g., shovels) if constructed of stainless steel.
- Surface soil samples are normally collected from the least contaminated to the most contaminated areas, if known.
- Document the sampling events, recording the information in the designated field logbook. Document any and all deviations from SOPs in the field logbook and include rationale for changes.
- Collect samples in accordance with Section 3.2.2.2.
- Decontaminate sampling equipment in accordance with Section 3.12.

3.25 Water Level/NAPL Measurement

Water levels can be measured by several instruments. The three most common are covered here - electric water level meter (measures depth to water only), interface probe (measures depth to water and depth to non-aqueous phase liquid) and pressure transducer (typically used to measure depth to water for long term monitoring or aquifer testing).

3.25.1 Procedures for Use of Water Level Meter

- Standing upwind of the well, open the well head and monitor with organic vapor meter as dictated by the site-specific health and safety plan.
- Check that water level meter is functioning correctly (test button, or immerse probe in tap water to test).
- Lower probe slowly into well until contact with water surface is indicated (tone and/or light).
- Slowly raise and re-lower probe until a precise, repeatable depth to water can be measured.
- Record the depth to water from the measuring point of known elevation, usually marked at the top of the casing. If no mark is present, measure from the highest point of the casing or as otherwise instructed in the site-specific work plan.
- Remove and decontaminate probe, secure well.

3.25.2 Procedures for Use of Interface Probe

The interface meter is used to measure the depth to water and the depth to non-aqueous phase liquid (light and/or dense).

- Standing upwind of the well, open the well head and monitor with organic vapor meter as dictated by the site-specific health and safety plan.
- Check that the interface level meter is functioning correctly (test button, or immerse probe in tap water and NAPL to test).
- Lower probe slowly into well until contact with water or NAPL surface is indicated. Water is typically indicated by a steady tone; NAPL is typically indicated by a beeping tone - check manufacturer's specifications.
- Slowly raise and re-lower probe until a precise, repeatable depth to water/NAPL can be measured.
- Record the depth to water/NAPL from the measuring point of known elevation, usually marked at the top of the casing. If no mark is present, measure from the

highest point of the casing or as otherwise instructed in the site-specific work plan.

- Measurement of interface depth between LNAPL and water: For LNAPL, the non-aqueous phase is floating on top of the water column, and the probe must be lowered through the NAPL before encountering water. In this case, shake the probe after water is encountered to help dislodge any NAPL droplets stuck to the probe. Then raise the probe slowly until it re-enters the NAPL. Perform this procedure until a repeatable result is obtained. The interface depth should be recorded in the up direction, never the down direction. When the probe is moving down, past the LNAPL, it may still be coated with product and can therefore yield misleading results. Therefore, it must be shaken in the water and raised to the interface for an accurate result. Record depth from measuring point, per item 5 above.

- Measurement of interface depth between DNAPL and water: For DNAPL, the non-aqueous phase is at the bottom of the well, below the water column. Lower the probe until NAPL is encountered. Then raise the probe, shake it in the water to dislodge any NAPL droplets, and lower it again. Perform this procedure until a repeatable result is obtained. The interface depth should be recorded in the down direction, never in the up direction. When the probe is moving up from the DNAPL it may still be coated with product and can therefore yield misleading results. Therefore, it must be shaken in the water and lowered to the interface for an accurate result. Record depth from measuring point, per item 5 above.

- Remove and decontaminate probe, secure well.

3.26 Tap Water Sampling

Tap water sampling may be performed in residential, commercial or industrial areas for several reasons. The most common tap water samples are used to obtain groundwater samples from private wells.

- Obtain permission to access the property and collect samples.

- Obtain the name(s) of the resident(s) or water supply owner/operator, the exact mailing address, and telephone numbers. This information is required to obtain access to the property to be sampled and to submit a letter of introduction to the owner/representative.

- Determine the location of the tap to be sampled based on its proximity to the water source. It is preferable that the tap water sampling be conducted at a tap located prior to any holding or pressure tanks, filters, water softeners, or other treatment devices that may be present.

- If possible, obtain well construction details, holding tank volumes etc. to evaluate standing volume of water in the system.

- If the sample must be collected at a point in the water line beyond a pressurization or holding tank, a sufficient volume of water should be purged to provide a complete exchange of fresh water into the tank and at the location where the sample is collected. If the sample is collected from a tap or spigot located just before a storage tank, spigots located inside the building or structure should be turned on to prevent any backflow from the storage tank to the sample tap or spigot. It is generally advisable to open as many taps as possible during the purge, to ensure a rapid and complete exchange of water in the tanks.

- Samples collected to determine if system related variables (e.g., transmission pipes, water coolers/heaters, holding/pressurization tanks, etc.) are contributing to the quality of potable water should be collected after a specific time interval (e.g., weekend, holiday, etc.). Sample collection should consist of an initial flush, a sample after several minutes, and another sample after the system has been purged.

- Devices such as hoses, filters, or aerators attached to the tap may harbor a bacterial population and therefore should be removed prior to sampling.

- Sample containers should not be rinsed before use when sampling for bacterial content, and precautions should be taken to avoid splashing drops of water from the ground or sink into either the bottle or cap.

- Samples of the raw water supply and the treated water after chlorination should be collected when sampling at a water treatment plant.

- In the logbook, record the location and describe the general condition of the tap selected for sampling. The rationale used in selecting the tap sampling location, including any discussions with the property owner, should also be recorded. Provide a sketch of the water supply/distribution system noting the location of any filters or holding tanks and the water supply source (i.e., an onsite groundwater well or surface water intake or a water service line from a public water main). If an onsite water supply is present, observe and record the surrounding site features that may provide potential sources of contamination to the water supply.

- Don the appropriate personal protective clothing as dictated by the site-specific health and safety plan. Gloves should be changed between sampling locations to avoid possible cross-contamination of the tap water samples.

- Prior to sample collection, the supply system should be purged by turning the cold-water tap on. The following general guidelines should be followed to determine when the system is adequately purged (refer to the site-specific sampling plans for any other requirements):

- Onsite Water Supply. A minimum of three standing volumes of water (i.e., the static volume of water in the well and holding tank, if present) should be purged. Obtain water temperature, conductivity, and pH measurements after each volume of water is purged. If the standing volume of water in the supply system is unknown, the tap should be allowed to run for a minimum of 15 minutes and temperature, conductivity, and pH measurements, or other parameters as specified by the project plan, should be collected at approximately 3- to 5-minute intervals. (In general, well construction details and holding tank volumes should be obtained prior to conducting the sampling event to estimate the standing volume of the water supply system.) The system is considered adequately purged when the temperature, conductivity, and pH stabilize within 10 percent for three consecutive readings. If these parameters do not stabilize within 15 minutes, then purging should be discontinued and tap water samples may be collected.

- Large Distribution Systems. Because it is impractical to purge the entire volume of standing water in a large distribution network, a tap should be run for a minimum of 5 minutes, which should be adequate to purge the water service line. Obtain temperature, conductivity, and pH measurements at approximately 1-minute intervals. The system is considered adequately purged when the temperature, conductivity, and pH readings, or other parameters as specified by the project plan, stabilize within 10 percent for three consecutive readings. If these parameters do not stabilize within 5 minutes, then purging should be discontinued and tap water samples may be collected. During purging, a 5-gallon bucket and stopwatch may be used to estimate the flow rate if required by the site-specific plans. Dispose the purged water according to the site-specific plans. Record the temperature/conductivity/pH readings, or other parameters as specified by the project plan, the volume of water purged, the flow rate if measured, and the method of disposal in the field logbook.

- After purging the supply system, collect the samples directly from the tap (i.e., if a hose was used for purging, the hose should be disconnected prior to sampling). Any fittings on the end of the faucet that might introduce air into the sample (i.e., a fine mesh screen that is commonly screwed onto the faucet) should be removed prior to sample collection also.

- Obtain a smooth-flowing water stream at moderate pressure with no splashing. Collect samples in accordance with Section 3.2.2.1. chain-of-custody forms.

3.26.1 Restrictions/Limitations

To protect the sample from contamination on the exterior of a tap, a tap should not be chosen for sampling if any of the following conditions exist:

- A leaky tap allowing water to flow out from around the stem of the valve handle and down the outside of the faucet.
- A tap located too close to the bottom of the sink or the ground surface.
- A tap that allows water to run up on the outside of the lip.
- A tap that does not deliver a steady stream of water. A temporary fluctuation in line pressure may cause sheets of microbial growth, lodged in some pipe sections or faucet connections, to break loose.

Careful sampling for VOC analysis, or for any other compound(s) that may be degraded by aeration, is necessary to minimize sample disturbance and, hence, analyte loss.

3.27 Sample Handling, Packaging, and Shipping

The shipping containers (coolers or shuttles) will be provided by the laboratory providing the analysis. These containers, once filled, will be secured with fiber tape, wrapped entirely around the container and will either be delivered directly to the Con Edison laboratory in Astoria Queens by the field crew or picked up by a laboratory provided courier. Consequently, the strict packaging, labeling and shipping of hazardous wastes and substances requirements set forth by the U.S. Department of Transportation (DOT) under CFR 49 will not be necessary. However, the following sample packaging procedures will be followed to guard against sample breakage and to maintain chain-of-custody.

- Check to ensure that the sample is properly filled; tighten cap securely.
- Enclose and seal sample containers in a clear plastic bag.
- Place freezer packages or ice in large ziplock plastic bags and place the bags in a sample cooler so that ice is not in direct contact with sample bottles. Sufficient ice will be added to cool the samples to 4°C.
- Pack noncombustible, absorbent vermiculite around bottles and ice to avoid sample breakage during transport.
- Complete Chain-of-Custody Records and other shipping/sample documentation including air bill numbers for each shipment of samples using a ballpoint pen. Seal documentation in a waterproof plastic bag and tape the bag inside the shipping container under the container lid. Include a return address for the cooler.
- Close the container and seal it with fiber tape and custody seals in such a manner that the custody seals would be broken if the cooler were opened.

3.28 Rock Coring

The rock core will be collected as follows:

- Decontaminate all equipment in accordance with Section 3.12 of the generic QAPP.
- Advance borehole to the desired depth using auger, rotary, air hammer or other drilling method, as appropriate.
- Install a steel casing in the borehole and grout it in place. Casing must be set into competent bedrock. Let the grout set for a minimum of 12 hours.
- Collect core (using specified core barrel) in accordance with ASTM D2113-06, as appropriate for site conditions.
- Record penetration rate.
- Record any fluid loss and depth of loss.
- Place core in new, sturdy, wooden, core boxes.
- Clearly label boxes with borehole number and depth.
- Drilling/coring induced breaks should be marked with 3 parallel lines across the break.
- Photograph full core box, with hole's number and depths clearly visible in the photo.
- Record core data including rock type, fractures and other pertinent information.
- Determine Rock Quality Designation (RQD) for each core run:

$$\text{RQD} = \frac{\text{the total length of core pieces greater than four inches long}}{\text{total core run}}$$

- Measure core lengths along the center line of the core.
- Do not count core pieces that are not "hard and sound" as part of the RQD; however, record such lengths separately.
- Core breaks known to be induced by drilling or core handling should be fitted together and counted as one piece when determining RQD.

3.29 Packer Testing

Packer testing is performed to obtain groundwater samples from discrete intervals within a larger open borehole in bedrock. A dual straddle packer system or single packer system can be used, as appropriate. The single packer is often used when collecting a groundwater sample from near the bottom of the borehole. Inflatable packers, with a submersible pump between the packers (or below the single packer) are typically used. Geophysical logging can be used prior to packer testing to design the packer interval. If packer testing occurs concurrent with drilling, then a single packer is typically used at progressively deeper depths.

Packer testing will be conducted as follows:

- Decontaminate all down hole equipment in accordance with Section 3.12 of the generic QAPP.
- Assemble packer(s) lift pipe and pump. If a straddle packer system will be used, assemble packers at desired spacing.
- Lower packer assembly to desired depth.
- Measure static water level using a water level indicator.
- Inflate packers with nitrogen, with sufficient pressure to seal against borehole wall.
- Calculate volume of water in packer zone and lift pipe using Table 3-5.
- Begin purging with submersible pump; record totalizer readings and flow rates. Dispose/contain water as appropriate for the site.
- Monitor water quality parameters if appropriate.
- Collect water sample based upon volume of water pumped and/or water quality parameters.
- Deflate packers.
- Move system to next test zone or remove from borehole, as appropriate.

3.30 Aquifer Performance Test

Aquifer performance tests are typically performed to characterize the hydraulic properties of wells and aquifers. Properties evaluated include specific capacity, hydraulic conductivity, transmissivity and storativity.

3.30.1 Continuous Background Monitoring

- Baseline groundwater level measurement data will be used to evaluate the effects of outside influences (i.e., influences other than the proposed pump test withdrawal) on groundwater levels. These influences will then be considered when analyzing the pump test data.
- Groundwater level data will be recorded with electronic data loggers at selected well, at 30-minute intervals.
- The loggers will be synchronized to record water levels at the same time.
- A synoptic round of water levels will be made at the wells prior to installing the transducers. After the transducers have been installed and recording has been started, a second round of synoptic water levels will be collected on the day of transducer installation to confirm proper data recording.
- A third round of manual groundwater level measurements will be collected from continuous monitoring points and any other existing wells just prior to beginning pump testing to:

  1) confirm proper data recording by transducers and

  2) obtain a broader baseline groundwater level data set.
- Groundwater level data will also be downloaded from data loggers at this time, saved to electronic media, and reviewed to confirm that groundwater levels have stabilized.
- Precipitation and barometric pressure data will be obtained for the APT period from the local weather station (within approximately 5 miles of the project).

3.30.2 Step Drawdown Test

The step drawdown test (or step test) is required to determine the specific capacity and short term yield of the recovery well and select the pumping rate for the long-term pump test.

- During the test, continuous groundwater levels at the pumping well and select observation points will be recorded logarithmically. An example of a logarithmic schedule is provided below.

Table 3-6
Step Drawdown Test Logarithmic Schedule

Log Cycle	*Elapsed Time*	*Sample Interval*	*Points/Cycle*
1	0-20 seconds	0.2 second	101
2	20-60 seconds	1 second	40
3	1-10 minutes	10 seconds	54
4	10-100 minutes	2 minutes	45
5	100-480 minutes	10 minutes	38

- The drawdown-time data shall be plotted semi-logarithmically.
- The drawdown (y-axis) shall be plotted on a linear scale and time (x-axis) shall be plotted on a logarithmic scale. The drawdown curves shall be extrapolated to the specified time of the proposed long-term test. The rate that results in the maximum drawdown without dropping the water level below the design pumping level within the time period of the long-term test shall be considered the flow rate to be used for the long-term test.
- The specific capacity versus pumping rate should also be plotted to determine if excessive well losses occur at the selected rate.
- A variable rate submersible pump capable of operating across the above flow range will be used to complete testing. A vertical check valve will be placed on the discharge line immediately above the pump. A one-inch diameter polyvinylchloride line will be placed in the well, with the open, bottom end extending to within one foot of the pump. This one-inch line will be used as the stilling pipe for the water level transducer.

After the pumping equipment is installed, the following testing steps will be followed:

- *Step 1* - Connect a flow meter, valve, and sample port to the pump discharge line. Extend the pump discharge line from the pumping well to the existing groundwater treatment system influent sump using flexible, chemical-resistant pipe/hose (e.g., garden hose, polyethylene pipe).
- *Step 2* - Measure and record the static groundwater level reading in the pumping well.
- *Step 3* – Start log cycle for select transducers, and initiate pumping. Set to initial flow rate (Step 1) using the valve (or variable-speed controller). Record the stabilized flow rate and start time for pumping. Confirm proper operation of the pumping well transducer. Confirm that significant leaks are not present along

the above-ground hose/pipe line extending between the pumping well and the influent sump.

- *Step 4* - Monitor the groundwater level in the pumping well using the transducer, and collect manual groundwater level measurements at monitoring points at ± 20 minute intervals.

- *Step 5* - After approximately two hours, calculate the specific capacity of the well (flow/drawdown [gpm/ft]), estimate the maximum well yield based upon the calculated capacity and pump depth, and increase the pumping rate to approximately 50 percent (%) of the calculated maximum yield (Step 2). If 50% of the yield has already been exceeded, adjust the rate to approximately 75% of the yield. Record the flow rate and adjustment time. Confirm proper operation of the pumping well transducer.

- *Step 6* - Monitor the groundwater level in the pumping well using the transducer, and collect manual groundwater level measurements at monitoring points at ± 20 minute intervals.

- *Step 7* - Repeat Steps 5 and 6 for up to two additional steps at approximately 75% and 95% of the maximum well yield (Steps 3 and 4). Be careful not to drop the water level below the top of the pump.

- *Step 8* - Shut off the pump at the end of the last step test (after 4 tests and 8 hours, maximum), and download the groundwater level data from all transducers. Also collect manual groundwater level measurements at approximately 20 minutes and 40 minutes after terminating pump operation. Leave the transducers in place.

3.30.3 Long-Term Constant Rate Test

The long-term constant rate test (72-hour pump test) will be performed at the pumping well on the day after completion of the step test, assuming groundwater levels have recovered to 90% of baseline values. The 72-hour pump test will not commence until this condition is met or a minimum of 72 hours have elapsed since the termination of the step testing. The step test results will be reviewed in advance and used to select the pumping rate for this test, which will equate to approximately 50 to 75% of the calculated short-term, maximum well yield.

- During this test, continuous groundwater levels at the pumping well and select observation points will be recorded logarithmically. An example of a logarithmic logging schedule is provided below.

Table 3-7
Long Term Constant Rate Test Logarithmic Schedule

Log Cycle	*Elapsed Time*	*Sample Interval*	*Points/Cycle*
1	0-20 seconds	0.2 second	101
2	20-60 seconds	1 second	40
3	1-10 minutes	10 seconds	54
4	10-100 minutes	2 minutes	45
5	100-480 minutes	10 minutes	38

The following testing steps will be followed:

- *Step 1* – Manually measure groundwater levels in recovery well and all observation points prior to initiating pumping.
- *Step 2* – Start log cycle for transducers, and initiated pumping at the pre-determined rate by adjusting the valve (or variable-speed controller). Record flow rate and start time. Also check proper data recording at the pumping well transducer.
- *Step 3* - Collect manual groundwater level measurements at 20 minute intervals until drawdown begins to stabilize. Also check pump flow rate and adjust valve as necessary to maintain a constant pumping rate until stabilization (difference between consecutive measurements less than 10%).
- *Step 4* - Perform manual groundwater level measurements and flow rate checks/adjustments at one-hour intervals after the system has approached stabilization. Download and review pressure transducer data at 6-hour intervals to confirm proper data recording and observe data trends.
- *Step 5* - Stop pumping after 72 hours have elapsed, and record time. Leave the transducers in place. Download and review pressure transducer data at 6-hour intervals to confirm proper data recording and observe data trends.

3.30.4 Recovery water level measurement

- Initiate a new log cycle for the transducers immediately upon termination of the constant-rate pumping test.
- Continuous groundwater levels at the pumping well and select observation points will be recorded logarithmically.

- Leave the transducers in place to record continuous groundwater level data until:

  1) the groundwater level at the pumping well has recovered to 90% of its baseline value or

  2) 72 hours (minimum) have elapsed since termination of pump testing.

3.30.5 Discharge Water Management

The water pumped from the well shall be discharged and managed following the plan specific to the project.

3.31 Pre-Packed Direct Push Well Installation

A subcontracted driller will perform the well installation. CDM will oversee the fieldwork.

- Wells will be constructed of a pre-packed 2.5 inch OD (1 inch ID) slotted PVC well screen (pre-packed with sand and stainless steel mesh) and 1-inch ID, schedule 40 PVC riser casings. The pre-packed well screens are manufactured prior to mobilization.
- Thread the drive cap onto the top of the 3.25 inch OD probe rod and advance the drive rod using either the hydraulic hammer or hydraulic probe mechanism.
- Advance the drive rod to the target depth using the hydraulic hammer. Add additional probe rods as necessary to reach the specified sampling depth.
- Lower the well assembly into the probe rod string with threaded PVC riser pipe to the bottom of the probe rod string.
- Install a sand filter around the well screen to directly above the screen. Grain size of the sand will be appropriate for the slot size of the screen (normally 0.01-inch). Retract the probe rods to a point above the screen.
- Install 2-foot grout penetration seal using "00" gravel or bankrun sand.
- Insert a tremie pipe and backfill the remainder of the hole with bentonite-cement grout until it flows at the surface.
- Square cut the well pipe below grade.
- Install protective flushmount casing around new well.

3.32 Membrane Interface Probe (MIP)

In order to provide a screening-level characterization of VOC contamination in subsurface soil in both the vadose and saturated zones, CDM will utilize a MIP to obtain qualitative, depth-continuous, relative instrument response data for VOCs and electrical conductivity data in the subsurface soil. The MIP data will be used to establish an instrument response gradient in subsurface soils to identify "hot spots" for sampling during the soil boring investigation.

- The MIP utilizes a truck-mounted photo-ionization detector (PID), flame-ionization detector (FID), and an electron-capture devise (ECD).

- The 1.5-inch diameter MIP will be pushed into the subsurface at a penetration rate of approximately 1-foot per minute. The tip of the probe contains a thermister, which provides a heat source to volatilize VOCs. The gasses that are produced pass into the probe through a permeable membrane and enter a sampling loop. The gasses then are transported to the surface and pass through the PID, FID, and ECD. The MIP will produce a response to all compounds that:

  1) Volatilize sufficiently to diffuse through the MIP probe membrane,

  2) are carried to the detector in the carrier gas, and

  3) produce a response on one or more of the detectors (PID, FID, and ECD).

The total response for each detector is related to the total contaminant concentration and the relative response of the detector to the compounds in the carrier gas stream. Therefore, the MIP is considered to produce qualitative data.

A number of "performance checks" have been incorporated into the MIP screening program to provide a basis for evaluating MIP performance during subsurface soil screening activities. The following performance checks will be used during the MIP screening activities:

- <u>Ex situ response check</u> - This performance check will be used to test the response of the probe to a known concentration of a target contaminant in a test cell. This check will be performed in accordance with Geoprobe® Systems Technical Bulletin MK3010 (Geoprobe® 2003)

- <u>Reproducibility check</u> - This performance check includes performance of a replicate push within 5 to 10 feet of a selected push. The MIP profiles for the replicate locations will be compared to assess the reproducibility of the data. As a guideline, MIP responses that are within one order of magnitude will be considered to be reasonable evidence of reproducibility.

- Ex situ response checks will be run at the following times:

  - at the start of each day

- if more than 3 hours elapses between the last response check and the next logging run

- if the MIP probe, membrane, trunk line, dryer, probe rod, or any major components of the MIP system are repaired or replaced.

- Replicate MIP profiles will be run on approximately 1 in 20 samples.

Performance check results will be reviewed for each sample lot to evaluate MIP performance. If MIP performance issues are identified, the MIP subcontractor will take corrective actions to remedy the issues.

3.32.1 MIP Procedure

Prior to initiating any field activities, the field team will review and discuss, in detail, the HASP and any appropriate background documentation. All monitoring and protective equipment will be thoroughly checked at this time. All underground and overhead utilities and structures which may interfere with the progress of the work will be located prior to the commencement of subsurface drilling activities.

- The MIP soil screening will be conducted using a Geoprobe® rig or equivalent direct push rig (as discussed above) and will follow the general drilling procedures outlined in Section 3.23.3.

- At each location the direct push rig will continuously collect data on the lithology and the VOC contamination.

- The MIP technology will provide a continuous depth qualitative readout of VOC concentrations. This probe will be used until the final depth is reached.

- The MIP subcontractor will provide CDM with an electronic data file of each push containing qualitative VOC readings and electrical conductivity readings.

- The screening point boreholes will be tremie-grouted with a cement-bentonite mixture after all sampling has been completed and the boring locations will be restored to pre-existing conditions.

3.33 Fish Sampling

Fish samples will be collected from an adequate number of locations in order to characterize and address project objectives, or as directed by the NYSDEC.

- Samples will be collected using site-specific common fisheries techniques (e.g., seine net, electroshocking, etc.).

- During each investigation, species representative of the site or individual location (i.e., dominant taxa, high percentage of total biomass, etc.) will be targeted for analysis.
- The age and/or trophic level of species and other pertinent sampling design information will be decided after consultation with the NYSDEC.
- Upon capture, sampling crews will taxonomically identify fish retained for analysis and record the weight and total length of representative individuals.
- In order to satisfy analytical requirements, it may be necessary in specific cases (e.g., minnow species) to composite samples consisting of an individual species. When required, the total number of individuals and total weight of the composite will be noted.
- After processing, individual samples will be wrapped in aluminum foil, placed in re-sealable plastic bags and placed on wet or dry ice.
- Samples will be shipped via overnight delivery (see Section 3.27) to the subcontracted analytical laboratory for the analyses specified in the site specific Work Plan.

3.34 Benthic Macroinvertebrate Sampling

Benthic macroinvertebrate (benthos) samples will be collected from an adequate number of locations in order to characterize and address project objectives, or as directed by the NYSDEC.

- Samples will be collected using site-specific sampling techniques (e.g., kick net, surber sampler, etc.).
- During each investigation, species representative of the site or individual location (i.e., dominant taxa, high percentage of total biomass, etc.) will be targeted for analysis. Pertinent sampling design information (e.g., sample size, etc.) will be decided after consultation with the NYSDEC.
- As samples are collected they will be placed into a clean sample vessel (e.g., stainless steal bucket, high density polyethylene bucket, etc.) for sorting.
- Representative species retained for analysis will be taxonomically identified to Order.
- Due to analytical requirements, all samples will consist of a given number of individuals composited together until the proper sample mass is achieved.

- After processing, individual samples will be placed into the appropriate sample container, placed in re-sealable plastic bags and placed on wet ice or dry ice.
- Samples will be shipped via overnight delivery (see Section 3.27) to the subcontracted analytical laboratory for the analyses specified in the site specific Work Plan.

Section 4
Instrument Procedures

4.1 Photoionization Detector

4.1.1 Introduction

This Standard Operating Procedure (SOP) is specific to the HNu PI 101 and the Thermal Environmental Organic Vapor Monitor (OVM) PID. These portable instruments are designed to measure the concentration of trace gases in ambient atmospheres at industrial and hazardous waste sites and are intrinsically safe. The analyzers employ PIDs.

The PID sensor consist of a sealed ultraviolet light source that emits photons which are energetic enough to ionize many trace species (particularly organics) but do not ionize the major compounds of air such as O_2, N_2, CO, CO_2, or H_2O. An ionization chamber adjacent to the ultraviolet lamp source contains a pair of electrodes. When a positive potential is applied to one electrode, the field created drives any ions, formed by absorption of UV light, to the collector electrode where the currents (proportional to concentration) are measured. One major difference between a flame ionization detector (FID) and a PID is that the latter responds to inorganic compounds as well as non methane type organic compounds.

To assess whether the instrument will respond to a particular species, the ionization potential (IP) should be checked. If the IP is less than the lamp energy, or, in some cases, up to 0.2-0.3 electron volts (ev) higher than the lamp energy, instrument response should occur. For example, hydrogen sulfide (IP = 10.5 ev) may be detected with a 10.2 ev lamp, but butane (IP 10.6 ev) will not be detected.

4.1.2 Calibration

Qualified personnel trained in calibration techniques for all field items perform calibration of all CDM field equipment. When a field instrument that requires calibration is obtained from the equipment room, the unit will display a calibration tag denoting the date when the instrument was last calibrated and/or maintained. All field instruments are calibrated each time they leave the equipment facility for a site. A maintenance file is kept for each calibrated field item.

PID and FID detector type instruments come with field calibration kits. A field calibration kit would be used if the instrument is to be kept out at the site for extended periods of time, or if the instrument endures prolonged environmental extremes. In either case, a calibration check standard could be introduced in the instrument to verify its accuracy. If an instrument will not calibrate or shows improper field operation, it should be sent back to the office, and another instrument reissued.

Field personnel should not try to maintain the instruments in the field. If long sampling program is required, be prepared to take more equipment for backup in case of instrument failure. Records and procedures of all calibration techniques are on file at the CDM equipment management facility in Ten Cambridge Center, Cambridge, Massachusetts.

With the instrument fully calibrated, it is now ready for use. Any results obtained should be reported as parts per millions (ppm) as isobutylene. If you need to convert these numbers based on a benzene standard, HNu offers a conversion table which is available from CDM. Important instrument specifications for each PID detector are listed as follows.

HNu PI 101 Performance	OVM Model 580A
Range - 0.1 to 2000	0 - 2000
Detection limit 0.1 PPM	0.1 PPM

HNu PI 101 Power Requirements	OVM Model 580A
Continuous use, battery >10 hours	8 hours
Recharge time, max >14 hours, 3 hours +	8 hours
NiCd Battery	Gel Cell Battery

Unit can be operated on battery charger.
Both units provide protection circuitry for the battery. This prevents deep discharging of the battery and considerably extends the battery life.

4.1.3 HNu PI 101

4.1.3.1 Procedure

- Before attaching the probe, check the function switch on the control panel to make sure it is in the off position. The 12-pin interface connector for the probe is located just below the span adjustment on the face of the instrument. Carefully match the slotted groove on the probe to the raise slot on the 12-pin connector on the control panel. Once in line, twist the outer ring on the 12-pin connector until it locks into position (a distinct snap noise will be felt when in place).

- Turn the function switch to the battery check position. The needle on the meter should read within or above the green battery arc on the scaleplate. The battery, if needle falls below the green arc, should be recharged before any measurements are taken. If the read LED on the instrument panel should come on, the battery needs charging and the unit cannot be operated without a charger.

- If the battery is functioning properly, turn the function switch to the STANDBY position. If the needle on the instrument does not read 0, then turn the knob on the instrument panel until the needle deflects to the zero point on the meter.

- Once the zero is confirmed, turn the function switch to the 0-20 position. At this point, the needle will read approximately 0.5 ppm. This reading is normal background for ambient air. For CDM health and safety reasons, the HNU PI 101 should be operated on this range to insure maximum sensitivity in the work area. The unit, however, has 2 other ranges (0-200), (0-2000) should monitoring be required for other purposes such as headspace analysis etc. where readings could exceed the 0-20 ppm range.

4.1.3.2 Limitations

- AC power lines (high-tension lines), or power transformers can interfere with the instruments performance. This situation can be confirmed by noting a deflection of the meter while in the STANDBY position.

- Environmental factors such as humidity, rain and extreme cold can limit the instrument performance. To verify the "water sensitivity" condition, gently blow in the hole at the end of the probe. If the needle deflects positively (on the 0-20 position) by 2 ppm or more, water sensitivity problem exists and the unit should be brought into the warehouse for service. HNU PI 101 should be kept out of the rain as much as possible or covered. This will insure longer operating times with less false positive readings.

- Quenching the detector can limit the instrument performance. This occurs when a compound such as methane at a very high concentration is introduced to the detector. The concentration is so high that the unit does not respond at all or gives a negative reading.

4.1.4 OVM 580A

4.1.4.1 Procedures

- With the unit being fully calibrated before receiving it, you are ready for operation. Located on the right hand side of the unit is a panel. Slide this panel off of the unit. Inside there is a switch that supplies power to the LCD portion of the instrument. Turn this switch on and replace the panel. On the top of the OVM, there is an instrument panel. Locate the on/off switch and turn the unit on. This switch activates the lamp as well as the pump. Turn this switch off when the instrument is not in use, but leave the internal switch on.

- The unit is now in the operation mode with all readings shown on the LCD display. Options for the OVM 580A include automatic recording and alarm settings. Should any options be required, they can be set up before the instrument leaves the CDM equipment warehouse.

  Warning signals associated with the OVM include a Low Battery signal. A flashing B will appear in the left-hand corner of the bottom line of the display when the 580A is in the RUN mode. If a gas concentration >2000 ppm is detected by the OVM, the top line of the display will show OVERRANGE. Once this occurs, the instrument will "lock out" until the unit is brought to a clean area. A clean area is described as an area where the concentration of organic vapors is below 20 ppm.

4.2 pH Meter

4.2.1 Introduction

pH is the negative logarithm of the effective hydrogen ion concentration (or activity) in gram equivalents per liter used. This expresses both acidity, and alkalinity on a scale whose valves run from 0 to 14. Number 7 represents neutrality, and numbers greater than 7 indicate increasing alkalinity while numbers less than 7 indicate increasing acidity. pH is one of the most commonly analyzed parameters. Water supply treatments such as neutralization, softening, disinfection and corrosion control are all pH dependent. CDM has a variety of pH monitoring instruments in the equipment warehouse.

4.2.2 Orion SA 250 pH Procedures

With the instrument fully calibrated, it is now ready for use. Follow the check out procedures:

- Slide power switch to on position. Attach BNC shorting plug to BNC connector on top of meter.
- If LO BAT indicator on LCD remains on, the battery must be replaced.
- Slide mode switch to mV. Display should read 0 ± .3.
- Slide mode switch to TEMP. Display should read 25.0. If 25.0 is not displayed, scroll using, and X10 keys, until 25.0 is displayed and press enter.
- Slide mode switch to pH .01. Press iso. Display should read the letters ISO, then a value of 7.000. If 7.000 is not displayed, scroll until 7.00 is displayed and press enter.
- Press slope. Display should read the letters SLP, then a value of 100.0. If 100.0 is not displayed, scroll until 100.0 is displayed and press enter.
- Press sample. Observe the letters pH, then a steady reading of 7.00, ±0.02 should be obtained. If not, press CAL and scroll until 200 is displayed and press enter. Press sample and observe a reading of 7.00.
- Remove the shorting plug. After completing these steps, the meter is ready to use with an electrode.
- Attach electrodes with BNC connectors to sensor input by sliding the connector onto the input, pushing down and turning clockwise to lock into position.

Connect reference electrodes with pin tip connectors by pushing connector straight into reference input.

- Put the temperature probe in the sample and let it stabilize.
- Once temperature is stable, set the unit to read pH (by 0.1 or 0.01) and take a reading in the aqueous sample. (Remembering first to remove the cap on the end of the pH probe.)

4.2.3 Model Tripar Analyzer Procedures

With the instrument fully calibrated, it is now ready for use:

- Connect the pH probe's BNC input connector to the front of the Tripar.
- Put the pH/mV switch on the pH position.
- Turn the parameter display selection switch to TEMP.
- Plug in the gray temperature plug jack in the input temperature sensor connector.
- Put end of temperature probe in the sample.
- Allow the temperature to stabilize.
- Turn the temperature compensation knob to the temperature shown.
- Turn the parameter display selection switch to pH.
- Put pH probe in the aqueous sample (remembering first to remove the cap on the end of the probe). Let it stabilize and record the reading.

4.3 Conductivity Meter

4.3.1 Introduction

Conductivity is a numerical expression of the ability of an aqueous solution to carry an electrical current. This ability depends on the presence of ions in the solution, and their total concentration. Factors such as mobility valence, relative concentration, and temperature also combine to create this occurrence. Solutions of most inorganic acids, bases and salts are relatively good conductors. Organic compounds in aqueous solutions are not good conductors. For example, freshly distilled water has conductivity reading of 0.5 to 2 mhos/cm and increases with time. This increase is caused by absorption of atmospheric carbon dioxide, and to a lesser extent ammonia. While industrial type wastes have conductivity readings of ±10,000 mhos/cm.

4.3.2 Model SCT Procedures

The model 33 SCT has 3 conductivity scales of 0-500, 0-5000, and 0-50,000 mhos/cm. Salinity is scaled 0-40 parts per thousand in a temperature range of -2 to +45^{B}C. Temperature is scaled -2^{B} to +5^{B}C.

With the instrument calibration verified, the unit is now ready for use. The model 33 S-C-T meter face is scaled and calibrated to give an accurate reading of the conductivity of a water sample by measuring the amount of current flow between two fixed electrodes in the probe. The unit also measures salinity in a special range conductivity circuit, which includes a user-adjusted temperature compensator. A precision thermistor in the probe measures temperature by changing its resistance in relation to the temperature of the water.

The start-up procedure is as follows:

- Plug the probe plug receptacle in the side of the meter.
- With the mode select in the OFF position, check to see that the meter needle is centered at the zero mark on the conductivity scale and adjust if necessary.
- Turn the mode control switch to Red Line position.
- Adjust the Red Line control knob so the meter needle lines up with the red line on the meter face. If this cannot be accomplished, replace the batteries. If battery replacement is necessary, use only alkaline "D" cells, as regular carbon zinc batteries will cause errors.
- Place the probe into the solution to be measured.
- Set the mode control to TEMPERATURE. Read the temperature on the bottom scale of the meter in Degrees C. Allow time for the probe temperature to come to equilibrium before taking a reading.
- With the probe in the solution to be tested, adjust the conductivity scale until the meter reading is on scale. (Multiply the reading by the correction on the calibration sticker on the instrument).
- When using the X10 and X100 scales, depress the CELL TEST button. If the reading on the dial moves +2%, the electrode is fouled and needs to be cleaned. Repeat the measurement on another instrument.
- Store the probe in distilled water when not in use.

4.4 Photovac Portable Gas Chromatograph

4.4.1 Introduction

The Photovac portable gas chromatograph (GC) can provide for accurate and specific identification of volatile organic compounds in a field control laboratory.

4.4.2 Equipment Preparation

- The Photovac portable GC should be set up in a sheltered area and, if possible, within a climate controlled area to minimize temperature changes. Do not place the GC near any equipment that causes vibration. A flat table, large enough to accommodate the GC, the printer, a laboratory size oven, and electrical power packs for the GC should be utilized during operation.

- Fill the GC with carrier gas being sure not to pressurize the GC with more than 1500 pounds per square inch (psi) of carrier gas. Check to ensure the pressure of the air feed to the GC column is 40 psi. The carrier gas should contain no more than 2.0 parts per million by volume (ppmV) of total hydrocarbons and not less than 0.1 ppmv of total hydrocarbons. The lower the hydrocarbon concentration the lower the baseline of the GC. A lower baseline minimizes interference of compound identification.

- Install new Teflon septa in the injection port being utilized. The septa should be replaced at the start of each day and after every twenty injections.

4.4.3 Calibration Procedures and Frequency

The Photovac portable GC will be calibrated at the beginning of each day prior to sample analysis.

Gas Standards

Gas standards used to calibrate the GC will be obtained from certified compressed gas cylinders of known concentration. CDM stocks two compressed gas standard cylinders containing the following gases and concentrations:

Cylinder 1

Benzene - 10 ppmv
Toluene - 10 ppmv
Ethyl Benzene - 10 ppmv
M-xylene - 10 ppmv
O-xylene - 10 ppmv
P-xylene - 10 ppmv

Cylinder 2

trans 1,2 Dichloroethylene - 1.05 ppmv
1,1,1 Trichloroethane - 19.3 ppmv
Trichloroethylene - 1.13 ppmv

These gas cylinders were purchased from Scott Specialty Gas Corporation and are certified by Scott to be traceable to NBS standards.

The calibration procedure using these cylinders is as follows:

- A two stage pressure regulator (CGA 350) is attached to the standard gas cylinder to be used.
- A 250 ml glass sampling bulb, determined clean by injecting a volume of air obtained from the bulb onto the GC (described later), is labeled and attached to the effluent port of the second stage of the gas regulator. The Teflon stopcocks of the sampling bulb are opened.
- The sample cylinder valve is opened and the first stage of the regulator is pressurized.
- Slowly the diaphragm valve controlling the gas flow entering the second stage is opened until the pressure reads 2 psig.
- The valve allowing the gas to exit the second stage of the regulator is opened until the gas can be heard escaping from the regulator and passing through the glass sample bulb. Purge the bulb for approximately ten seconds. Close the Teflon stopcock located at the discharge end of the sampling bulb, then, the stopcock closest to the regulator. In this way the calibration gas is collected at the same pressure as the delivery pressure of the second stage of the regulator.
- Using a gas tight 1 ml syringe, extract approximately 500 microliters (µl) of the calibration gas from the glass bulb and purge the volume of gas into the atmosphere. Repeat this step.
- Place the syringe needle in the glass bulb. Pull the syringe plunger back approximately 500 µl of calibration gas enters the syringe barrel. Without removing the syringe from the glass bulb depress the plunger. Pump the syringe in this manner several times.
- Extract the syringe from the glass bulb with approximately 500 µl of calibration gas present. Carefully depress the plunger until 300 µl of calibration gas is present in the syringe barrel. Immediately inject this gas volume into the Photovac GC.
- A response factor for each analyte is obtained as the ratio of the known gas concentration injected and the area under the peak produced by that injection. This integration is performed automatically by the internal Photovac data processor and stored in the library.

- The procedure to obtain a calibration gas sample is repeated and the gas volume is injected into the GC. The GC will identify the compounds in the sample stream that have retention times within +/- 20% of the retention times of the compounds in the library. The area of these identified peaks will be compared to the response factor of the compounds stored in the library and integrate a corresponding concentration.

- If the calibration check concentration does not equal +/- 15% of the library concentration, a new calibration check is performed. If this check fails, a new library is created.

4.4.4 Sample Analyses

The following procedure will be followed when performing analysis of samples.

- The Photovac portable GC is set as described above. The GC function and application file is loaded into memory. This includes all previously established calibration data and retention time information.

- 300 µl of sample are obtained from the sample source and injected into the GC. Samples will be injected as soon as possible after it is collected.

- Immediately after injection the GC is started.

- Each chromatograph run will run for a minimum of 5 minutes. At this time the run will be stopped and the results obtained.

- Following completion of the run, the Photovac GC will produce a hard copy printout of the results. This printout will include the sample identification, time of analysis, and appropriate operating parameters.

This procedure will be followed for all sample runs.

4.4.5 Method Blanks and Duplicates

Prior to any calibration or sample injections, the integrity and level of contamination of each syringe used for injections will be verified.

- Plungers will be removed from the barrel of the syringe and placed into a laboratory oven for 5 minutes. The temperature of the oven should not be above 150 degrees Fahrenheit (F) or below 120 degrees F.

- The syringes will be removed from the oven, cooled, and reassembled.

- Pump the syringe plunger several times, purging the syringe with ambient air.

- Collect approximately 500 µl of ambient air in the syringe and carefully depress the plunger to 300 µl. Immediately inject the gas volume into the GC.

- Detection of the target compounds above the detection limit (50 ppbv for most compounds) will require another decontamination procedure before additional analyses.
- Blanks will be performed after every sample and calibration injection. Blanks will not be performed between duplicate sample injections.
- Duplicate samples will be performed at a minimum of 1 every 10 sample injections.

Section 5
Laboratory Procedures

The term "data quality" refers to the level of uncertainty associated with a particular data set. The data quality associated with environmental measurement data is a function of the sampling plan rationale and procedures used to collect the samples as well as the analytical methods and instrumentation used in making the measurements. Each component has its own potential sources of error and biases that can affect the overall measurement process.

Sources of error that can be traced to the sampling component of environmental data collection are: poor sampling plan design, inconsistent use of standard operating procedures, sample handling and transportation. The most common sources of error that can be traced to the analytical component of the total measurement system are calibration and contamination problems. It is recognized that by far the largest component of the total uncertainty associated with environmental data collection originates from the sampling process. All sampling programs initiated in support of this project will stress forward planning and be well conceived and reviewed prior to the collection of any samples as a way to minimize this major source of potential error.

Uncertainty cannot be eliminated from environmental measurement data. The amount of uncertainty that can be tolerated depends on the objective of the sampling program and the intended use of the data collected. The purpose of the project's quality assurance program is to assure that the data quality of all data collected be of known and ascertainable value.

5.1 Data Quality Criteria

Data quality can be assessed in terms of its precision, accuracy, representativeness, completeness, and comparability. Analytical method detection limits will also be discussed in this section.

5.1.1 Precision

Precision is a measure of the reproducibility of analyses under a given set of conditions. The overall precision of a sampling event is a mixture of sampling and analytical factors. The precision of data collected in support of this project will be assessed on two different levels:

- By calculating the relative percent difference (RPD) of laboratory matrix spike duplicates and/or laboratory replicate samples (a measure of analytical precision).
- By calculating the RPD of field duplicates samples submitted to laboratory "blind" (a measure of the precision of the entire measurement system, including sampling).

Relative percent difference will be calculated according to the following equation:

$$RPD = \frac{|A - B|}{(A + B)/2} \times 100\%$$

where: A = Sample Result
B = Replicate Sample Result

5.1.2 Accuracy

Accuracy is a measurement of the amount of bias that exists in a measurement system. This can be thought of as the degree that the reported value agrees with the supposed "true value". The accuracy of data collected in support of this project will be assessed in the following ways:

- By calculating the percent recovery (%R) of laboratory matrix spikes and/or laboratory control standards
- By documenting the level of contamination that exists (if any) in laboratory method blanks
- By documenting the level of contamination that exists (if any) in field and/or trip blanks submitted to the laboratory "blind" for analysis
- Percent recovery will be calculated according to the following equation:

$$\%R = \frac{SSR - SR}{SA} \times 100$$

where: SSR = Spiked Sample Result
SR = Sample Result
SA = Spike Concentration

5.1.3 Representativeness

Unlike the previous two criteria which can be expressed in quantitative terms, representativeness is a qualitative parameter. However, in terms of overall data quality, representativeness may be the most important parameter of all.

The representativeness criterion is concerned with the degree to which a sample reflects (represents) a characteristic of a population, parameter variations at a specific location or an environmental condition. Sample representativeness will be addressed in support of this project through a detailed sampling plan design and rationale and through the proper use of the appropriate sampling standard operating procedures, depending on sample matrix and the parameters to be analyzed.

Composite samples will be collected in situations conducive to compositing techniques (particularly samples collected along the vertical extent of a borehole). The use of composite samples tends to maximize the representativeness of a sampling round because more information is provided about a much broader area than a single grab sample. This is especially true in situations where the objective of sampling is to determine where gross contamination exits on site and the location of any "hot spots". In these cases, broad coverage of the area to be sampled is more important than obtaining the lowest possible detection limits.

5.1.4 Completeness

Completeness is a measure of the amount of usable data obtained from a measurement system compared to the amount that was expected to be obtained under correct normal conditions. Usability will be determined by evaluation of the precision, accuracy, representativeness, and comparability parameters. Those data that are validated as correct, or are qualified as estimated or non-detect are considered usable. Rejected data are not considered usable. A completeness goal of 90% is projected. If this goal is not met, the effect of not meeting this goal will be discussed by the CDM project manager and the NYSDEC site manager. Completeness is calculated using the following equation:

$$Percent\ Completeness = \frac{DO}{DP} \times 100$$

Where:

DO = Data obtained and usable
DP = Data planned to be obtained

There also may be incomplete data while still meeting the 90 percent goal if a critical sample location cannot be sampled.

5.1.5 Comparability

The comparability criterion is a quality characteristic which is an expression of the confidence with which one data set can be compared with another. Comparability issues are of importance at two different levels of a sampling program. The primary comparability issues are concerned with whether the field sampling techniques, analytical procedures, and concentration units of one data set can be compared with another.

The comparability criterion also applies to the environmental conditions/considerations present at the time of the sampling. Temporal and/or seasonal variations may make data collected from the same location at different times of the year incomparable, or comparable in a relative sense only, for example.

Comparability is judged by comparing results to other similar data sets. Consistency in the acquisition, handling, and analysis of samples is necessary for comparing results. Data developed under this investigation will be collected and analyzed using Soil Vapor Intrusion Guidance for soil vapor collection and NYSDEC Department of Remediation Draft DER-10 Technical Guidance for Site Investigation and Remediation, dated December 2002 to ensure comparability of results with other analyses performed in a similar manner.

5.1.6 Method Detection Limits

Whenever environmental measurement data is to be used in comparison with predetermined "action levels" or other regulatory requirements, the reported method detection limits of the analytical data is of prime importance. Analytical methods specified in support of this project should have a reported detection limit at least 50% below the required action level to assure that measurements made in the vicinity of the action level are of high quality. In circumstances concerning extremely low action levels or regulatory requirements where analytical techniques will have to be pushed to their limits, every effort will be made to select the most appropriate analytical procedures. It is recognized that analytical detection limits are sample specific and are affected by sample volumes as well as the need for sample concentration or dilution. These circumstances will be accounted for in the review and interpretation of the analytical results.

5.2 Quality Control

Two separate levels of quality control exist for all samples collected in support of this project, internal laboratory quality control and program generated quality control.

5.2.1 Internal Laboratory Quality Control

Internal laboratory quality control is a function of the individual laboratory's QA/QC Plan. A laboratory's QA/QC plan contains specific criteria governing the manner in which analyses are conducted and provide information on the laboratory's performance and control of the sources of error that exist within the lab. Included in the plan are requirements for the type and frequency of quality control check samples that are to be analyzed on a routine basis.

All laboratory analysis conducted in support of this project must include the following quality control check samples:

- Surrogate spikes (where appropriate)
- Matrix spike/matrix spike duplicate or laboratory duplicates and laboratory control samples (where appropriate)
- Method blanks

The laboratory may adhere to the analysis frequency specified in their QA/QC plan for these check samples provided that the specified frequency is equal-to or greater-than the frequency specified in Table 5-1 or as modified/specified by the QAPP.

5.2.2 Program Generated Quality Control

Program generated quality control consists of quality control check samples that are submitted to the laboratory for analysis "blind" along with actual environmental samples. These samples provide quality control information for the entire sampling event, from the actual sampling and handling through laboratory analysis. As such, they can provide the best overall estimate of the total uncertainty associated with the sampling round.

TABLE 5-1

LABORATORY SAMPLE FREQUENCY

QC Check Sample	Frequency of Analysis
Method Blanks	One per analytical batch or one per every twenty samples
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One per analytical batch or one per every twenty samples
Surrogate Spikes	One per every trace organic analysis

The combination of laboratory duplicates and laboratory control samples may be substituted for MS/MSD analysis for parameters where they are more appropriate.

Program generated quality control samples collected in support of this project are:

- Duplicate samples
- Field blanks
- Trip blanks

Each report should have a cover page that references the CDM task number.

The cover page also provides an opportunity to describe in a narrative format any unusual problems or interferences encountered during analysis. In addition, all results should be reported on a dry weight basis for soils and at dilution-corrected concentrations for all samples.

5.2.3 QC Deliverables Package

The following quality control data is required to be reported. For "priority pollutant" type analysis, the following quality control data is required per sample batch:

- Method Blanks associated with each analytical procedure.

- Surrogate Spike Recoveries for volatile organics, PCBs, semi-volatiles and polynuclear aromatic hydrocarbons.
- MS/MSDs for all priority pollutant parameters. One MS/MSD should be run for every 20 samples.

For non-priority pollutant parameters, the following quality control data is required per sample batch:

- Method Blanks
- Laboratory Duplicates -- One duplicate analysis should be performed at a frequency of one per twenty samples.

No specific acceptance criteria for blanks and spike recoveries will be set forth here, however, all laboratories are expected to conform to standard EPA quality control specifications. CDM expects laboratories to reanalyze samples if quality control samples fail to meet EPA specifications.

The quality control data may be presented as a quality control section within the report or it may be integrated among the results.

5.3 Data Quality Requirements

Taking into consideration a project's overall objective and intended use of the data, it should be considered that analyses be conducted in accordance with SW-846, Test Methods for Evaluating Solid Waste, Third Edition procedures. In cases where additional procedures are required, other EPA approved laboratory methods will be used.

5.4 Data Deliverable

Analytical data deliverable will be provided in accordance with NYSDEC requirements (EPA Region 2 EDD, dated December 2003).

5.5 Analytical Data Validation

If a Work Assignment requires the validation of data; i.e., data validation is performed to determine whether or not the data, as presented, meets the site/project specific criteria for data quality and data use.

Laboratories results shall be supported by sufficient back-up data and QA/QC results to enable the reviewer to conclusively determine the quality of the data. The laboratory will review data prior to its release from the laboratory. Objectives for review are in accordance with the QA/QC objectives stated in each site-specific Work Plan. The laboratory is required to evaluate their ability to meet these objectives. Outlying data will be flagged in accordance with laboratory standard operating procedures, and corrective action will be taken to rectify the problem.

A NYSDEC-approved qualified independent third party data validator will review the data package to determine completeness and compliance in accordance with Standby Contract D004437. A narrative describing how the data did or did not meet the validation criteria is part of the data validation procedure. The validation assessment will describe the overall quality of the data and the data validation report will provide a written statement upon completion of the validation indicating whether or not the data are valid and usable, and include a percent completeness value of usable data.

5.6 Data Usability Summary Report

A Data Usability Summary Report (DUSR) provides a thorough evaluation of analytical data without the third party data validation. The primary objective of a DUSR is to determine whether or not the data, as presented, meets the site/project specific criteria for data quality and data use. If a Work Assignment requires a DUSR, the DUSR will be developed by a NYSDEC approved qualified environmental scientist in accordance with Standby Contract D004437.

ATTACHMENT 1

NYSDOH Indoor Air Quality Questionnaire and Building Inventory

NEW YORK STATE DEPARTMENT OF HEALTH
INDOOR AIR QUALITY QUESTIONNAIRE AND BUILDING INVENTORY
CENTER FOR ENVIRONMENTAL HEALTH

This form must be completed for each residence involved in indoor air testing.

Preparer's Name ________________________________ Date/Time Prepared ____________

Preparer's Affiliation ____________________________ Phone No.__________________

Purpose of Investigation____

1. OCCUPANT:

Interviewed: Y / N

Last Name: ______________________ First Name: ______________________

Address: ____

County: _______________

Home Phone: _________________ Office Phone: _________________

Number of Occupants/persons at this location ______ Age of Occupants ___________________

2. OWNER OR LANDLORD: (Check if same as occupant ___)

Interviewed: Y / N

Last Name: ______________________First Name: ______________________

Address: ____

County: _______________

Home Phone: _________________ Office Phone: _________________

3. BUILDING CHARACTERISTICS

Type of Building: (Circle appropriate response)

Residential	School	Commercial/Multi-use
Industrial	Church	Other: _______________

If the property is residential, type? (Circle appropriate response)

Ranch	2-Family	3-Family
Raised Ranch	Split Level	Colonial
Cape Cod	Contemporary	Mobile Home
Duplex	Apartment House	Townhouses/Condos
Modular	Log Home	Other:_____________

If multiple units, how many? _______

If the property is commercial, type?

Business Type(s) ________________________________

Does it include residences (i.e., multi-use)? Y / N If yes, how many? _____

Other characteristics:

Number of floors_____ Building age_____

Is the building insulated? Y / N How air tight? Tight / Average / Not Tight

4. AIRFLOW

Use air current tubes or tracer smoke to evaluate airflow patterns and qualitatively describe:

Airflow between floors

____

____

____

Airflow near source

____

____

____

Outdoor air infiltration

____

____

____

Infiltration into air ducts

____

____

____

5. **BASEMENT AND CONSTRUCTION CHARACTERISTICS** (Circle all that apply)

a. Above grade construction:	wood frame	concrete	stone	brick
b. Basement type:	full	crawlspace	slab	other ________
c. Basement floor:	concrete	dirt	stone	other ________
d. Basement floor:	uncovered	covered	covered with _______________	
e. Concrete floor:	unsealed	sealed	sealed with ________________	
f. Foundation walls:	poured	block	stone	other ________
g. Foundation walls:	unsealed	sealed	sealed with ________________	
h. The basement is:	wet	damp	dry	moldy
i. The basement is:	finished	unfinished	partially finished	
j. Sump present?	Y / N			
k. Water in sump?	Y / N / not applicable			

Basement/Lowest level depth below grade: ________(feet)

Identify potential soil vapor entry points and approximate size (e.g., cracks, utility ports, drains)

____

____

6. **HEATING, VENTING and AIR CONDITIONING** (Circle all that apply)

Type of heating system(s) used in this building: (circle all that apply – note primary)

Hot air circulation	Heat pump	Hot water baseboard	
Space Heaters	Stream radiation	Radiant floor	
Electric baseboard	Wood stove	Outdoor wood boiler	Other ___________

The primary type of fuel used is:

Natural Gas	Fuel Oil	Kerosene
Electric	Propane	Solar
Wood	Coal	

Domestic hot water tank fueled by: ____________________________

Boiler/furnace located in:	Basement	Outdoors	Main Floor	Other__________
Air conditioning:	Central Air	Window units	Open Windows	None

Are there air distribution ducts present? Y / N

Describe the supply and cold air return ductwork, and its condition where visible, including whether there is a cold air return and the tightness of duct joints. Indicate the locations on the floor plan diagram.

____

____

____

____

7. OCCUPANCY

Is basement/lowest level occupied? Full-time Occasionally Seldom Almost Never

Level	General Use of Each Floor (e.g., familyroom, bedroom, laundry, workshop, storage)
Basement	____
1st Floor	____
2nd Floor	____
3rd Floor	____
4th Floor	____

8. FACTORS THAT MAY INFLUENCE INDOOR AIR QUALITY

a. Is there an attached garage? Y / N

b. Does the garage have a separate heating unit? Y / N / NA

c. Are petroleum-powered machines or vehicles stored in the garage (e.g., lawnmower, atv, car) Y / N / NA Please specify________________

d. Has the building ever had a fire? Y / N When?________________

e. Is a kerosene or unvented gas space heater present? Y / N Where?________________

f. Is there a workshop or hobby/craft area? Y / N Where & Type? ________________

g. Is there smoking in the building? Y / N How frequently?________________

h. Have cleaning products been used recently? Y / N When & Type?________________

i. Have cosmetic products been used recently? Y / N When & Type?________________

j. Has painting/staining been done in the last 6 months? Y / N Where & When? ______________

k. Is there new carpet, drapes or other textiles? Y / N Where & When? ______________

l. Have air fresheners been used recently? Y / N When & Type? ______________

m. Is there a kitchen exhaust fan? Y / N If yes, where vented?____________

n. Is there a bathroom exhaust fan? Y / N If yes, where vented?____________

o. Is there a clothes dryer? Y / N If yes, is it vented outside? Y / N

p. Has there been a pesticide application? Y / N When & Type?________________

Are there odors in the building? Y / N
If yes, please describe: ____

Do any of the building occupants use solvents at work? Y / N
(e.g., chemical manufacturing or laboratory, auto mechanic or auto body shop, painting, fuel oil delivery, boiler mechanic, pesticide application, cosmetologist

If yes, what types of solvents are used? ____________________________________

If yes, are their clothes washed at work? Y / N

Do any of the building occupants regularly use or work at a dry-cleaning service? (Circle appropriate response)

Yes, use dry-cleaning regularly (weekly) No
Yes, use dry-cleaning infrequently (monthly or less) Unknown
Yes, work at a dry-cleaning service

Is there a radon mitigation system for the building/structure? Y / N Date of Installation: ___________
Is the system active or passive? Active/Passive

9. WATER AND SEWAGE

Water Supply:	Public Water	Drilled Well	Driven Well	Dug Well	Other: ______
Sewage Disposal:	Public Sewer	Septic Tank	Leach Field	Dry Well	Other: ______

10. RELOCATION INFORMATION (for oil spill residential emergency)

a. Provide reasons why relocation is recommended: ________________________________

b. Residents choose to: remain in home relocate to friends/family relocate to hotel/motel

c. Responsibility for costs associated with reimbursement explained? Y / N

d. Relocation package provided and explained to residents? Y / N

11. FLOOR PLANS

Draw a plan view sketch of the basement and first floor of the building. Indicate air sampling locations, possible indoor air pollution sources and PID meter readings. If the building does not have a basement, please note.

Basement:

First Floor:

12. OUTDOOR PLOT

Draw a sketch of the area surrounding the building being sampled. If applicable, provide information on spill locations, potential air contamination sources (industries, gas stations, repair shops, landfills, etc.), outdoor air sampling location(s) and PID meter readings.

Also indicate compass direction, wind direction and speed during sampling, the locations of the well and septic system, if applicable, and a qualifying statement to help locate the site on a topographic map.

13. PRODUCT INVENTORY FORM

Make & Model of field instrument used: ___________________________________

List specific products found in the residence that have the potential to affect indoor air quality.

Location	Product Description	Size (units)	Condition*	Chemical Ingredients	Field Instrument Reading (units)	Photo ** Y / N

* Describe the condition of the product containers as **Unopened (UO), Used (U)**, or **Deteriorated (D)**
** Photographs of the **front and back** of product containers can replace the handwritten list of chemical ingredients. However, the photographs must be of good quality and ingredient labels must be legible.

Appendix D

Financial Information, Schedule 2.11, Subcontractor Backup

Budget Estimates

Estimated Budget and Level of Effort (LOE) Summary

Task Items	Description/Cost	Dollars
1	Site Visit, Work Plan Development, Groundwater Modeling, Records Search	$54,273
2	Site Characterization Investigation	$475,433
3	Field Documentation and Reporting	$29,133
4	Document Disposition and Data	$11,642
5	Citizen Participation Plan	$8,464
	Total Estimate Budget (Tasks 1 – 5)	**$578,945**

Task 1 includes:

1A – Site Visit and Work Plan Development	$ 15,000
1B - Preliminary Groundwater Modeling	$ 9,873
1C – Historical Records Search and Sample Mapping	$ 29,400

Task 2 includes:

• Passive Soil Gas Screening	$ 35,309
• Geophysical Survey	$ 17,735
• Soil Boring/Groundwater Profiling	$ 252,078
• Monitoring Well Installation	$ 91,883
• Groundwater Sampling	$ 11,983
• Site Survey	$ 24,875
• Data validation	$ 4,402
• IDW Disposal	$ 37,168

Attached are the detailed costs by task and subtask on the NYSDEC schedule 2.11. Also attached is subcontractor backup.

General Assumptions:

- Work will be performed in modified Level D. Upgraded levels of protection will require a cost adjustment.

- All costs are based upon the scope and schedule provided in this Work Plan. Costs associated with project delays or expedited schedules beyond CDM's control are not assumed.

- CDM will provide four hard copies by mail and one electronic file (pdf) by e-mail for each report submitted to the NYSDEC.

Task 1A and 1B - Records Search and Work Plan Development:

- Only one site visit is assumed for this phase.

- Only one round of comments received concurrently is anticipated on draft deliverables. The review comments will be consolidated by NYSDEC. It is assumed that comments are minimal in nature and no re-evaluation is required. It is assumed that all comments can be addressed in 8 hours.

- Project management, subcontractor procurement, scheduling, budgeting, administrative activities are included in this task.

- A comprehensive Work Plan will be delivered to the Department submitted as a separate document from the Records Search Report.

- The Work Plan should include the description of the major tasks and sub-tasks to be performed including pertinent information to conduct field activities, potential areas of concern, analytical methods and sampling methods, a staffing plan identifying key and technical staff, identification of areas of subcontracting, work assignment budget, generic Health and Safety Plan, and Citizen participation Plan

- CDM's Generic QAPP has been previously submitted to NYSDEC; a copy of this document will not be submitted with the Draft Work Plan. However, the applicable generic QAPP sections will be submitted with the Final Work Plan.

- The Records Search report and the groundwater model letter report will be submitted as a separate documents.

- The Records Search report will identify potential sources of contamination and identify sample locations for follow up site characterization investigations, however no interviews are assumed.

Task 2 – Site Characterization Investigations:

- A notice to proceed must be received at least one week prior to mobilization.
- NYSDEC will provide access to all sampling and drilling locations.
- Drilling, groundwater profiling, geophysical surveying, soil gas screening, laboratory analytical, surveying and data validation services will be subcontracted.
- CDM will provide oversight during field activities, collect samples and maintain sample chain-of-custody.
- No schedule delays are assumed due to inclement weather or equipment failure.
- Delays due to the site owner or public are not assumed.
- Project management, subcontractor procurement, scheduling, budgeting, administrative activities are included in this task.
- For costing purposes, CDM assumes that 75 soil vapor screening samples will be collected.
- CDM assumes that monitoring well installation will take 15 days, and groundwater profiling will take 45 days.
- CDM assumes that the soil vapor screening will take a total of 4 days.
- CDM assumes that all material and equipment staged in access areas will be removed to allow easy access to all sampling locations by the drilling equipment.
- One PID unit will be utilized for health and safety air monitoring.
- It is assumed that soil IDW will be containerized in up to 60 drums and groundwater IDW will be containerized in a poly tank.
- It is assumed that NYSDEC will provide access to locations to stage IDW until characterization and disposal can be done.

Task 3 - Field Documentation and Reporting:

- Only conference calls are anticipated to be necessary for this phase. Meetings are not assumed to be required for this task.

- Only one round of comments received concurrently is anticipated on draft deliverables. The review comments will be consolidated by NYSDEC. It is assumed that comments are minimal in nature and no re-evaluation is required. It is assumed that all comments can be addressed within 12 hours.

- During site work, digital photographs and field notes will be kept.

- A report will be developed including a description of work conducted with field notes, photos, validated analytical data, figures, field measurements, and summary tables.

- It is assumed that four data tables (identifying groundwater data, groundwater profiling data, soil sampling data, and soil vapor screening data) and four figures (one showing sample locations, one showing groundwater data, one showing soil vapor screening data, and one showing soil sampling data) will be necessary for the report.

- Laboratory analyses turnaround time is standard time, except for groundwater profiling samples which will be submitted for one-week turnaround time to allow for modifying sampling locations if necessary. One-week turnaround time surcharge is 125 percent of standard time.

- Laboratory analyses are targeted to volatile organic compounds and low level analyses is not necessary for this site characterization work.

<u>Task 5 – Citizen Participation Plan:</u>

- CDM will attend one meeting, if requested by NYSDEC.

MBE/WBE Utilization Plan

To meet the requirements of the MBE/WBE program, CDM has prepared the following utilization plan:

Total Dollar Value of the work assignment	$578,945
MBE Percentage Goal	15%
MBE Dollar Value Goal	$47,137
WBE Percentage Goal	5%
WBE Dollar Value Goal	$225,537
Combined MBE/WBE Percentage Goal	20%
Combined MBE/WBE Dollar Value Goal	$272,674

Minority and woman-owned firms are expected to participate as follows:

Services to be Provided	Description of Services	Subcontractor Name and Contact Information	Proposed Subcontract Price
WBE Geophysical Survey	Utility markout	Radar Solutions Inc. Doria Kutrubes (781)891-4492	$9,650
WBE Drilling and Hydropunch®	Soil boring and groundwater profiling	Summit Drilling Co., Inc. Robert Kreilick (800)242-6648	$146,875
WBE Drilling	Well Installation	Delta Well Chris Okon 631-981-2255	$65,905
M/WBE Quarterly Reports	M/WBE Quarterly Reports	Kenneth Shider (518) 269-2207	$907
MBE – Survey	Sample Location Survey	Yu & Associates, Inc. Andrew Leung 201-791-0075	$17,633
MBE Field Services	Soil Gas Screening	Yu & Associates, Inc.	$28,597
WBE - Data Validation	DUSR	ChemWorld Environmental Andrea Schuessler (301) 294-6144	$3,107
		TOTAL	$272,674

01/14/08

Cost Review for Work Plan or Amendment

Contractor Name: CDM
WA # and Name: D004437-26/ Speonk Solvent Plume

Date: May 12, 2008
Reviewer: DD 5/9/08

	GENERAL COST REVIEW CHECKLIST	Yes	No	Comments
	A complete set of 2.11 Schedules (a) through (h) is attached.	✓		
	For grouped work assignments, Schedule 2.11s are broken down by site.	✓		
1.	**Schedule 2.11(b) - Direct Labor**			
	Average reimbursement rates are used for each year. For future years, an escalation factor of 3% has been used.	✓		
	Hours are segregated by year.	✓		
	Total cost for each NSPE level is shown.	✓		
	Total direct labor costs match amounts on Schedule 2.11(a).	✓		
	Total labor hours match hours on Schedule 2.11(h).	✓		
	The Principal's (NSPE level 9) labor hours charged to WA are less than 2% of the total time.	✓		
2.	**Schedule 2.11(b-1) - Direct Administrative Labor Hours**			
	Breakdown of Schedule 2.11(b-1) is reasonable, i.e., admin LOE is within acceptable guideline of <4% of overall WA LOE. Justification is attached for any exceedance.	✓		
3.	**Schedules 2.11(c) and (d) - Direct Non-Salary Costs**			
	Rates listed in Schedule 2.11(c) are consistent with contract.	✓		
	Rates for in-house and/or miscellaneous costs match contract Schedule 2.10(b).	✓		
	Quotes are included for any non-contract item (including equipment purchases & rentals; excluding air fare) >$1k. If sufficient number of quotes are unavailable, an engineer's estimate must be provided. The low quote has been selected.	✓		
	All costs are allowable, e.g., office telephone and office shipping cannot be reimbursed as a direct cost if they're included in ICR. If they're not in ICR, they are included in 2.10(b) or 2.10(c). Field costs must be receipted.	✓		
	Appropriate lodging/per diem/mileage rates are used.	✓		
	Rates are approved for consultant-owned equipment as per Schedule 2.10(c).			none
	Total of direct non-salary costs matches the amount on Schedule 2.11(a).	✓		
	Other direct costs (no. of field days, lodging, and field equipment usage) are reasonable based on field work schedule or supporting documentation.	✓		
4.	**Schedule 2.11(e) - Cost-plus-fixed-fee subcontracts**	Yes	No	Comments
	Proposed subconsultant is on standby or has DEC-approved rates with another standby consultant. Otherwise, financial information required for cost analysis must be submitted for DEC review.	✓		

	Standby subcontract is active and rates (salary, direct and indirect costs, and fixed fee) match contract rates.	✓			
	A breakdown of direct non-salary costs in the form of additional Schedule 2.11s is attached, if appropriate.	✓			✓
	Total subcontract cost matches amount on Schedule 2.11(a).	✓			✓
	Subcontractor has justified/obtained adequate quotes for any further subcontracted work.	✓			✓
	Subcontractor certification(s) have been submitted.		✓	To be submitted upon receipt	
5.	**Schedule 2.11(f) - Unit Price Subcontracts**				
	There are quotes for non-standby subcontracts >$1k. Bids are comparable (quantities and items) and provide unit costs plus job total. If sufficient number of quotes are unavailable, an engineer's estimate must be provided. The low quote has been selected.	✓		It was necessary for CDM to request bids from drillers not on the standby list due to the unique requirements of the project.	✓
	Standby Drillers (Two phase process) - Costs from at least 3 standbys (or additional quotes from non-standby drillers) are attached. Proper unit costs and mobilization/demobilization costs are used. The low quote has been selected.	✓		It was necessary for CDM to request bids from drillers not on the standby list due to the unique requirements of the project.	✓
	Standby Labs and Data Validators (Used on a rotational basis) - Unit cost per sample match unit cost in their standby contract.	✓			✓
	M/WBE - cost reasonableness of sole/single source M/WBE contracts <$10K and are documented by an engineer's estimate.	✓			✓
	Correct management fee is calculated only on non-professional unit priced subs >$10k and M/WBE firms from $1. (Management fee is not allowed on professional engineering firms, architects, or surveyors, unless the contract specifically allows it.)	✓			✓
	Subcontractor certification(s) have been submitted.		✓	To be submitted upon receipt	
	Justification is attached for any subcontracts >$100,000 supporting a determination not to design and competitively bid the work. Response-type activities (drum removals, soil excavation, and other construction-type activities) typically must be competitively bid, unless otherwise approved by CPS.	✓		Boring/ground water profiling exceeds $100K. Five bids were received, however we note that this activity is not a response-type activity	✓
6.	**Schedule 2.11(g) - Cost Control Report**				
	Individual 2.11(g)s equal Summary 2.11(g) and costs match those on 2.11(a).	✓			✓

	PMWP or amendment development costs are within 5% of the total WA or amendment costs. Acceptable justification has been submitted if the percentage exceeds 5%.	✓		Cost for "Task 1A- Site Visit and Work Plan Development" are less than 5% of the total work assignment cost.
	PMWP or amendment development costs are limited to preparing a PMWP or amendment. Additional sub-tasks, if included, have been conceptually approved.	✓		Additional subtasks include "Task 1B-Preliminary Groundwater Modeling" and "Task 1C-Records Search" as well as compiling Suffolk County sampling data with NYSDEC sampling data and preparing maps.
7.	**Schedule 2.11(g) Supplemental - Cost Control Report (subs)**			
	Schedules include all applicable subcontracts and management fees (for unit price only).	✓		
8.	**Schedule 2.11(a)**			
	Rates for indirect and fixed fee match contract rates.	✓		
	All numbers rolled up into Schedule 2.11(a) add up.	✓		
9.	**Additional Cost Information/Comments**			
	Due to project requirement need to drill to 200 feet, a copy of each of the drilling contractors bids are provided for further reference so that details of each bid are apparent.			

Schedule 2.11(a)

Summary of Work Assignment Price

Work Assignment Number D004437-26

1) Direct Salary Costs (Schedules 2.10(a) and 2.11(b))	$69,501
2) Indirect Costs (Schedule 2.10(g))	$116.692
3) Direct Non-Salary Costs (Schedules 2.10(b)(c)(d) and 2.11(c)(d))	$32,306

4) Subcontract Costs

Cost-Plus-Fixed-Fee Subcontracts (Schedule 2.10(e) and 2.11(e))

	Name of Subcontractor	**Services To Be Performed**	**Subcontract Price**
i)	Ken Schider Consulting	W/MBE Reporting	$907
ii)	Yu & Associates, Inc	MBE Surveying & Soil Gas Screening	$46,231
iii)			

A) Total Cost-Plus-Fixed-Fee Subcontracts $47,138

Unit Price Subcontracts (Schedule 2.10 (f) and 2.11 (f))

	Name of Subcontractor	**Services To Be Performed**	**Subcontract Price**
i)	EDR	Database search	$995
ii)	Delta Well	WBE Well Driller	$65,905
iii)	Summit Drilling	WBE Borings, Groundwater Profiling	$146,875
iv)	TestAmerica	Analytical Laboratory	$32,031
v)	ChemWorld Environmental, Inc.	WBE Data Validator	$3,107
vi)	Radar Solutions	WBE Geophysical Survey	$9,650
vii)	Miller Environmental	IDW Removal	$27,460

B) Total Unit Price Subcontracts $286,023

5) Subcontract Management Fee $14,251

6) Total Subcontract Costs (lines 4A + 4B + 5)	$347,412
7) Fixed Fee (Schedule 2.10(h))	$13,034
8) Total Work Assignment Price (Lines 1 + 2 + 3 + 6 + 7)	$578,945

Engineer/Contract # D004437
Project Name Speonk Solvent Plume
Work Assignment No. D004437-26

Date Prepared: 5/1/2008

Schedule 2.11(b)
Direct Labor Hours Budgeted

Labor Classification	***IX***		***VIII***		***VII***		***VI***		***IV***		***III***		***II***		***I***		Admin Support		***Total No. of Direct Labor Hours and Costs Budgeted***	
*Av. Salary Rate ($) Year 2008	$65.24		$59.42		$52.09		$45.95		$32.86		$28.62		$25.52		$21.12		$21.12		0	
Description	Hours	Cost	Hours	Cost	Hours	Cost	Hours	Cost	Hours	Cost	Hours	Cost	Hours	Cost	Hours	Cost	Hours	Cost	Hours	Cost
Task 1 Site Visit, Work Plan Development, Preliminary Groundwater Modeling, Records Search and Sample Mapping	4	$260.96	40	$2,376.80	16	$833.44	98	$4,503.10	123	$4,041.78	155	$4,436.10	48	$1.224.96		$0	6	$126.72	490	$17,803.86
Task 2 Site Characterization	6	$391.44	12	$713.04	10	$520.90	205	$9.419.75	270	$8.872.20	460	$13.165.20	72	$1.837.44		$0	6	$126.72	1041	$35.046.69
Task 3 Field Documentation and Reporting	4	$260.96	8	$475.36	12	$625.08	24	$1.102.80	120	$3,943.20	80	$2.289.60	46	$1.173.92		$0	6	$126.72	300	$9.997.64
Task 4 Document Disposition and Data	2	$130.48	2	$118.84	4	$208.36	16	$735.20	31	$1.018.66	40	$1.144.80	20	$510.40		$0	6	$126.72	121	$3,993.46
Task 5 Citizen Participation Plan	4	$260.96	10	$594.20	8	$416.72	10	$459.50	0	$0.00	28	$801.36	0	$0.00		$0	6	$126.72	66	$2.659.46
Total Hours	20		72		50		353		544		763		186		0		30		2018	
Total Direct Labor Cost ($) **Year 2008**		$1,304.80		$4,278.24		$2,604.50		$16,220.35		$17,875.84		$21,837.06		$4,746.72		$0		$633.60		$69,501.11

* For multiple years use one average salary rate row for each year and each years subtotal Labor Cost.

Engineer/Contract # D004437

Project Name Speonk Solvent Plume

Work Assignment No. D004437-26

Date Prepared: __________

Schedule 2.11(b-1)
Direct Administrative Labor Hours Budgeted

Labor Classification		*IX*	*VIII*	*VII*	*VI*	*V*	*IV*	*III*	*II*	*I*	*Admin. Support*	*Total No. of Direct Labor Hrs.*
Task 1	Work Plan Development	2	8	2	1	0	●	0	0	0	6	19
Task 2	Site Characterization	4	8	2	0	0	0	0	0	0	6	20
Task 3	Field Documentation and Reporting	4	4	0	0	0	0	●	●	●	6	14
Task 4	Document Disposition and Data	2	1	0	0	●	●	●	0	0	6	9
Task 5	Citizen Participation Plan	2	1	0	0	0	0	0	0	0	6	9
TOTAL HOURS		14	22	4	1	●	●	0	0	0	30	71

Contract/Project administrative hours would include (subject to contract allowability) but not necessarily be limited to the following activities:

1) Work Plan Budget Development
   > Conflict of Interest Check
   > Budget schedules & supporting documentation
2) Review work assignment (WA) progress
   > Conduct progress reviews
   > Prepare monthly project report
   > Update WA progress schedule
   > Prepare M/WBE Utilization Report
3) Contractor Application for Payment (CAP)
   > ●versee and prepare monthly CAP

4) Program Management
   > Prepare monthly cost control report
   > Cost control reviews
   <> Staffing Plans
   >Manage subcontracts
   > NSPE list update
   > Equipment inventory
5) Miscellaneous
   > Conduct Health and Safety Reviews
   > Word processing and graphic artists
   > Report editing

Contract/Project Administration hours would n●t inclu

1) QA/QC reviews
2) Technical oversight by management
3) Develop subcontracts
4) Work plan development
5) Review of deliverables

Schedule 2.11 (c)

Direct Non-Salary Costs
Work Assignment Number D004437-26

	Item		Max. Reimbursement * Rate (Specify Unit)	Est. No. of Units	Total Estimated Cost
A)	Other				
	1)	Shipping Task 1	LS	1	$75.00
	2)	Outside Printing Task 1	LS	1	$300.00
	3)	Shipping Task 3	LS	1	$75.00
	4)	Outside Printing Task 3	LS	1	$400.00
	3)	Shipping Task 4	LS	1	$50.00
	4)	Outside Printing Task 4	LS	1	$145.00
	3)	Shipping Task 5	LS	1	$50.00
	4)	Outside Printing Task 5	LS	1	$150.00
				Sub-Total Other	$1,245.00
B)	Miscellaneous Task 1 - Workplan Development/Groundwater Model/Record Search				
	1)	Meals (per day)	$64.00	3	$192.00
	2)	Lodging (per day)	$127.00	3	$381.00
	3)	Mileage (per mile)	$0.505	660	$333.30
	4)	PPE (level D) (per day)	$15.00	0	$0.00
	5)	Tolls	$18.00	3	$54.00
	6)	LVE	$1.00	0	$0.00
				Sub-Total Miscellaneous Task 1	$960.30
B)	Miscellaneous Task 2 - Site Characterization				
	1)	Meals (per day)	$64.00	86	$5,504.00
	2)	Lodging (per day)	$127.00	86	$10,922.00
	3)	Mileage (per mile)	$0.505	8800	$4,444.00
	4)	PPE (level D) (per day)	$15.00	86	$1,290.00
	5)	Tolls	$18.00	40	$720.00
	6)	LVE	$1.00	86	$86.00
	7)	Cooler Overnight Ship	$125.00	15	$1,875.00
				Sub-Total Miscellaneous Task 2	$24,841.00
C)	Miscellaneous Task 5 - Citizen Participation Plan				
	1)	Meals (per day)	$64.00	2	$128.00
	2)	Lodging (per day)	$127.00	2	$254.00
	3)	Mileage (per mile)	$0.505	440	$222.20
	4)	PPE (level D) (per day)	$15.00	0	$0.00
	5)	Tolls	$18.00	2	$36.00
	6)	LVE	$1.00	0	$0.00
				Sub-Total Miscellaneous Task 5	$640.20
				Total Direct Non-Salary Costs	**$27,686.50**

Work Assignment No. D004437-26

Schedule 2.11(d) 3

Maximum Reimbursement Rate for Vendor Rented Equipment

Item	Max Reimbursement Rate ($)*	Est. Usage (unit of time)	Est. Rental Cost ($) (Col. 2 x 3)
Task 2			
PID (per month)	$400.00	2	$800.00
CGI (per month)	$250.00	2	$500.00
Submersible pump (per week)	$160.00	3	$480.00
Oil-Water Interface probe (per day)	$25.00	7	$175.00
Water level meter (per week)	$28.00	1	$28.00
Horiba U-22 Water Quality meter (per week	$165.00	1	$165.00
Poly tubing 3/8 x 1/2 (per foot)	$0.25	750	$187.50
Generator (per week)	$75.00	1	$75.00
Low-flow pump <0.2 L/min (per day)	$25.00	7	$175.00
Cargo Van (per week)	$225.00	6	$1,350.00
		TOTAL:	**$3,935.50**

* Reimbursement will be made at the Maximum Reimbursement rate or the actual rental rate, whichever is less.

Work Assignment No. D004437-26

Schedule 2.11(d) 5

Consumable Supplies

Item	Estimated Quantity	Unit Cost ($)	Total Budgeted Cost (Col. 2 x3) ($)
Jars - headspace	200	$0.45	$90.00
Gasoline for Cargo Van per gallon	132	$4.50	$594.00
		TOTAL	**$684.00**

Schedule 2.11 (e)

Cost-Plus-Fixed-Fee Subcontracts
Work Assignment Number D004437-26

Name of Subcontractor	Services to be Performed	Subcontract Price
Ken Schider Consulting	**M/WBE Reporting**	**$907.13**

A) Direct Salary Costs

Professional Responsibility Level	Labor Classification	Ave. Reimbursement Rate ($/Hr.)	Max. Reimbursement Rate ($/Hr.)	Est. No. of Hours	Total Est Direct Salary Cost (Ave. Reimb. Rate x Est. # of Hrs.)
IV	Eng/Scientist 4	$32.86	$38.95	12	$394.32

Total Direct Salary Costs **$394.32**

Footnotes:

1) The labor rate averages and maximums shall be adjusted by a rate equal to the increase in the CPI index CUURA101SAO-"All Urban ConsumersNew York-Northern N.J.-Long Island" for the previous year. This index is published by the U.S. Department of Labor's Bureau of Labor Statistics. The adjustment will be calculated every January and will be effective for subsequent work assignment billing and budgeting purposes.
2) Schedule 2.11(e) may be re-negotiated after four (4) years at the request of either party. Any revision as a result of re-negotiation will be subject to the approval of the Office of the State Comptroller.
3) The maximum annual escalation is limited to 5%.
4) Reimbursement will be limited to the lesser of either the individual's actual hourly rate or the maximum rate for each labor
5) Reimbursement will be limited to the maximum reimbursement rate for the professional responsibility level of the actual work
6) Only those labor classifications indicated with an asterisk will be entitled to overtime.
7) Reimbursement for technical time of principals, owners, and officers will be limited to the maximum reimbursement rate of that category, the actual hourly labor rate paid, or the State M-6 rate, whichever is lower.
8) Maximum reimbursement rates may be exceeded for work assignment activities that are under the jurisdiction of the Schedule of Prevailing Wage Rates set by the New York State Department of Labor.

B) Indirect Costs

Indirect costs shall be paid based on a percentage of direct salary costs incurred which shall not exceed a maximum of 115 % or the actual rate calculated in accordance with 48 CFR Federal Acquisition Regulation, whichever is lower.

Amount budgeted for indirect costs is: **$453.47**

C) Maximum Reimbursement Rates for Direct Non-Salary Costs

Item		Max Reimbursement Rate (Specify Unit)	Est. No. of Units	Total Est. Cost
1)	Travel	See Schedule 2.10 (d) for rates		
2)	Supplies			

Total Direct Non-Salary Costs **$0**

D) Fixed Fee

The fixed fee is: 7% **$59.35**
See Schedule 2.10 (h) for how the fixed fee should be claimed.

Schedule 2.11 (e)
Cost Plus Fixed-Fee Subcontracts

Speonk Solvent Plume Survey

May 1, 2008

NAME OF SUBCONTRACTOR	SERVICES TO BE PERFORMED	SUBCONTRACT PRICE
YU & ASSOCIATES, INC.	Sample Survey	**$17,633.34**

A. Direct Salary Costs

Professional Responsibilty Level	Labor Classi-fication	Average Reimbursement Rate ($/Hr.)		Maximum Reimbursement Rate ($/Hr.)		Estimated Number of Hours	Total Estimated Direct Salary Cost ($)
Principal	VIII	2008	0.00	2008	0.00	0	0.00
Senior Geologist/Scientist/ Engineer/ Licensed Surveyor	V	2008	29.05	2008	33.17	8	232.40
Staff Geologist/ Scientist/Engineer	IV	2008	0.00	2008	0.00	0	0.00
Staff Geologist/ Scientist/Engineer/CAD Operator	III	2008	0.00	2008	0.00	0	0.00
Senior Technician/Staff Engineer/Scientist/Geologist	II	2008	0.00	2008	0.00	0	0.00
Technician/Draftsperson	I	2008	0.00	2008	0.00	0	0.00
						Total Direct Salary Costs:	**232.40**

B. Indirect Costs - 136.8% of direct salary cost

Indirect Costs: **317.92**

C. Maximum Reimbursement Rates for Direct Non-Salary Costs:

Item	Maxium Reimbursement Rate	Estimated No. of Units		
Mileage	0.47 /mi.	0 miles/trip	0	0.00
Tolls	18 /day	0 trips		0.00
Field Surveying Subcontractor	17050 /lump	1 lump		17,050.00
		Total Direct Non Salary Costs:		**17,050.00**

D. Fixed Fee (6% of Total Direct and Indirect Salary Costs)

Fixed Fee: **33.02**

Assumptions:

Estimate includes 6 mobilizations by surveying subcontractor; NYSDEC to assist with property access

Schedule 2.11 (e)
Cost Plus Fixed-Fee Subcontracts

Speonk Solvent Plume Soil Gas Screening

May 1, 2008

NAME OF SUBCONTRACTOR	SERVICES TO BE PERFORMED	SUBCONTRACT PRICE
YU & ASSOCIATES, INC.	Soil Gas Screening	**$28,597.33**

A. Direct Salary Costs

Professional Responsibilty Level	Labor Classi-fication	Average Reimbursement Rate ($/Hr.)		Maximum Reimbursement Rate ($/Hr.)		Estimated Number of Hours	Total Estimated Direct Salary Cost ($)
Principal	VIII	2008	51.68	2008	52.40	4	206.72
Senior Geologist/Scientist/ Engineer/ Licensed Surveyor	V	2008	29.05	2008	33.17	60	1,743.00
Staff Geologist/ Scientist/Engineer	IV	2008	0.00	2008	0.00	0	0.00
Staff Geologist/ Scientist/Engineer/CAD Operator	III	2008	24.59	2008	26.20	60	1,475.40
Senior Technician/Staff Engineer/Scientist/Geologist	II	2008	0.00	2008	0.00	0	0.00
Technician/Draftsperson	I	2008	0.00	2008	0.00	0	0.00

Total Direct Salary Costs: 3,425.12

B. Indirect Costs - 136.8% of direct salary cost

Indirect Costs: 4,685.56

C. Maximum Reimbursement Rates for Direct Non-Salary Costs:

Item	Maxium Reimbursement Rate	Estimated No. of Units		
Mileage	0.47 /mi.	1080 miles/trip	1	507.60
Tolls	18 /day	8 trips		144.00
Lodging	127 /night	0 nights		0.00
Meals	64 /day	0 days		0.00
Level D Protective Equip	25 /day	6 days	1	150.00
Truck Rental	550 /week	1 week		550.00
Horriba U-22	300 /week	0 week		0.00
Water level meter	50 /week	0 week		0.00
Grundfos Pump	315 /week	0 week		0.00
Generator	150 /week	1 week		150.00
Tubing	0.3 /foot	0 feet		0.00
Rental Equip Shipping	0 /shipment	1 shipment		0.00
FedEx (coolers)	60 /day	2 days		120.00
Misc Field (alconox. Iee, plastic, etc)	110 /lump	1 lump		110.00
BeSure Laboratory Costs	18268.4 /lump	1 lump		18,268.40

Total Direct Non Salary Costs: **20,000.00**

D. Fixed Fee (6% of Total Direct and Indirect Salary Costs)

Fixed Fee: **486.64**

Assumptions:
Estimate 4 days for field activities; NYSDEC to assist with property access

Schedule 2.11 (f)

Unit Price Subcontracts
Work Assignment Number D004437-26

Name of Subcontractor	Services to be Performed	Subcontract Price	Management Fee
EDR	Environmental Database, Aerial Photos, Topo Maps, etc	$995	$0

Item	Max. Reimbursement Rate (Specify Unit)	Est. No. of Units	Total Est. Cost
City Directories (10 Properties)		10	$995
Subtotal-Subcontract Price			**$995**
Subcontract Management Fee*			**$0**
TOTAL			**$995**

Assumptions:

Includes corridor database search-

EDR Radius Map Report with GeoCheck (This map-based report meets government records requirements for Phase I and other environmental site assessments as described in ASTM standards and the EPA's All Appropriate Inquiries (AAI) rule.)

Sanborn Maps (Provide all available photos from the early 1900s to the present)

Historic Aerial Photos (Decade Package - provide all available photos from the 1930s to the present)

Historic Topographic Maps (Provide all available photos from the early 1900s to the present)

City Directory Abstract (provide a record of changes in property occupancy at specific locations, enabling the evaluation of potential liabilities on a target property resulting from past activities)

Schedule 2.11 (f)

Unit Price Subcontracts
Work Assignment Number _D004437-26_

Name of Subcontractor	Services to be Performed	Subcontract Price	Management Fee
Radar Solutions Inc.	WBE utility locator	$9,650.00	$483

Item	Max. Reimbursement Rate (Specify Uni	Est. No. of Units	Total Est. Cost
Geophysical Survey (Clear Drilling Locations)			
Daily Rate	$1,930 day	5	$9,650.00
Subtotal-Subcontract Price			**$9,650.00**
Subcontract Management Fee*			**$482.50**
TOTAL			**$10,132.50**

* A subcontract management fee of 5% has been included for W/MBE subcontracts.

Schedule 2.11 (f)

Unit Price Subcontracts
Work Assignment Number _D004437-26_

Name of Subcontractor	Services to be Performed	Subcontract Price	Management Fee
ChemWorld Environmental	WBE Data Validator	$3,107.00	$155.35

Item	Max. Reimbursement Rate (Specify Unit)		Est. No. of Units	Total Est. Cost
DATA VALIDATION Task 2				
Groundwater				
TCL VOCs 8260B	$13	/Sample DUSR	187	$2,431.00
Soil				
TCL VOCs 8260 B	$13	/Sample DUSR	52	$676.00

Subtotal-Subcontract Price	**$3,107.00**
Subcontract Management Fee*	**$155.35**
TOTAL	**$3,262.35**

* A subcontract management fee of 5% has been included for M/WBE subcontracts.

Schedule 2.11 (f)

Unit Price Subcontracts
Work Assignment Number _DOO4437-26_

Name of Subcontractor	Services to be Performed	Subcontract Price	Management Fee
Delta Well	WBE Driller	$65,905.00	$3,295.25

Item	Unit Cost		Est. No. of Units	Total Est. Cost
Mobilization	$2,000		1	$2,000
4.25 inch ID Hollow Stem Augers (0-50ft)	$20	ea	300	$6,000
4.25 inch ID Hollow Stem Augers (50-100ft)	$20	ea	300	$6,000
4.25 inch ID Hollow Stem Augers (100-200ft	$45	ea	300	$13,500
2" Split spoons (0-50 ft)	$40	ea	30	$1,200
2" Split spoons (50-100ft)	$50	ea	30	$1,500
2" Split spoons (100-200ft)	$60	ea	60	$3,600
PVC Well Screen, 2.0 inch ID, #10 slot, schedule 40	$5	ft	120	$600
PVC Well Riser, 2.0 inch ID, schedule 40	$4	ft	780	$3,120
Well screen sand pack for 2.0 inch monitoring - well set in 4.25 inch hollow stem augers	$8	ft	180	$1,440
bentonite seal	$25	ft	12	$300
cement bentonite grout	$15	ft	708	$10,620
Flush-Mount, 6.0 inch ID Protector with locking cover, drain hole and concrete apron	$225	ea	6	$1,350
DOT drums	$50	ea	60	$3,000
Moving 55 gallon drums to borehole; filling, transporting and staging of drill cutting drums	$15	ea	60	$900
well development	$180	hr	12	$2,160
decon pad	$875	ea	1	$875
decon time	$180	hr	18	$3,240
water tanker	$300	day	15	$4,500
Subtotal-Subcontract Price				**$65,905.00**
Subcontract Management Fee*				**$3,295.25**
TOTAL				**$69,200.25**

* A subcontract management fee of 5% has been included for W/MBE subcontracts.
Assumes Level D PPE, upgrade to Level C would incur surcharges not reflected above

Schedule 2.11 (f)

Unit Price Subcontracts
Work Assignment Number _**DOO4437-26**_

Name of Subcontractor	Services to be Performed	Subcontract Price	Management Fee
Summit Drilling (WBE)	Groundwater profiling, bori	$146,875.00	$7,343.75

Item		Unit Cost	Est. No. of Units	Total Est. Cost
Mud rotary drill rig, support vehicle, cre	per day	$1,900.00	45	$85,500.00
Mob and demob	lump	$2,500.00	2	$5,000.00
Fuel Surcharge	per day	$125.00	45	$5,625.00
Decontamination of drilling equipment	lump	$250.00	2	$500.00
NY One Call Notification	site	$175.00	2	$350.00
Overnight expense	per day	$250.00	45	$11,250.00
Hydropunch sample	per samp	$125.00	240	$30,000.00
Borehole abandonment	per hole	$425.00	15	$6,375.00
55 gallon drum	per drum	$65.00	35	$2,275.00

Subtotal-Subcontract Price	**$146,875.00**
Subcontract Management Fee*	**$7,343.75**
TOTAL	**$154,218.75**

* A subcontract management fee of 5% has been included for W/MBE subcontracts.
Assumes Level D PPE, upgrade to Level C would be charged at 150% of above crew rate

Schedule 2.11 (f)

Unit Price Subcontracts
Work Assignment Number D004437-26

Name of Subcontractor	**TestAmerica (Severn Trent)**
Services to be Performed	**Laboratory**
Subcontract Price	**$32,030.94**
Management Fee	**$1,601.55**

Item	Max. Reimbursement Rate	Specify Unit	Est. No. of Units	Total Est. Cost
Task 2 - Site Characterization				
LABORATORY ANALYSIS				
Groundwater				
TCL VOCs 8260B (profiling) (a)	$115.88	Sample	168	$19,467.00
TCL VOCs 8260B (wells)	$92.70	Sample	19	$1,761.30
Soil				
TCL VOCs 8260B	$92.70	Sample	52	$4,820.40
RCRA Characteristics, TCLP	$1,495.56	Sample	4	$5,982.24
			Subtotal-Subcontract Price	**$32,030.94**
			Subcontract Management Fee*	**$1,601.55**
			TOTAL	**$33,632.49**

* A subcontract management fee of 5% has been included for subcontracts over $10,000.

Schedule 2.11 (f)

Unit Price Subcontracts
Work Assignment Number D004437-26

Name of Subcontractor	Services to be Performed	Subcontract Price	Management Fee
Miller Environmental	**IDW Removal**	**$27,460.00**	**$1,373.00**

Item	Max. Reimbursement Rate (Specify Unit)	Est. No. of Units	Total Est. Cost
Mobilization - supply tank 10,000 gal	$600 lump	1	$600.00
Daily rental - supply tank 10,000 gal	$44 per day	90	$3,960.00
Cleaning - supply tank 10,000 gal	$1,200 lump	1	$1,200.00
DebMobilization - supply tank 10,000 gal	$600 lump	1	$600.00
Dispose of water from poly tank	$0.55 per gallon	10000	$5,500.00
IDW Removal (non-hazardous soil/water); 55-gal	$120 drum	100	$12,000.00
IDW Removal (non-hazardous debris); 55-gal dru	$120 drum	10	$1,200.00
IDW Removal (non-hazardous mud); 55-gal drum	$120 drum	20	$2,400.00
		TOTAL	**$27,460.00**

Subcontract Management Fee*	**$1,373.00**
TOTAL	**$28,833.00**

* Subcontract Management Fee of 5% on Subcontracts over $10,000

Daily rental is for 90 days @ $44/day

Schedule 2.11 (g) - Summary

Monthly Cost Control Report
Summary of Fiscal Information

Engineer Camp Dresser & McKee
Contract No. D004437
Project Name Speonk Solvent Plume
Work Assignment No. D004437-26
Summary of Tasks
Percentage Completed

Date Prepared ____________
Billing Period ____________
Payment No. _____ **Invoice No.** ____________

Expenditure Category	A Costs Claimed This Period	B Paid to Date	C Total Disallowed to Date	D Total Costs Incurred to Date (A+B+C)	E Estimated Costs to Completion	F Estimated Total Work Assignment Price (A+B+E)	G Approved Budget	H Estimated Under/Over (G-F)
1. Direct Salary Costs	$0	$0	$0	$0	$0	$0	$69,501	
2. Indirect Costs - '167.9%	$0	$0	$0	$0	$0	$0	$116,692	
3. Subtotal Direct Salary Costs and Indirect Costs	$0	$0	$0	$0	$0	$0	$186,193	
4. Travel	$0	$0	$0	$0	$0	$0	$25,066	
5. Other Non-Salary Costs	$0	$0	$0	$0	$0	$0	$7,241	
6. Subtotal Direct Non-Salary Costs	$0	$0	$0	$0	$0	$0	$32,306	
7. Subcontractors	$0	$0	$0	$0	$0	$0	$333,161	
7a. Subcontract Mgt. Fee	$0	$0	$0	$0	$0	$0	$14,251	
8. Total Work Assignment Cost	$0	$0	$0	$0	$0	$0	$565,912	
9. Fixed Fee	$0	$0	$0	$0	$0	$0	$13,034	
10. Total Work Assignment Price	$0	$0	$0	$0	$0	$0	$578,945	

Project Manager (Engineer) Patricia Forgang

Date ______________________

Schedule 2.11 (g)

Monthly Cost Control Report
Summary of Fiscal Information

Engineer Camp Dresser & McKee
Contract No. D004437
Project Name Speonk Solvent Plume
Work Assignment No. D004437-26
Task #/Name Task 1 - Site Visit, Prelim Modelling, Records Search Report & Work Plan Development
Complete 0%

Page 1 of 5
Date Prepared ____
Billing Period ____
Invoice No. ____

	A	B	C	D	E	F	G	H
Expenditure Category	*Costs Claimed This Period*	*Paid to Date*	*Total Disallowed to Date*	*Total Costs Incurred to Date (A+B+C)*	*Estimated Costs to Completion*	*Estimated Total Work Assignment Price (A+B+E)*	*Approved Budget*	*Estimated Under/Over (G-F)*
1. Direct Salary Costs	$0	$0	$0	$0	$0	$0	$17,804	$0
2. Indirect Costs - '167.9%	$0	$0	$0	$0	$0	$0	$29,893	$0
3. Subtotal Direct Salary Costs and Indirect Costs	$0	$0	$0	$0	$0	$0	$47,697	$0
4. Travel	$0	$0	$0	$0	$0	$0	$960	$0
5. Other Non-Salary Costs	$0	$0	$0	$0	$0	$0	$375	$0
6. Subtotal Direct Non-Salary Costs	$0	$0	$0	$0	$0	$0	$1,335	$0
7. Subcontractors	$0	$0	$0	$0	$0	$0	$1,902	$0
7a. Subcontract Mgt. Fee	$0	$0	$0	$0	$0	$0	$0	$0
8. Total Work Assignment Cost	$0	$0	$0	$0	$0	$0	$50,934	$0
9. Fixed Fee	$0	$0	$0	$0	$0	$0	$3,339	$0
10. Total Work Assignment Price	$0	$0	$0	$0	$0	$0	$54,273	$0

Project Manager (Engineer) Patricia Forgang

Date ____

Schedule 2.11 (g)

Monthly Cost Control Report
Summary of Fiscal Information

Engineer Camp Dresser & McKee
Contract No. D004437
Project Name Speonk Solvent Plume
Work Assignment No. D004437-26
Task #/Name Task 2- Site Characterization
Complete 0%

Date Prepared ______
Billing Period ______
Invoice No. ______

	A	B	C	D	E	F	G	H
Expenditure Category	*Costs Claimed This Period*	*Paid to Date*	*Total Disallowed to Date*	*Total Costs Incurred to Date (A+B+C)*	*Estimated Costs to Completion*	*Estimated Total Work Assignment Price (A+B+E)*	*Approved Budget*	*Estimated Under/Over (G-F)*
1. Direct Salary Costs	$0	$0	$0	$0	$0	$0	$35,047	$0
2. Indirect Costs 167.9%	$0	$0	$0	$0	$0	$0	$58,843	$0
3. Subtotal Direct Salary Costs and Indirect Costs	$0	$0	$0	$0	$0	$0	$93,890	$0
4. Travel	$0	$0	$0	$0	$0	$0	$23,465	$0
5. Other Non-Salary Costs	$0	$0	$0	$0	$0	$0	$5,996	$0
6. Subtotal Direct Non-Salary Costs	$0	$0	$0	$0	$0	$0	$29,461	$0
7. Subcontractors	$0	$0	$0	$0	$0	$0	$331,259	$0
7a. Subcontract Mgt. Fee	$0	$0	$0	$0	$0	$0	$14,251	$0
8. Total Work Assignment Cost	$0	$0	$0	$0	$0	$0	$468,861	$0
9. Fixed Fee	$0	$0	$0	$0	$0	$0	$6,572	$0
10. Total Work Assignment Price	$0	$0	$0	$0	$0	$0	$475,433	$0

Project Manager (Engineer) **Patricia Forgang**

Date ______

Schedule 2.11 (g)

Monthly Cost Control Report
Summary of Fiscal Information

Engineer Camp Dresser & McKee
Contract No. D004437
Project Name Speonk Solvent Plume
Work Assignment No. D004437-26
Task #/Name Task 3 - Field Documentation and Reporting
Complete 0%

Page 3 of 5
Date Prepared ______
Billing Period ______
Invoice No. ______

Expenditure Category	A	B	C	D	E	F	G	H
	Costs Claimed This Period	Paid to Date	Total Disallowed to Date	Total Costs Incurred to Date (A+B+C)	Estimated Costs to Completion	Estimated Total Work Assignment Price (A+B+E)	Approved Budget	Estimated Under/Over (G-F)
1. Direct Salary Costs	$0	$0	$0	$0	$0	$0	$9,998	$0
2. Indirect Costs 167.9%	$0	$0	$0	$0	$0	$0	$16,786	$0
3. Subtotal Direct Salary Costs and Indirect Costs	$0	$0	$0	$0	$0	$0	$26,784	$0
4. Travel	$0	$0	$0	$0	$0	$0	$0	$0
5. Other Non-Salary Costs	$0	$0	$0	$0	$0	$0	$475	$0
6. Subtotal Direct Non-Salary Costs	$0	$0	$0	$0	$0	$0	$475	$0
7. Subcontractors	$0	$0	$0	$0	$0	$0	$0	$0
7a. Subcontract Mgt. Fee	$0	$0	$0	$0	$0	$0	$0	$0
8. Total Work Assignment Cost	$0	$0	$0	$0	$0	$0	$27,259	$0
9. Fixed Fee	$0	$0	$0	$0	$0	$0	$1,875	$0
10. Total Work Assignment Price	$0	$0	$0	$0	$0	$0	$29,134	$0

Project Manager (Engineer) **Patricia Forgang**

Date ______

Schedule 2.11 (g)

Monthly Cost Control Report
Summary of Fiscal Information

Engineer Camp Dresser & McKee
Contract No. D004437
Project Name Sgeonk Solvent Plume
Work Assignment No. D004437-26
Task #/Name Task 4- Document Disposition and Data
Complete 0%

Date Prepared
Billing Period
Invoice No.

Expenditure Category	A Costs Claimed This Period	B Paid to Date	C Total Disallowed to Date	D Total Costs Incurred to Date (A+B+C)	E Estimated Costs to Completion	F Estimated Total Work Assignment Price (A+B+E)	G Approved Budget	H Estimated Under/Over (G-F)
1. Direct Salary Costs	$0	$0	$0	$0	$0	$0	$3.993	$0
2. Indirect Costs 167.9%	$0	$0	$0	$0	$0	$0	$6.705	$0
3. Subtotal Direct Salary Costs and Indirect Costs	$0	$0	$0	$0	$0	$0	$10.698	$0
4. Travel	$0	$0	$0	$0	$0	$0	$0	$0
5. Other Non-Salary Costs	$0	$0	$0	$0	$0	$0	$195	$0
6. Subtotal Direct Non-Salary Costs	$0	$0	$0	$0	$0	$0	$195	$0
7. Subcontractors	$0	$0	$0	$0	$0	$0	$0	$0
7a. Subcontract Mgt. Fee	$0	$0	$0	$0	$0	$0	$0	$0
8. Total Work Assignment Cost	$0	$0	$0	$0	$0	$0	$10.893	$0
9. Fixed Fee	$0	$0	$0	$0	$0	$0	$749	$0
10. Total Work Assignment Price	$0	$0	$0	$0	$0	$0	$11.642	$0

Project Manager (Engineer) **Patricia Forgang**

Date

Schedule 2.11 (g)

Monthly Cost Control Report
Summary of Fiscal Information

Engineer Camp Dresser & McKee
Contract No. D004437
Project Name Speonk Solvent Plume
Work Assignment No. D004437-26
Task #/Name Task 5 - Citizen Participation Plan
Complete 0%

Date Prepared ____
Billing Period ____
Invoice No. ____

Expenditure Category	A Costs Claimed This Period	B Paid to Date	C Total Disallowed to Date	D Total Costs Incurred to Date (A+B+C)	E Estimated Costs to Completion	F Estimated Total Work Assignment Price (A+B+E)	G Approved Budget	H Estimated Under/Over (G-F)
1. Direct Salary Costs	$0	$0	$0	$0	$0	$0	$2,659	$0
2. Indirect Costs 167.9%	$0	$0	$0	$0	$0	$0	$4,465	$0
3. Subtotal Direct Salary Costs and Indirect Costs	$0	$0	$0	$0	$0	$0	$7,125	$0
4. Travel	$0	$0	$0	$0	$0	$0	$640	$0
5. Other Non-Salary Costs	$0	$0	$0	$0	$0	$0	$200	$0
6. Subtotal Direct Non-Salary Costs	$0	$0	$0	$0	$0	$0	$840	$0
7. Subcontractors	$0	$0	$0	$0	$0	$0	$0	$0
7a. Subcontract Mgt. Fee	$0	$0	$0	$0	$0	$0	$0	$0
8. Total Work Assignment Cost	$0	$0	$0	$0	$0	$0	$7,965	$0
9. Fixed Fee	$0	$0	$0	$0	$0	$0	$499	$0
10. Total Work Assignment Price	$0	$0	$0	$0	$0	$0	$8,464	$0

Project Manager (Engineer) Patricia Forgang

Date ____

Schedule 2.11 (g) - Supplemental

Cost Control Report for Subcontracts

Engineer Camp Dresser & McKee
Contract No. D004437
Project Name Speonk Solvent Plume
Work Assignment No. D004437-26

Page 5 of 5
Date Prepared ______
Billing Period ______
Invoice No. ______

Subcontract Name	A Subcontract Costs Claimed this Application Inc. Resubmittals	B Subcontract Costs Approved for Payment on Previous Applications	C Total Subcontract Costs to Date (A plus B)	D Subcontract Approved Budget	E Management Fee Budget	F Management Fee Paid	G Total Costs to Date (C plus F)
1. EDR	$0	$0	$0	$995	$0	$0	$0
1. Radar Solutions	$0	$0	$0	$9,650	$483	$0	$0
2. ChemWorld Environmental	$0	$0	$0	$3,107	$155	$0	$0
3. Yu & Associates, Inc.	$0	$0	$0	$46,231	$0	$0	$0
4. Delta Well	$0	$0	$0	$65,905	$3,295	$0	$0
5. Ken Schider	$0	$0	$0	$907	$0	$0	$0
6. Test America	$0	$0	$0	$32,031	$1,602	$0	$0
7. Summit Drilling	$0	$0	$0	$146,875	$7,344	$0	$0
8. Miller Environmental	$0	$0	$0	$27,460	$1,373	$0	$0
TOTALS	$0	$0	$0	$333,161	$14,251	$0	$0

Project Manager (Engineer) Patricia Forgang **Date** ______

NOTES:

1) Costs listed in Columns A, B, C & D do not include any management fee costs.
2) Management fee is applicable to only properly procured, satisfactorily completed, unit price subcontracts over $10,000.
3) Line 11, Cloumn G should equal Line 7 (Subcontractors), Column D of Summary Cost Control Report.

Schedule 2.11(h)
Monthly Cost Control Report
Summary of Labor Hours
Number of Direct Labor Hours Expended to Date/Estimated Number of Direct Labor Hours to Completion

Engineer/Contract # D004437
Project Name Speonk Solvent Plume
Work Assignment No. D004437-26

Date Prepared ____________
Billing Period ____________
Invoice No. ____________

NSPE Labor Classification	*IX Exp/Est*	*VIII Exp/Est*	*VII Exp/Est*	*VI Exp/Est*	*IV Exp/Est*	*III Exp/Est*	*II Exp/Est*	*I Exp/Est*	*Admin.*	*Total No. of Direct Labor Hrs. Exp/Est*
Task 1	0 / 4	0 / 40	0 / 16	0 / 98	0 / 123	0 / 155	0 / 48	0 / 0	0 / 6	0 / 490
Task 2	0 / 6	0 / 12	0 / 10	0 / 205	0 / 270	0 / 460	0 / 72	0 / 0	0 / 6	0 / 1041
Task 3	0 / 4	0 / 8	0 / 12	0 / 24	0 / 120	0 / 80	0 / 46	0 / 0	0 / 6	0 / 300
Task 4	0 / 2	0 / 2	0 / 4	0 / 16	0 / 31	0 / 40	0 / 20	0 / 0	0 / 6	0 / 121
Task 5	0 / 4	0 / 10	0 / 8	0 / 10	0 / 0	0 / 28	0 / 0	0 / 0	0 / 6	0 / 66
Total Hours	0 / 20	0 / 72	0 / 50	0 / 353	0 / 544	0 / 763	0 / 186	0 / 0	0 / 30	0 / 2018

* Expended/Estimated

Borings/Groundwater Profiles to 200 ft	Delta Well (WBE)	Summit Drilling (WBE)	SGS	SGS/Stone	Glacier Drilling (1)
Mobilization	$6000 lump sum	$5000 lump sum	$6.500 lump sum	$8,000 lump sum	$700/day
Technique	Auger/temporary well	mud rotary/hydropunch	Auger/temporary well	Mud Rotary/ Waterloo profiler	Geoprobe 8040/temporary well
No. Days	45	45	90	53	30
Basis	Footage/time	time/materials	time/materials	time/materials	time/materials
Total estimated Cost	$247,300	$146,875	$369,440	$343,140	$117,581

It was necessary for CDM to request bids from drillers not on the standby list due to the unique requirements of the project.
Broing/GW Profiling contractor unit costs are included in bidding sheets attached.
This is not remedial design work nor is it a response-type activity.
(1) Glacier Drilling has refused to provide qualifications documentation.

Well Drilling	Delta Well (WBE)	Summit Drilling (WBE)	SGS	Glacier Drilling	Hydrotech	Lawes
Mobilization	$2,000 lump sum	$2,500 lump sum	$8,000 lump sum	$700/day	No bid	No bid
Technique	Auger	mud rotary	Auger	Auger	Says too deep	Says too deep
No. Days	15	18	60	17		
Basis	Footage/time	time/materials	time/materials	time/materials		
Total Cost	$65,905	$66,772	$150,370	$86,830	No bid	No bid

It was necessary for CDM to request bids from drillers not on the standby list due to the unique requirements of the project.
Drilling contractor unit costs are included in bidding sheets attached.

Laboratory - Test America	Quantity	Units	Unit Price			
Soil						
TCL VOCs 8260	52	Sample	92.7	$4,820		
Water						
TCL VOCs 8260 - groundwater profiling with one-week turnaround time	168	Sample	115.875	$19,467		
TCL VOCs 8260 - groundwater profiling with one-week turnaround time	19	Sample	92.7	$1,761		
Waste Charcactization						
Soil	2	Sample	1495.56	$2,991		
Water	1	Sample	1495.56	$1,496		
Drilling Mud	1	Sample	1495.56	$1,496		
Total Cost				$32,031		

Data Validator - ChemWorld Environmental (WBE)	Quantity	Units	Unit Price			
Soil						
TCL VOCs 8260	52	Sample	13	$676		
Water						
TCL VOCs 8260	187	Sample	13	$2,431		
	Total Cost			$3,107		

Land Survey and Soil Gas Screening	YEC (MBE)	Yu (MBE)	Matrix (MBE)
Total Cost	$49,051	$46,231	$53,675

Geophysics	Radar Solutions (WBE)	Naeva	AGS	Hager (WBE)	Hager-Richter (WBE)
Days	5	6	4	4-5	5
Estimated Cost	$9,650	$15,408	$8,400	$18,450	$17,000

Investigation Derived Waste Disposal		Estimated Quantity	Unit	Innovative	Envirosmart	SeaCoast	H&S Environmental	Miller Environmental
				(2-6900-gal tank)	(2-4,900-gallon tank)	(2 - 4,000-gallon tank)	(2-6,000-gallon tank)	(1-10,000gal tank)
Supply Tank	mobilization	1	each	$3,800	$2,750	$1,610	$1,280	$600
	daily rental	90	day	$29	$29	$34	$29	$44
	cleaning	1	each	$2,900	$6,710	$3,600	$8,800	$1,200
	demobilization	1	each	$3,600	$2,750	$1,610	$1,280	$600
dispose of water from poly tank		10000	gal - nonhazardous	$0.60	$0.78	$0.64	$0.86	$0.55
		0	gal - hazardous	2.25/gallon	Not provided	$1.78	Not provided	Not provided
dispose of 55-gallon drums - primarily soil, with water, plastic, debris		100	each - nonhazardous	$115	$120	$123	$145	120
		0	each - hazardous	$395	Not provided	$180	Not provided	Not provided
dispose of 55-gallon drums - primarily debris (plastic), with water, soil		10	each - nonhazardous	$115	$120	$123	$145	$120
		0	each - hazardous	$385	Not provided	$180	Not provided	Not provided
Dispose of 55-gallon drums - drilling mud (bentonite/water)		20	each - nonhazardous	$115	$120	$123	$175	$120
		0	each - hazardous	$385	Not provided	$180	Not provided	Not provided
Dispose of 55-gallon drums - development water		0	each - nonhazardous	$115	Not provided	$123	Not provided	Not provided
		0	each - hazardous	$385	Not provided	180	Not provided	Not provided
			Total Cost	$32,210	$38,220	$32,270	$42,020	$27,460

Drilling Contractor Bids
Groundwater Profiling
Groundwater Monitoring Wells

Chenenko, Ricky wells

From: Glacierdrilling@aol.com
Sent: Monday, April 21, 2008 2:53 PM
To: Chenenko, Ricky
Subject: Re: Emailing: speonk profilng bid.pdf
Attachments: CDM NJ 3.pdf

I just read your note concerning the Geoprobe cost proposals. The number of liners was an error on my part in typing this up. Simply took a number from the wrong column from my notes. I will revise them to indicate the correct number of liners howevery it will not change our estimate for the number of days required.
I will have Mark call you at his first opportunity to take about the tooling.

Attached is a cost proposal for the well installation work. The only item I haven't been able to address is the Water supply - Tanker. If we have to supply that we'll have to figure out how we might do that in view of the logistics for us. I will pursue this and will give you a line item to add for this if we can figure out how we might address this.

Reuben R. Schock,
Business Manager/Development
Glacier Drilling, LLC
Phone / fax 860-645-1304
glacierdrilling@aol.com

Glacier Drilling, LLC P.O. Box 9188, Bolton, CT 06043-9188

Date: 4/21/2008

For: **Cost Proposal**

Camp Dresser & McKee
Raritain Plazal, RaritainCenter
Edison, New Jersey 08818

Phone: 732-590-4645
Fax: 732-225-7851

Attention: Ricky A Chenenko,

We are pleased to submit the following bid:

Job Description:

Scope of work for monitoring well installation:
Using a Truck Rig: CME-85 install 6 (2" PVC) MWs, 3 to 200' requiring sampling every 5' and 3 to 100' with no sampling required using 10' screens, .010 slot and finish with 8" Road Boxes; and steam clean between borings; grout to surface and drum excess materials and also develop wells at a site in the Hamlet of Speonk, NY.

Equipment / Labor & Materials:

Quantity	DESCRIPTION	CHARGES	TOTAL
17.00	Truck Rig: CME-85 / 2 man crew / day	$3,600.00	61,200.00
	(Level C Rate)		
17.00	Mob. & Demob. / Per Day	700.00	11,900.00
15.00	Steam Cleaner charge / day	150.00	2,250.00
1.00	Decon pad charge	250.00	250.00
2.00	Pump	95.00	190.00
6.00	Threaded Plug, 2" PVC	8.00	48.00
6.00	Screen, .010 slot x 10', 2" PVC	40.00	240.00
78.00	Riser x 10', 2" PVC	26.50	2,067.00
6.00	Expandable Gripper, 2"	18.00	108.00
48.00	Sand, 50 lb bags	11.50	552.00
6.00	Bentonite / bag	22.50	135.00
6.00	8" Road Box	55.00	330.00
12.00	Cement Mix / bag	12.50	150.00
822.00	Grouting / ft.	5.00	4,110.00
60.00	Drums	55.00	3,300.00
Additional Comments:			
a) This cost estimate will be adjusted for actual quantities required.			
b) Overtime, if required after 8 hrs. on site, would be billed at $450./hr.			
Prepared by: Reuben R. Schock, Phone/Fax: 860-645-1304			
		Total service charges:	**86,830.00**

Price valid until: 7/21/2008

Wells

Chenenko, Ricky

From: Chris Okon [chris@deltawell.com]
Sent: Thursday, April 17, 2008 4:44 PM
To: Chenenko, Ricky
Subject: NYSDEC Speonk MW bid
Attachments: scan0001.pdf

Ricky - attached is pricing for the MW bid. Our estimate assumes the following:

Drilling locations are accessible to Failing F-10 HSA rig
Level D PPE w/HASP and monitoring by CDM
Available One-Call-Center underground utility mark-outs by Delta
Private property mark-outs are not included
A staging area will be provided
Access permits are not included in pricing
Sales tax is not included in pricing

Call/email me with any questions.

Christopher M. Okon
DELTA WELL & PUMP CO INC
97 Union Ave, PO Box 1309
Ronkonkoma, NY 11779
631-981-2255
631-981-2369 (fax)
chris@deltawell.com

BID SHEET
[illegible] GROUNDWATER PLUME
SUFFOLK COUNTY, NEW YORK
APRIL 2008

Company Name & Contact Information	Company Contact Address Tel Fax Email

Description	Quantity	Unit	Unit Rate Level C	Unit Rate Level D	Cost Level C	Cost Level D
Mobilization						
Mobilization	1	each		2200		2200
Proposed Restoration [illegible]						
Proposed Production [illegible]	15	day	700	—	10,500	—
[illegible]						
0-[illegible] feet in depth						
4.25 inch ID Hollow Stem Augers	300	feet	25	20	7500	6000
[illegible] feet in depth						
4.25 inch ID Hollow Stem Augers	300	feet	25	20	7500	6000
[illegible] in depth						
4.25 inch ID Hollow Stem Augers	300	feet	57	45	17,100	13500
[illegible]						
0-[illegible] feet in depth						
2.0 inch	30	each	50	40	1500	1200
[illegible] feet in depth						
2.0 inch	30		63	50	1890	1500
[illegible] feet in depth						
2.0 inch	60		75	60	4500	3600
Well Screen (Flush joint threaded) [illegible]						
PVC Well Screen, 2.0 inch ID, [illegible]	120	feet	7	5	840	600
Well Riser (Flush joint threaded) PVC						
PVC well riser, 2.0 inch ID [illegible]	780	feet	6	4	4680	3120
Well Screen [illegible]						
[illegible]	180	feet	10	8	1800	1440
Bentonite [illegible]						
[illegible] 2.0 inch [illegible]	12	feet	32	25	384	300
[illegible]						
[illegible]	708	feet		15		10,620
High solids bentonite		feet		17		—
[illegible]						
Flush Mount						
[illegible]	6	each		225		1350
[illegible] of Drilling Materials						
Supply Clean DOT approved [illegible] gallon drums [illegible]	60	each		50		3000
[illegible]	60	each		15		900
Well Development						
[illegible]			225	180	2700	2160
[illegible]			225	180	2700	2160
[illegible]	12	hour	225	180	2700	2160
[illegible]			225	180	2700	2160
Decontamination						
[illegible]	1	each		875		875
[illegible]	18	hour		180		3240
[illegible]		hour		200		—
Stand-by Time						
[illegible]		hour		150		—
[illegible]		hour		200		—
Other						
Water Tanker	15	day		300		4500
TOTAL						72,335

DELTA WELL & PUMP CO., INC.
97 UNION AVE., P.O. BOX 1309
RONKONKOMA, NY 11779-0760
PHONE (631) 981-2255 ● FAX 981-2369

4-17-08

CHRIS OKON

4 Days included

65905

BID SHEET
[illegible] GROUNDWATER PLUME
SUFFOLK COUNTY, NEW YORK
APRIL 2008

Company Name & Contact Information	Company Contact Address Tel Fax Email

Description	Quantity	Units	Unit Rate Level C	Unit Rate Level D	Cost Level C	Cost Level D
Mobilization						
Mobilization		1 each		2000		2000
Personal Protective Equipment						
Personal Protective Equipment		15 day	700	—	10,500	—
Hollow Stem Augering (without sampling)						
0-50 feet in depth						
4.25 inch ID Hollow Stem Augers		300 feet	25	20	7500	6000
50-100 feet in depth						
4.25 inch ID Hollow Stem Augers		300 feet	25	20	7500	6000
100-300 feet in depth						
4.25 inch ID Hollow Stem Augers		300 feet	57	45	17100	13500
[illegible]						
0-50 feet in depth						
2.0 inch		30 each	50	40	1500	1200
50-100 feet in depth						
2.0 inch		30	63	50	1890	1500
100-300 feet in depth						
2.0 inch		60	75	60	4500	[illegible]
Well Screen [illegible] PVC						
PVC Well Screen, 2.0 inch ID, 0.010 slot, schedule 40		120 feet	7	5	840	600
Well Riser (Flush Joint Threaded) PVC						
PVC well riser, 2.0 inch ID, schedule 40		780 feet	6	4	4680	3120
Well Screen Backfill Material						
[illegible]		180 feet	10	8	1800	1440
Bentonite Pellet Seal						
Seal for 2.0 inch [illegible]		12 feet	32	25	384	300
Riser Backfill Material (Grout)						
Cement-bentonite		708 feet		15		10620
High solids bentonite		feet		17		—
Installation of Protective Casing						
Flush Mount						
[illegible] 8.0 inch ID [illegible]		6 each		225		1350
Containerization of Drilling Materials						
Supply Clean DOT-approved 55 gallon drums [illegible]		60 each		50		3000
Moving 55 gallon drums [illegible]		60 each		15		900
Well Development						
[illegible]			225	180	2700	2160
[illegible]			225	180	2700	2160
Pump and surge [illegible]		12 hour	225	180	2700	2160
High pressure jetting			225	180	2700	2160
[illegible]		1 each		875		875
Steam cleaning of drill rig [illegible]		18 hours		180		3240
Decontamination of split spoons using solvents		hours		200		—
Stand-by Time						
[illegible] crew		hour		150		—
Rig and crew		hour		300		—
Other						
Water Trailer	15	day		300		4500
TOTAL						72,545

DELTA WELL & PUMP CO., INC.
97 UNION AVE., P.O. BOX 1309
RONKONKOMA, NY 11779-0760
PHONE (631) 981-2255 ● FAX 981-2369

[signature] 4-17-08
CHRIS OKON

wells + Profs

Chenenko, Ricky

From: Robert Kreilick [rrk@summitdrilling.com]

Sent: Wednesday, April 16, 2008 2:51 PM

To: Chenenko, Ricky

Attachments: Proposal Number- P004653 Job Site- Speonk NY.PDF; Proposal Number- P004652 Job Site- Speonk NY.PDF

Robert R. Kreilick, Jr., P.G.
Robert R. Kreilick, Jr., P.G.
President and Chief Executive Officer
rrk@summitdrilling.com

Summit Drilling Co., Inc.
9W Chimney Rock Road
Bound Brook, NJ 08805
908-722-4266 Telephone
732-356-1009 Fax
800-242-6648 Toll Free
www.summitdrilling.com

9W Chimney Rock Road, Bound Brook, NJ 06805
Telephone (908) 722-4266 Toll Free (800) 242-6648 Fax (732) 356-1009
www.summitdrilling.com

Summit Drilling Co., Inc.

Proposal No.:	P004653
Terms:	Not to exceed 60 day
Date:	4/9/08
Attention:	Ricky Chenenko
Your email:	Chenenkora@cdm.com
Phone No:	732-225-7000
Fax No:	732-225-7851
Cell No:	--

Company: Camp Dresser & McKee, Inc.
Raritan Plaza I
Raritan Center
Edison, NJ 08818

Job Site:
Speonk, NY

Scope: TASK 1
(10) Soil boring/Groundwater profile borings to approximately 200'
* Split spoons to approximately 40'
* Discrete water samples every 10' from 40' to 200'
* Abandon upon completion

TASK 2
(5) Soil boring/Groundwater profile borings to approximately 200'
* Split spoons to approximately 40'
* Discrete water samples every 10' from 40' to 200'
* Abandon upon completion

Item Description	Estimated Quantity	Unit	Unit Price	Extended Total
TASK 1				
Mud rotary drill rig, support vehicle, crew	30.00	Days	1,900.00	57,000.00
Mobilization - demobilization	1.00	Lump Sum	2,500.00	2,500.00
Fuel surcharge	30.00	Days	125.00	3,750.00
Decontamination of drilling equipment	1.00	Lump Sum	250.00	250.00
NY One Cell Notification	1.00	Site	175.00	175.00
Overnight Expenses	30.00	Nite	250.00	7,500.00
Hydropunch sample	160.00	Each	125.00	20,000.00
Borehole abandonment	10.00	Location	425.00	4,250.00
55 gallon drum	20.00	Each	65.00	1,300.00
TASK 1 Approximate Cost	1.00	Total	96,725.00	96,725.00
TASK 2				
Mud rotary drill rig, support vehicle, crew	15.00	Days	1,900.00	28,500.00
Mobilization - demobilization	1.00	Lump Sum	2,500.00	2,500.00
Fuel surcharge	15.00	Days	125.00	1,875.00
Decontamination of drilling equipment	1.00	Lump Sum	250.00	250.00
NY One Call Notification	1.00	Site	175.00	175.00
Overnight Expenses	15.00	Nite	250.00	3,750.00
Hydropunch sample	80.00	Each	125.00	10,000.00
Borehole abandonment	5.00	Location	425.00	2,125.00
55 gallon drum	15.00	Each	65.00	975.00
TASK 2 Approximate Cost	1.00	Total	50,150.00	50,150.00
	Approximate Total			**$146,875.00**

Summit Drilling now offers drum removal services

ADDITIONAL ITEMS, IF REQUIRED:
If a job is cancelled within 48 business hours of drill date, the jobs mobilization and ½ the daily rate will be invoiced, Well construction variance request @ $125/well, NJDEP well search @ $85/well, Liftgate trk/ drum moving @ $675/day, Overtime @ $250/hr, asphalt patch @ $15/bag, hole plug @ $22/bag, 1" PVC screen @ $6/foot, 1" PVC riser @ $4/foot, 1" PVC cap @ $4/each.

DRILLING CO., INC.

9W Chimney Rock Road, Bound Brook, NJ 08805
Telephone (908) 722-4266 Toll Free (800) 242-6648 Fax (732) 356-1009
www.summitdrilling.com

Company: Camp Dresser & McKee, Inc.
Raritan Plaza I
Raritan Center
Edison, NJ 08818

Proposal No.: P004653
Terms: Not to exceed 60 day
Date: 4/9/08
Attention: Ricky Chenenko
Your email: Chenenkora@cdm.com

Phone No: 732-225-7000
Fax No: 732-225-7851
Cell No: --

Job Site:
Speonk, NY

Item Description	Estimated Quantity	Unit	Unit Price	Extended Total

Summit's invoice to be paid when you receive payment from your client, but not to exceed the terms stated above. A finance charge of 1-1/2% per month will be applied to the unpaid balance after terms stated. In the event Summit is required to institute legal action in order to recover any monies due and owing under this agreement, it is agreed and understood that Summit will be entitled to collect reasonable attorney fees and costs of suit.

All work to conform to D.E.P. specifications. Daily rate subject to change for Level C, B, A protection. Client assumes all responsibility for all underground markouts. This proposal is good for 60 days.

Camp Dresser & McKee, Inc.

Acceptance of Proposal - The above prices, specifications and conditions are satisfactory and accepted. You are authorized to do the work as specified PAYMENT WILL BE MADE AS OUTLINED ABOVE.

Date of acceptance________________________________

Your Signature___________________________________

Summit Drilling Co. Inc.
By

Robert R. Kreilick, Jr., P.G.
President
rrk@summitdrilling.com

Summit Drilling Co., Inc.

9W Chimney Rock Road, Bound Brook, NJ 08805
Telephone (908) 722-4266 Toll Free (800) 242-6648 Fax (732) 356-1009
www.summitdrilling.com

Company: Camp Dresser & McKee, Inc.
Raritan Plaza I
Raritan Center
Edison, NJ 08818

Proposal No.: P004652
Terms: Not to exceed 60 day
Date: 4/9/08
Attention: Ricky Chenenko
Your email: Chenenkora@cdm.com

Phone No: 732-225-7000
Fax No: 732-225-7851
Cell No: --

Job Site:
Speonk, NY

Scope: Install (3) 2" Diameter well pairs:
* (1) 2" PVC monitor well to approximately 100'
* (1) 2" PVC monitor well to approximately 200'
* Split spoon samples every 5'

Item Description	Estimated Quantity	Unit	Unit Price	Extended Total
Mud rotary drill rig, support vehicle, crew	18.00	Days	1,900.00	34,200.00
Mobilization - demobilization	1.00	Lump Sum	2,500.00	2,500.00
Fuel surcharge	18.00	Days	125.00	2,250.00
Decontamination of drilling equipment	1.00	Lump Sum	300.00	300.00
NY One Call Notification	1.00	Lump Sum	175.00	175.00
Overnight Expenses	18.00	Nite	250.00	4,500.00
Well Development	6.00	Each	725.00	4,350.00
Morie well gravel	6.00	Well	125.00	750.00
Bentonite slurry	6.00	Well	100.00	600.00
Portland cement	45.00	Bag	15.00	675.00
2" PVC Screen, .020 slot (10' per well)	60.00	Foot	12.00	720.00
2" PVC riser	1,680.00	Foot	6.00	10,080.00
2" PVC cap/bottom	6.00	Each	12.00	72.00
Flushmount surface completion	6.00	Each	275.00	1,650.00
55 gallon drum	60.00	Each	65.00	3,900.00
		Approximate Total		**$66,722.00**

Summit Drilling now offers drum removal services

ADDITIONAL ITEMS, IF REQUIRED:
If a job is cancelled within 48 business hours of drill date, the jobs mobilization and ½ the daily rate will be invoiced, Well construction variance request @ $125/well, NJDEP well search @ $85/well, Liftgate trk/ drum moving @ $675/day, Overtime @ $250/hr, asphalt patch @ $15/bag, hole plug @ $22/bag, 1" PVC screen @ $6/foot, 1" PVC riser @ $4/foot, 1" PVC cap @ $4/each.

Summit's invoice to be paid when you receive payment from your client, but not to exceed the terms stated above. A finance charge of 1-1/2% per month will be applied to the unpaid balance after terms stated. In the event Summit is required to institute legal action in order to recover any monies due and owing under this agreement, it is agreed and understood that Summit will be entitled to collect reasonable attorney fees and costs of suit.

All work to conform to D.E.P. specifications. Daily rate subject to change for Level C, B, A protection. Client assumes all responsibility for all underground markouts. This proposal is good for 60 days.

Camp Dresser & McKee, Inc.

Acceptance of Proposal - The above prices, specifications and conditions are satisfactory and accepted. You are authorized to do the work as specified. PAYMENT WILL BE MADE AS OUTLINED ABOVE.

Date of acceptance______________________________

Your Signature______________________________

Summit Drilling Co. Inc.
By

Robert R. Kreilick, Jr., P.G.
President
rrk@summitdrilling.com

Wells + Profiles

Chenenko, Ricky

From: Dillon, Dermot P (West Creek) [Dermot.Dillon@sgs.com]
Sent: Tuesday, April 22, 2008 2:23 PM
To: Chenenko, Ricky
Subject: RE: Emailing: speonk profilng bid.pdf

Attachments: 0408-5850.xls; 0408-5851.xls; 0408-5852.xls

0408-5850.xls (158 KB) 0408-5851.xls (93 KB) 0408-5852.xls (93 KB)

Ricky:

Attached, please find 3 quotes for Speonk, NY.

One for profiling the 15 locations to 200'
One for HAS with spoons and Temp well water samples One for 3 each nested well pairs to 200'

Please review, and if you have any questions, please give me a call.

Dermot P. Dillon
Drilling Division Manager
SGS Environmental Services Inc.
PO Box 423
328 Stafford Forge Road
West Creek, NJ 08092
Ph. 609-294-1110
Fax 609-296-8970

http://www.us.sgs.com/drilling_us.htm

-----Original Message-----
From: Chenenko, Ricky [mailto:ChenenkoRA@cdm.com]
Sent: Wednesday, April 16, 2008 10:21 AM
To: Becker, Art E (West Creek)
Cc: Dillon, Dermot P (West Creek)
Subject: RE: Emailing: speonk profilng bid.pdf

That would be fine.

You may also want to quote without it, using another method. If total costs are different. Then we'll need to weigh the costs and benefits.

-----Original Message-----
From: Becker, Art E (West Creek) [mailto:Art.Becker@sgs.com]
Sent: Wednesday, April 16, 2008 10:05 AM

To: Chenenko, Ricky
Cc: Dermot Dillon
Subject: RE: Emailing: speonk profilng bid.pdf

Ricky,
Yes, we did the Speonk work with ERM. We went to 150 ft. with the Geoprobe. We partner with Stone Environmental in deep profiling with their proprietory profiling equipment. This provides excellent data and results. Do you want us to quote the project using Stone's technology??
Art

-----Original Message-----
From: "Chenenko, Ricky" <ChenenkoRA@cdm.com>
To: "Becker, Art E (West Creek)" <Art.Becker@sgs.com>
Sent: 4/16/08 9:25 AM
Subject: RE: Emailing: speonk profilng bid.pdf

Art,

Was that the same "Speonk Groundwater Plume" project? I know that ERM was out there with a Geoprobe and got to around that deep. Was that you guys?

Anyway, don't hesitate to bid on an alternate method. I may be forced to change methods. Such as augers with temporary well pulled up. Or augers (or perhaps mud) with hydropunch.

I'd spoken to the folks with the Waterloo profiler and they sent me an estimate, which included you as their driller. At that time I was looking around for possible alternatives, due to the depth issue. I'd forgetten about that when I sent you this. You may want to revisit that
with them, for this bid.

Thanks,
Ricky
-----Original Message-----
From: Becker, Art E (West Creek) [mailto:Art.Becker@sgs.com]
Sent: Tuesday, April 15, 2008 8:41 PM
To: Chenenko, Ricky
Cc: Dillon, Dermot P (West Creek); Hanley, Thomas (West Creek)
Subject: RE: Emailing: speonk profilng bid.pdf

Ricky,
I was in Philadelphia all day, just got home. I will be away the balance of this week. I have forwarded the bid to our West Creek office. We will review specs and get back to you with our intention to bid or not based upon the significant auger and Geoprobe depths you desire. We have been to 150 feet with the Geoprobe around Speonk. It will be difficult to get to 200 feet and heaving sands will be an issue. Let us review and think about this. Thanks for including us in the bid process.
Art

-----Original Message-----
From: Chenenko, Ricky [mailto:ChenenkoRA@cdm.com]
Sent: Tuesday, April 15, 2008 11:43 AM
To: Becker, Art E (West Creek)
Subject: Emailing: speonk profilng bid.pdf

Art,

CDM is performing a groundwater investigation in Speonk, Suffolk County, for NYSDEC. As part of this work we are proposing to install up to 15 groundwater profiling borings and 6 monitoring wells.

The profile borings can be performed with drill rig or by direct push - (depth of 200 feet is near or beyond most direct push technology). Soils will be samples prior to the profiling. Please specify type of rig and tooling proposed for this borings.

Wells will be installed by auger, in three clusters of two wells.

Note: Two-hundred foot depth is based upon approximate base of the upper glacial aquifer.

Please read the attached scopes of work and complete the bid forms.
Note that these are separate contracts and will be awarded separately.

Please use the current pricing in the master services agreement. Assume all work in Level D; provide level C unit prices as appropriate.

If you have any questions, please feel free to call me. If you can have bids to me by close of business Thursday, it would be greatly appreciated.

Thanks,

Ricky A. Chenenko
CDM
Raritan Plaza I, Raritan Center
Edison, New Jersey 08818

Main: (732) 225-7000 ext. 54645
Direct: (732) 590-4645
Fax: (732) 225-7851

The message is ready to be sent with the following file or link attachments:

speonk profilng bid.pdf

Information in this email and any attachments is confidential and intended solely for the use of the individual(s) to whom it is addressed or otherwise directed. Please note that any views or opinions presented in this email are solely those of the author and do not necessarily represent those of the Company.
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All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at http://www.sgs.com/terms_and_conditions.htm

Information in this email and any attachments is confidential and intended solely for the use of the individual(s) to whom it is addressed or otherwise directed. Please note that any views or opinions presented in this email are solely those of the author and do not

necessarily represent those of the Company.
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All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at http://www.sgs.com/terms_and_conditions.htm

Scope of Work: As requested, we will provide mud rotary drill rig to drill profile holes as per your specifications. The rig will be equipped with a Groprobe® hammer capable of driving the Stone Environmental profiler to a depth of 200' at 15 locations. Upon completion of the profile holes,the borehole grouted to the surface as needed. All drill cuttings and mud will be placed in 55 gallon drums for disposal by others. Decontamination will take place between locations.

We have included a line item for DOT approved 55 gallon drums in the event cuttings need to be contained. Our prices are as follows:

Description	***Quantity***	***unit***	***unit price***	***total price***
Mobilization of Profiling drill rig and crew equipped with specialized drilling and sampling tooling	2	each	$ 4,000.00	***$ 8,000.00***
Saturday rig and crew surcharge	5	each	$ 500.00	***$ 2,500.00***
Sunday rig and crew surcharge	5	each	$ 750.00	***$ 3,750.00***
Mud rotary Profile drill rig and crew per 10 hr day	53	per 10 hr day	$ 3,250.00	***$ 172,250.00***
Water truck rental per month	2	per month	$ 3,200.00	***$ 6,400.00***
Perdiem for drill crew (per man per day)	106	per man / nt	$ 130.00	***$ 13,780.00***
Abandonment of boreholes (assume 100' per borehole)	1500	per foot	$ 6.00	***$ 9,000.00***
55 gallon drums for collection of drill mud and cuttings	120	each	$ 52.00	***$ 6,240.00***
Overtime rate rig and crew per hour (after 10 hrs on site)		per hour	$ 345.00	***$ -***
Water Acquisition per month	2	per month	$ 325.00	***$ 650.00***
Hydrant adaptor and backflow preventor per month	2	per month	$ 250.00	***$ 500.00***
Stone Costs (see Stone inc. worksheet)	1	each	$ 120,070.00	***$ 120,070.00***
			Total	***$ 343,140.00***

Prices are good for a period of 60 Days.

Prices do not include a surcharge for union or prevailing wage rate labor. If either of these are needed, please contact this office

Rigs will be scheduled upon receipt of a signed proposal or contract. SGS cannot hold any tentative dates. Due to our present commitments with our clients, scheduling dates will only be held with one of these documents in hand.

Scope of Work: As requested, we will provide hollow stem auger drill rig to drill boreholes to a depth of 200' at 15 locations. Continuous split spoon samples will be collected to total depth. A 1" temp PVC well will be installed, and raised through the borehole for the collection of water samples at 10' intervals while removing the augers. Upon completion,the boreholes will be grouted to the surface as needed. All drill cuttings and mud will be placed in 55 gallon drums for disposal by others. Decontamination will take place between locations.

We have included a line item for DOT approved 55 gallon drums in the event cuttings need to be contained. Our prices are as follows:

Description	Quantity	unit	unit price	total price
Mobilization of CME 1050 H.S.A rig and crew	1	each	$ 6,500.00	*$ 6,500.00*
Saturday rig and crew surcharge	5	each	$ 500.00	*$ 2,500.00*
Sunday rig and crew surcharge	5	each	$ 750.00	*$ 3,750.00*
CME 1050 and drill crew per 10 hr day	90	per 10 hr day	$ 3,250.00	*$ 292,500.00*
Water truck rental per month	2	per month	$ 3,200.00	*$ 6,400.00*
Perdiem for drill crew (per man per day)	180	per man / nt	$ 130.00	*$ 23,400.00*
Abandonment of boreholes (assume 100' per borehole)	1500	per foot	$ 6.00	*$ 9,000.00*
55 gallon drums for collection of drill mud and cuttings	120	each	$ 52.00	*$ 6,240.00*
Overtime rate rig and crew per hour (after 10 hrs on site)		per hour	$ 345.00	*$ -*
Water Acquisition per month	2	per month	$ 325.00	*$ 650.00*
Hydrant adaptor and backflow preventor per month	2	per month	$ 250.00	*$ 500.00*
1" PVC materials for collection of water samples	3000	feet	$ 6.00	*$ 18,000.00*
			Total	***$ 369,440.00***

Prices are good for a period of 60 Days.

Prices do not include a surcharge for union or prevailing wage rate labor. If either of these are needed, please contact this office

Rigs will be scheduled upon receipt of a signed proposal or contract. SGS cannot hold any tentative dates. Due to our present commitments with our clients, scheduling dates will only be held with one of these documents in hand.

SGS Proposal #0408-5852

Scope of Work: As requested, we will provide hollow stem auger drill rig to drill boreholes to a depth of 200' at 3 locations. Split spoon samples will be collected to total depth at 5' intervals. In each location, 2 each 2" diameter PVC wells will be installed at depths of 200 and 100' deep. Each well will be finished off at grade with an 8" manhole set in a 2'x2' concrete pad. All drill cuttings and mud will be placed in 55 gallon drums for disposal by others. Decontamination will take place between locations. Development will be into a Baker Tank as provided by others.

Our prices are as follows:

Description	***Quantity***	***unit***	***unit price***	***total price***
Mobilization of CME 1050 H.S.A rig and crew	2	each	$ 4,000.00	***$ 8,000.00***
Saturday rig and crew surcharge	3	each	$ 500.00	***$ 1,500.00***
Sunday rig and crew surcharge	3	each	$ 750.00	***$ 2,250.00***
CME 1050 and drill crew per 10 hr day (includes development)	30	per 10 hr day	$ 3,250.00	***$ 97,500.00***
Water truck rental per month	2	per month	$ 3,200.00	***$ 6,400.00***
Perdiem for drill crew (per man per day)	60	per man / nt	$ 130.00	***$ 7,800.00***
2" PVC well materials installed	900	per foot	$ 24.00	***$ 21,600.00***
55 gallon drums for collection of drill mud and cuttings	60	each	$ 52.00	***$ 3,120.00***
Overtime rate rig and crew per hour (after 10 hrs on site)		per hour	$ 345.00	***$ -***
Water Acquisition per month	2	per month	$ 325.00	***$ 650.00***
Hydrant adaptor and backflow preventor per month	2	per month	$ 250.00	***$ 500.00***
Manholes set in 2'x2' concrete pads	3	each	$ 350.00	***$ 1,050.00***
			Total	***$ 150,370.00***

Prices are good for a period of 60 Days.

Prices do not include a surcharge for union or prevailing wage rate labor. If either of these are needed, please contact this office

Rigs will be scheduled upon receipt of a signed proposal or contract. SGS cannot hold any tentative dates. Due to our present commitments with our clients, scheduling dates will only be held with one of these documents in hand.

Profils

Chenenko, Ricky

From: Chris Okon [chris@deltawell.com]
Sent: Friday, April 18, 2008 4:30 PM
To: Chenenko, Ricky
Subject: NYSDEC Speonk Deep Vertical Profile Borings
Attachments: scan0001.pdf

Ricky - attached is cost estimate based on the provided scope of work. We would drill the borings using our Failing F-10 rig with 3.25" ID hollow stem augers taking 2" spoons on the way down. At depth we would install a 2" ID stainless steel well point set on 2" ID black steel casing and remove the augers allowing the formation to collapse around the temp well (TW). We would then purge the TW using our 2" submersible pump set on 1/2" ID poly tubing. Purge water will be collected in a tank to be emptied at the CDM supplied frac tank as needed. After a sample is obtained we would pull the TW up to the next desired sample zone and repeat process. After the last sample is obtained we would completely remove the TW and grout the remaining annular space which is usually found from the water table to grade. We have utilized this process extensively at Brookhaven National Laboratory. Our pricing assumes the following:

Drilling locations will be accessible to rig and equipment
Level D PPE w/HASP and monitoring by CDM
Available One-Call-Center underground utility mark-outs by Delta
Any other mark-outs to be the responsibility of CDM
Disposal of IDW by CDM
Frac tank to be supplied by CDM
Access permits are not included
Traffic control is not included
Prices do not include any applicable sales tax.

We would bill the time required to install, sample and remove the TW under the hourly rate of Rig and Crew Time of our Contract.

We also would bill the time needed to empty our transfer tank into the frac tank at the standby rate of our Contract.

We hope the above meets with your approval. Call/email me with any questions.

Delta is a certified WBE.

Christopher M. Okon
DELTA WELL & PUMP CO INC
97 Union Ave. PO Box 1309
Ronkonkoma, NY 11779
631-981-2255
631-981-2369 (fax)
chris@deltawell.com

DELTA WELL & PUMP CO., INC.
CONTRACT ESTIMATE

DATE	April 18, 2008	FILE NAME	50239
TO	CDM	PROJECT DESCRIPTION	NYSDEC Speonk Project Deep Vertical Profile Borings
		CONTRACT NUMBER	
		ESTIMATE AMOUNT	$266,300.00

REQUISITION #	REQUISITION SUMMARY	AMOUNT THIS ESTIMATE	CUMULATIVE TOTAL
	TOTAL EARNED		
	% RETENTION WITHHELD		
	TOTAL AMOUNT DUE		
	LESS PREVIOUS REQUISITIONS		
	AMOUNT DUE THIS REQUISITION		

ITEM NO	DESCRIPTION	QTY	UNIT PRICE	CONTRACT AMOUNT	QTY THIS ESTIMATE	AMT THIS ESTIMATE	QTY TO DATE	AMOUNT TO DATE
1	Mobilization/demobilization (ea)	2	3,000.00	6,000.00				
2	Drilling 3" ID HSAs 0-50' (ft)	750	18.00	13,500.00				
3	Drilling 3" ID HSAs 50-100' (ft)	750	18.00	13,500.00				
4	Drilling 3" ID HSAs >100' (ft)	1500	35.00	52,500.00				
5	2" spoons 0-50' (ea)	255	40.00	10,200.00				
6	2" spoons 50-100' (ea)	75	50.00	3,750.00				
7	2" spoons 100-200 (ea)	150	60.00	9,000.00				
8	Furnish drums (ea)	135	50.00	6,750.00				
9	Stage drums (ea)	135	15.00	2,025.00				
10	Decontamination pad (ea)	1	875.00	875.00				
11	Decontamination (hr)	45	180.00	8,100.00				
12	Rig and crew for GW sampling (hr)	510	200.00	102,000.00				
13	Steam cleaner (day)	30	25.00	750.00				
14	Water tanker for water supply (day)	45	300.00	13,500.00				
15	Borehole grouting (ft)	450	8.00	3,600.00				
16	Water tanker for water transfer (day)	45	300.00	13,500.00				
17	Transfer of water (standby rate) (hr)	45	150.00	6,750.00				
	TOTALS (SUMMARIZED ON PAGE 1)			266,300.00				

Chenenko, Ricky

From: Chris Okon [chris@deltawell.com]
Sent: Monday, April 21, 2008 8:19 AM
To: Chenenko, Ricky
Subject: RE: NYSDEC Speonk Deep Vertical Profile Borings

I figured times for 18 samples per VPB times 15 sites as follows; 1 hour per sample from 30 to 100, 2.2 hours per sample from 100 to 150, and 3 hours per sample from 150-200 which totals to (8 x 1) + (5 x 2.2) + (5 x 3) = 33 hours per site x 15 sites = 510 hours. It could be tightened up some using 1/1.5/2 giving a total of 382.5 hours. Hopefully the formation would be mostly sands and gravel so the temp well purges and recovers well.

Christopher M. Okon
DELTA WELL & PUMP CO INC
97 Union Ave, PO Box 1309
Ronkonkoma, NY 11779
631-981-2255
631-981-2369 (fax)
chris@deltawell.com

-----Original Message-----
From: Chenenko, Ricky [mailto:ChenenkoRA@cdm.com]
Sent: Friday, April 18, 2008 3:41 PM
To: chris@deltawell.com
Subject: RE: NYSDEC Speonk Deep Vertical Profile Borings

I just realized that you probably have as many water sampling hours as total hours on the job.

From: Chris Okon [mailto:chris@deltawell.com]
Sent: Friday, April 18, 2008 5:28 PM
To: Chenenko, Ricky
Subject: RE: NYSDEC Speonk Deep Vertical Profile Borings

eliminating spoons from the water table down would save about $19,000.00 and shave 13 to 15 days of time off the drilling.

Christopher M. Okon
DELTA WELL & PUMP CO INC
97 Union Ave, PO Box 1309
Ronkonkoma, NY 11779
631-981-2255
631-981-2369 (fax)
chris@deltawell.com

-----Original Message-----
From: Chenenko, Ricky [mailto:ChenenkoRA@cdm.com]
Sent: Friday, April 18, 2008 3:13 PM
To: chris@deltawell.com
Subject: RE: NYSDEC Speonk Deep Vertical Profile Borings

OK,

You've got about 45 days to do this work.

How much shorter/less expensive if we just split spoon to the water table and buzz down the rest of the way with spoons?

From: Chris Okon [mailto:chris@deltawell.com]
Sent: Friday, April 18, 2008 4:30 PM
To: Chenenko, Ricky
Subject: NYSDEC Speonk Deep Vertical Profile Borings

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We hope the above meets with your approval. Call/email me with any questions.

Delta is a certified WBE.

Christopher M. Okon
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Subject: RE: NYSDEC Speonk Deep Vertical Profile Borings

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Sent: Friday, April 18, 2008 4:30 PM
To: Chenenko, Ricky
Subject: NYSDEC Speonk Deep Vertical Profile Borings

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Prices do not include any applicable sales tax.

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We also would bill the time needed to empty our transfer tank into the frac tank at the standby rate of our Contract.

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631-981-2369 (fax)
chris@deltawell.com

Chenenko, Ricky

profile

From: Glacierdrilling@aol.com
Sent: Monday, April 21, 2008 3:02 PM
To: Chenenko, Ricky
Subject: Re: Emailing: speonk profilng bid.pdf
Attachments: CDM NJ 1.pdf; CDM NJ 2.pdf

Attached are the revised cost proposals for the sampling to the water table for the Geoprobe work.

Sorry about the confusion I may have created.

Reuben R. Schock,
Business Manager/Development
Glacier Drilling, LLC
Phone / fax 860-645-1304
glacierdrilling@aol.com

Glacier Drilling, LLC P.O. Box 9188, Bolton, CT 06043-9188

Date: 4/21/2008

For:
Camp Dresser & McKee
Raritain Plazal, RaritainCenter
Edison, New Jersey 08818

Phone: 732-590-4645
Fax: 732-225-7851

Attention: Ricky A Chenenko,

Revised Cost Proposal

Scope of Work - First Mobilization

40', on 7 holes, 200 on 3 holes

Using a Geoprobe 8040, complete 10 borings, macro core sampling to ~~200'~~ and also obtain water samples every 10', grout up borings,

We are pleased to submit the following bid:

Job Description: drum excess materials in the Hamlet of Speonk, NY.

Equipment / Labor & Materials:

Quantity	DESCRIPTION	CHARGES	TOTAL
20.00	Geoprobe 8040 / 2 man crew / day	$2,400.00	48,000.00
20.00	Mob. & Demob. / Per Day	700.00	14,000.00
176 ~~80.00~~	Macro Liners. 5'	8.00	$1408 ~~640.00~~
50.00	Tubing / 500' roll	95.00	4,750.00
2000.00	Grouting / ft.	2.00	4,000.00
10.00	Drums	55.00	550.00
	If required:		
	Screen, .010 slot x 10'. 1" PVC / ea - $35.00		
	Riser x 10', 1" PVC = $20.00		
	Threaded Press Cap, 1" PVC = $5.50		
	Threaded Point, 1" PVC - $9.00		
Note: C Level work would be charged at 1.5 times day rate for Geoprobe charge ($2400. x 1.5 / day)			
Additional Comments:			
a) This cost estimate will be adjusted for actual quantities required.			
b) Overtime, if required after 8 hrs. on site, would be billed at $450./hr.			
Prepared by: Reuben R. Schock, Phone/Fax: 860-645-1304			
		Total service charges:	71,940.00

72708

Mob 3
Daily Rate 2
Macrocore ~~Pr~~ Liner 12

Price valid until: 7/21/2008

Glacier Drilling, LLC P.O. Box 9188, Bolton, CT 06043-9188

Date: 4/21/2008

For: **Revised Cost Proposal**
Camp Dresser & McKee
Raritain Plazal, RaritainCenter
Edison, New Jersey 08818

Phone: 732-590-4645
Fax: 732-225-7851

Scope of Work - Second Mobilization

Attention: Ricky A Chenenko,

40
Using a Geoprobe 8040, complete 5 borings, macro core sampling to 200' and also obtain water samples every 10', grout up borings,

We are pleased to submit the following bid:
Job Description: drum excess materials in the Hamlet of Speonk, NY.

Equipment / Labor & Materials:

Quantity	DESCRIPTION	CHARGES	TOTAL
10.00	Geoprobe 8040 / 2 man crew / day	$2,400.00	24,000.00
10.00	Mob. & Demob. / Per Day	700.00	7,000.00
40.00	Macro Liners, 5'	8.00	320.00
25.00	Tubing / 500' roll	95.00	2,375.00
1000.00	Grouting / ft.	2.00	2,000.00
10.00	Drums	55.00	550.00
	If required:		
	Screen, .010 slot x 10', 1" PVC / ea - $35.00		
	Riser x 10', 1" PVC = $20.00		
	Threaded Press Cap, 1" PVC = $5.50		
	Threaded Point, 1" PVC - $9.00		
Note: C Level work would be charged at 1.5 times day rate for			
Geoprobe charge ($2400. x 1.5 / day)			
Additional Comments:			
a) This cost estimate will be adjusted for actual quantities required.			
b) Overtime, if required after 8 hrs. on site, would be billed at $450./hr.			
Prepared by: Reuben R. Schock, Phone/Fax: 860-645-1304			
		Total service charges:	**36,245.00**

Price valid until: 7/21/2008

Chenenko, Ricky

From: Glacierdrilling@aol.com
Sent: Monday, April 21, 2008 2:53 PM
To: Chenenko, Ricky
Subject: Re: Emailing: speonk profilng bid.pdf
Attachments: CDM NJ 3.pdf

I just read your note concerning the Geoprobe cost proposals. The number of liners was an error on my part in typing this up. Simply took a number from the wrong column from my notes. I will revise them to indicate the correct number of liners howevery it will not change our estimate for the number of days required.
I will have Mark call you at his first opportunity to take about the tooling.

Attached is a cost proposal for the well installation work. The only item I haven't been able to address is the Water supply - Tanker. If we have to supply that we'll have to figure out how we might do that in view of the logistics for us. I will pursue this and will give you a line item to add for this if we can figure out how we might address this.

Reuben R. Schock,
Business Manager/Development
Glacier Drilling, LLC
Phone / fax 860-645-1304
glacierdrilling@aol.com

Chenenko, Ricky

From: John Lamprecht @ LAWES [john@lawes.org]
Sent: Tuesday, April 15, 2008 2:28 PM
To: Chenenko, Ricky
Subject: Re: Emailing: speonk profilng bid.pdf

Ricky - this is a little too deep for us. We'll have to take a pass. Give me a call if you have any questions. Thanks for asking though. JML

"Chenenko, Ricky" <ChenenkoRA@cdm.com> wrote:

> CDM is performing a groundwater investigation in Speonk, Suffolk County, for NYSDEC. As part of this work we are proposing to install up to 15 groundwater profiling borings and 6 monitoring wells.
>
> The profile borings can be performed with drill rig or by direct push - (depth of 200 feet is near or beyond most direct push technology). Soils will be samples prior to the profiling. Please specify type of rig and tooling proposed for this borings.
>
> Wells will be installed by auger, in three clusters of two wells.
>
> Note: Two-hundred foot depth is based upon approximate base of the upper glacial aquifer.
>
> Please read the attached scopes of work and complete the bid forms. Note that these are separate contracts and will be awarded separately.
>
> Please use the current pricing in the master services agreement. Assume all work in Level D; provide level C unit prices as appropriate.
>
> If you have any questions, please feel free to call me. If you can have bids to me by close of business Thursday, it would be greatly appreciated.
>
> Thanks,
>
> Ricky A. Chenenko
> CDM
> Raritan Plaza I, Raritan Center
> Edison, New Jersey 08818
>
> Main: (732) 225-7000 ext. 54645
> Direct: (732) 590-4645
> Fax: (732) 225-7851

The message is ready to be sent with the following file or link attachments:

speonk profilng bid.pdf

Note: To protect against computer viruses, e-mail programs may prevent sending or receiving certain types of file attachments. Check your e-mail security settings to determine how attachments are handled.

John Lamprecht
Land, Air, Water Environmental Services, Inc.
631-874-2112

Chenenko, Ricky

From: John Lamprecht @ LAWES [john@lawes.org]
Sent: Tuesday, April 15, 2008 2:51 PM
To: Chenenko, Ricky
Subject: RE: Emailing: speonk profilng bid.pdf

Speon would have to be < 50' to water so I couldn't guarantee getting to 200' without problems drilling with augers.

"Chenenko, Ricky" <ChenenkoRA@cdm.com> wrote:

> John,
>
> You can still bid on it by auger. Because of the depth, I'm not sure we won't be doing it that way. Unless you only have direct push.
>
> ---
>
> **From:** John Lamprecht @ LAWES [mailto:john@lawes.org]
> **Sent:** Tuesday, April 15, 2008 2:28 PM
> **To:** Chenenko, Ricky
> **Subject:** Re: Emailing: speonk profilng bid.pdf
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> Ricky - this is a little too deep for us. We'll have to take a pass. Give me a call if you have any questions. Thanks for asking though. JML
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bids to me by close of business Thursday, it would be greatly appreciated.

Thanks,

Ricky A. Chenenko
CDM
Raritan Plaza I, Raritan Center
Edison, New Jersey 08818

Main: (732) 225-7000 ext. 54645
Direct: (732) 590-4645
Fax: (732) 225-7851

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John Lamprecht
Land, Air, Water Environmental Services, Inc.
631-874-2112

John Lamprecht
Land, Air, Water Environmental Services, Inc.
631-874-2112

Professional Services Bids
Passive Soil Gas Screening and Surveying

YU & Associates, Inc.
611 River Drive, Elmwood Park, New Jersey 07407 • 201-791-0075 • Fax 201-791-4533

April 17, 2008
08048

CDM
Raritan Plaza I, Raritan Center
Edison, New Jersey 08818

Re: Proposal for Passive Soil Gas Services and Survey Services for Speonk Solvent Plume
Speonk (Southampton), New York 11972

Dear Mr. Chenenko:

YU & Associates, Inc (YU) is pleased to submit this proposal to provide passive soil gas and survey services for the Speonk Solvent Plume in Speonk (Southampton), NY. We understand the subject site to include approximately 600-acres of residential, commercial, industrial, and wooded properties in the Hamlet of Speonk in the vicinity of Philips Avenue and Speonk-Riverhead Road. We have prepared this proposal covering the following tasks:

Task 1: Soil Gas Sampling

In accordance with the RFP, YU will provide the following services:

1. Prior to the start of sampling, utility clearance will be conducted using the New York City/Long Island One-Call System. For areas not covered by the One-Call System, samplers will not be advanced beyond 1-foot below ground surface (bgs).
2. Installation of up to 75 BeSure passive soil gas samplers in a grid pattern at up to three sampling areas. Samplers will be installed and marked in accordance with the manufacturer's recommendations. In areas covered by asphalt and/or concrete, a hammer-drill will be utilized to penetrate the surface to a maximum depth of 3-feet bgs.
3. Retrieval of BeSure samplers following a sampler exposure period of approximately two weeks. Samplers will be retrieved and shipped to the laboratory in accordance with the manufacturer's recommendations.
4. Following the retrieval of BeSure samplers, sampling locations will be backfilled and/or patched in an effort to restore each site to pre-sampling conditions.

YU anticipates that CDM's site-specific Health and Safety Plan (HASP) will cover the passive soil gas sampling fieldwork in accordance with the requirements of 29 Code of Federal Regulations (CFR) 1910.120 and will be made available for reference by YU while in the field. Fieldwork is expected to be conducted using Level D protection.

Task 2: Field Surveying

YU will engage a New York State licensed surveyor to perform surveying tasks for the referenced project and will manage any associated coordination. Surveying will relate the horizontal and vertical positions into the North American Datum 1983 (NAD83) and North American Vertical Datum 1988 (NAVD88) as well as the state plane coordinate system. Vertical measurements will be recorded to an accuracy level of 0.01 feet.

Survey of the following items are included in this task:

1. Up to 75 passive soil gas sample locations,
2. Approximately 10 surface geophysical transects of 750 feet long,
3. Up to 15 soil boring/groundwater profiling locations,
4. Up to six monitoring wells including three 2-well clusters, and
5. Up to 12 groundwater profiling locations performed by others.

Based on 6 mobilizations

DELIVERABLES

Following the completion of sample analysis and field surveying, YU will submit to CDM electronic copies of all subcontractor submitted data. It is YUs understanding that data processing/tabulation and/or figure generation are not covered in the project scope of work.

PROJECT TEAM

Mr. Andrew Leung, P.E. will serve as Principal Engineer. He will interface with the project management team, provide document reviews and be available for discussions during the course of the project. **Mr. Michael Grifasi** will serve as Senior Geologist and primary point-of-contact for the day-to-day activity for this program. **Ms. Vanessa Meer** and **Mr. Beck Straley** will serve as Project Scientists and will participate in the sampling activities for this program.

PROJECT FEE

Our estimated total fee to perform the above scope of work is **$46,231.** The breakdown for this estimate is provided below and in the attached Form 2.11.

Task	Description	Subcontractors and Expense Fee	YU's Fee
1	Passive Soil Gas Sampling	$20,000	$8,597
2	Field Survey	$17,050	$584
	Sub Total	$37,050	9,181
		Project Total	$46,231

CONDITIONS AND ASSUMPTIONS

- Unencumbered access to the site is provided by the client and owner; the site shall be made accessible during all sampling and surveying activities.
- CDM shall provide YU & Associates with a minimum of 5 days notice prior to the start of fieldwork.
- All work can be performed during normal working hours.

- The field investigation will be completed in up to four 8-hour work days. Additional inspection time and/or costs resulting from unanticipated field conditions or involvement of third parties will be billed at the hourly rate set forth in the Standby agreement.
- Eighty-one samples, including duplicates and trip blanks, will be submitted to the laboratory for analysis. Samples analyzed in addition to the 81 proposed samples will be billed at a rate of $225/each.
- Utility clearance will be covered by the One-Call System. Sampling will be completed in areas not covered by the One-Call System without any additional clearance. However, sample depth will be modified to reduce the likelihood of utility contact.
- Deliverables will be submitted in an electronic format. Hard copies, where necessary, will be billed at additional cost.
- Design and attendance at meetings are excluded from this proposal. Meetings, if necessary, will be billed as per the hourly rate set forth in the standby contract agreement.
- Up to three mobilizations per man-day for soil gas sampling are included in this cost estimate. Any additional mobilizations will be billed at a flat rate of $105/trip.
- Additional scope(s) of work authorized by the client beyond that specifically described in this proposal shall be billed in accordance with the standby contract agreement.
- The fee quoted in this proposal is valid for 30 days from the date of issuance. Thereafter, adjustments may be made to cover increased personnel costs.
- This proposal is submitted solely and exclusively for the use of CDM in deciding whether or not to retain YU & Associates, Inc. to perform the requested services. Disclosure of this proposal's content to any third party without prior written authorization from YU is expressly prohibited.

SCHEDULE

We anticipate the passive soil gas sampling and associated surveying to begin in **August, 2008**.

We appreciate the opportunity to provide environmental services for this project. If you require additional information or clarification regarding our proposed scope of services, please do not hesitate to contact us. Should you find the terms of this cost estimate and scope of work acceptable please indicate your acceptance by signing below and returning one copy to this office.

Very Truly Yours,
YU & ASSOCIATES, INC.

Andrew Leung

Andrew Leung, P.E.
Vice President

ACCEPTED BY:

We have reviewed the above proposal and authorize YU & Associates to proceed with the work.

BY: ________________________

TITLE: ________________________

(FOR CLIENT): ________________________

DATE: ________________________

Bid Sheet
Professional Services At The
Speonk Solvent Plume
Speonk (Southampton), New York

	Direct and Indirect Salary Costs	Travel/ Subcontractor	Total
Task 1: Passive Soil Gas Survey	$ 8,597	$ 20,000	$ 28,597
Task 2: Field Surveying	$ 583	$ 17,050	$ 17,633
Total Price			$ 46,231

Exhibit 2
Profes sionalServices At The
Speonk Solvent Plume
Speonk (Southa mpton)New York

Subcontractor: YU & As cs oia tes

A. Direct Salary Costs

Task	Professional Responsibility Level	NSPE Level	Average Reimbursement Rate	Maximum Reimbursement Rate	Estimated Number of Hours	Estimated Direct Salary Cost (Avg. Reimbursement Rate
	Principal Engineer	Level VIII	$ 51.68	$ 52.40	4	$ 206.72
1	Senior Geologist	Level V	$ 29.05	$ 33.17	60	$ 1,743.00
	Project Scientist	Level III	$ 24.59	$ 26.20	60	$ 1,475.40
	Principal Engineer	Level VIII	$ 61.60	$ 61.60		$ -
2	Senior Geologist	Level V	$ 29.05	$ 33.17	8	$ 232.40
	Project Scientist	Level III	$ 24.59	$ 26.20		$ -
					132	$ 3,657.52

Total Direct Salary Costs $ 3,657.52

B. Indirect Costs

Amount budgeted for indirect costs is (136.8%): $ 5,003.49

C. Maximum Reimbursement Rates for Direct Non-Salary Costs

Item	Maximum Reimbursement Rate	Unit	# Units	Total Estimated Cost
1 Travel				
Overnight Expenses		Night		$ -
Dinner Only		Dinner		$ -
Breakfast Only		Breakfast		$ -
Mileage (distance to site (90 mi) * no. of trips (12))	$ 0.47	Mile	1080	$ 507.60
Tolls	$ 18.00	Day	8	$ 144.00
Total Travel				$ 651.60
2 Supplies				
Truck Rental	$ 550.00	Week	1	$ 550.00
Level D Protection	$ 25.00	Day	6	$ 150.00
BeSure Laboratory Costs	$ 18,268.40	Lump Sum	1	$ 18,268.40
Field Surveying	$ 17,050.00	Lump Sum	1	$ 17,050.00
Sample Shipping	$ 60.00	Each	2	$ 120.00
Generator Rental	$ 150.00	Week	1	$ 150.00
Miscelaneous Expenses	$ 110.00	Lump Sum	1	$ 110.00
Total Supplies				$ 36,398.40
Total Travel and Supplies Cost				$ 37,050.00

D. Fixed Fee

Fixed Fee:	$ 519.66
Total not-to-exceed price:	$ 46,230.67

Professional Servic esAt The
Speonk Solvent Plume
Speonk (Southampton), New York
Task 1

Subcontractor: YU & A ssc iates

A. Direct Salary Costs

Task	Professional Responsibility Level	NSPE Level	Average Reimbursement Rate	Maximum Reimbursement Rate	Estimated Number of Hours	Estimated Direct Salary Cost (Avg. Reimbursement Rate
	Principal Engineer	Level VIII	$ 51.68	$ 52.40	4	$ 206.72
1	Senior Geologist	Leval V	$ 29.05	$ 33.17	60	$ 1,743.00
	Project Scientist	Level III	$ 24.59	$ 26.20	60	$ 1,475.40
					124	$ 3,425.12

Total Direct Salary Costs $ 3,425.12

B. Indirect Costs

Amount budgeted for indirect costs is (136.8%): $ 4,685.56

C. Maximum Reimbursement Rates for Direct Non-Salary Costs

Item	Maximum Reimbursement Rate	Unit	# Units	Total Estimated Cost
1 Travel				
Overnight Expenses		Night		$ -
Dinner Only		Dinner		$ -
Breakfast Only		Breakfast		$ -
Mileage (distance to site [90 mi] * no. of trips [12])	$ 0.47	Mile	1080	$ 507.60
Tolls	$ 18.00	Day	8	$ 144.00
Total Travel				$ 651.60
2 Supplies				
Truck Rental	$ 550.00	Week	1	$ 550.00
Level D Protection	$ 25.00	Day	6	$ 150.00
BeSure Laboratory Costs	$ 18,268.40	Lump Sum	1	$ 18,268.40
Sample Shipping	$ 60.00	Each	2	$ 120.00
Generator Rental	$ 150.00	Week	1	$ 150.00
Miscelaneous Expenses	$ 110.00	Lump Sum	1	$ 110.00
Total Supplies				$ 19,348.40
Total Travel and Supplies Cost				$ 20,000.00

D. Fixed Fee

Fixed Fee:	$ 486.64
Total not-to-exceed price:	$ 28,597.33

Professional Services At The
Speonk Solvent Plume
Speonk (Southampton), New York
Task 2

Subcontractor: **YU & Associates**

A. Direct Salary Costs

Task	Professional Responsibility Level	NSPE Level	Average Reimbursement Rate	Maximum Reimbursement Rate	Estimated Number of Hours	Estimated Direct Salary Cost (Avg. Reimbursement Rate
	Principal Engineer	Level VIII	$ 61.60	$ 61.60		$ -
2	Senior Geologist	Level V	$ 29.05	$ 33.17	8	$ 232.40
	Project Scientist	Level III	$ 24.59	$ 26.20		$ -
					8	$ 232.40

Total Direct Salary Costs $ 232.40

B. Indirect Costs

Amount budgeted for indirect costs is (136.8%): $ 317.92

C. Maximum Reimbursement Rates for Direct Non-Salary Costs

Item	Maximum Reimbursement Rate	Unit	# Units	Total Estimated Cost
1 Travel				
Overnight Expenses		Night		$ -
Dinner Only		Dinner		$ -
Breakfast Only		Breakfast		$ -
Mileage (distance to site [90 mi] * no. of trips [12])	$ 0.47	Mile		$ -
Tolls	$ 18.00	Day		$ -
Total Travel				$ -
2 Supplies				
Field Surveying	$ 17,050.00	Lump Sum	1	$ 17,050.00
Total Supplies				$ 17,050.00
Total Travel and Supplies Cost				$ 17,050.00

D. Fixed Fee

Fixed Fee:	$ 33.02
Total not-to-exceed price:	$ 17,633.34

BEACON ENVIRONMENTAL SERVICES, INC.

COST ESTIMATE

June 9, 2008

Prepared for: **Yu and Associates, Inc.**
200 River Front Boulevard
Elmwood Park, NJ 07407

Beacon Project No. 2126

The following cost estimate is for providing a BESURE Sample Collection Kit™ containing 75 field samplers, three (3) duplicate field samples, and three (3) trip blanks for soil-gas services at the Speonk Site in Southampton, NY, as described in the attached Proposal. The charges include determination of the sampling duration, preparation and shipment to the site of a BESURE Kit™ with detailed instructions, analysis of samples with GC/MS instrumentation following EPA Method 8260B, and two copies of a survey report with color isopleth maps.

Estimate of charges:

Item	Unit	Quantity	Unit Cost	Extended Cost
Equipment Preparation and Shipment to Site	Lump sum	1	$780	$ 780.00
Analysis of Field Samples, Duplicate Field Samples, and Trip Blanks by EPA Method 8260B	Analysis	81	$175	$14,175.00
Survey Report with color isopleth maps (Paper copies and e-copy)	Report	2	Included	Included
TOTAL COST				**$14,955.00**

The Total Price will be invoiced when survey results are issued. The final invoice will reflect the actual number of samples collected and analyzed. All invoices anticipate payment within 30 days of the invoice date.

PROPOSAL FOR SOIL-GAS SAMPLING AND ANALYTICAL SERVICES
Speonk Site
Southampton, NY

Background

Beacon Environmental Services, Inc. (BEACON), a small business concern (NAICS 541380), has been invited by Yu and Associates, Inc. to provide a Proposal and Cost Estimate for soil-gas services at the Speonk Site in Southampton, NY. The Proposal and Cost Estimate are based on information provided to BEACON by Yu and Associates.

Objective

Collection of passive soil-gas (PSG) samples from the shallow subsurface will provide data on the identity and relative concentrations of targeted volatile organic compounds (VOCs) which may be present, without generating waste from soil cuttings. This data will be used to identify source areas of contamination and to delineate the lateral extent of the contaminants.

Survey Design

Yu and Associates will determine actual sampling locations. At Yu and Associates's option, BEACON will assist in the development of the sampling plan.

Sampling Procedures

A small, easy-to-carry BESURE Sample Collection Kit™ containing sufficient equipment to collect at least 75 field samples will be provided to Yu and Associates personnel for collection of soil-gas samples following the protocols of BEACON's passive method. BEACON will ship the Field Kits via FedEx® overnight delivery within two (2) business days following notice to proceed.

To install a PSG Sampler, a 3/4" diameter hole is made to a depth of four inches using a hammer and a metal stake provided in the Kit. When applicable, a hammer drill, slide hammer, or other comparable equipment can be used to create a 1/2" diameter hole to a two- to three-foot depth. In either case, the PSG Sampler (which contains ***two sets of hydrophobic adsorbent cartridges***) is installed in the top four inches of the hole. For locations covered by asphalt or concrete surfacing, a 1 1/4" to 1 1/2" diameter hole is drilled through the surfacing to the underlying soils, and the hole is sleeved with a sanitized metal pipe provided in the Kit. After the Sampler is installed inside the metal pipe, the hole is patched with an aluminum foil plug and a thin concrete patch to protect the sampler. The samplers are exposed to subsurface gas for approximately three to 10 days. Following the exposure period, the Samplers are retrieved and shipped to BEACON's laboratory for analysis. Three trip blanks, which will remain with the other PSG samples during preparation, shipment, and storage, will be included with the field samples.

BEACON provides in the BESURE Sample Collection Kit™ pre-cleaned metal sleeves when sampling through impermeable surfacing to protect the Samplers. These sleeves prevent any horizontal migration of vapors in the more porous substrate from influencing the soil-gas samplers. The metal sleeves are advanced below the substrate and tapped into the underlying soils so that the Samplers will only be adsorbing compounds in soil gas that is moving vertically through the soils beneath, and not in the vapors that may be migrating laterally through the more porous substrate. Other soil-gas vendors simply create a hole 2 to 3 feet deep, and leave their samplers unprotected to the horizontal migration of vapors in the substrate. This easy-to-perform but important procedure of using the metal sleeves is critical to an accurate and reliable soil gas survey (see **Attachment 1**).

Note: The adsorbent cartridges used by BEACON are hydrophobic, which allows the samplers to be effective even in water-saturated conditions. Extensive empirical evidence, which is supported by a government study, has proven that hydrophobic adsorbents work perfectly well in high moisture conditions and should not be encased by a hydrophobic membrane.[1] The use of surrogates and internal standards by BEACON during the analysis of samples verifies that moisture is not a problem during the analysis of the samples. Therefore, water does not adversely impact adsorption of compounds in the field or the analysis of the samplers at the laboratory. An analytical method that does not use internal standards or surrogates during the analysis of each sample cannot provide proof of performance that the system was functioning properly for each sample.

A two-person team can install approximately 50 to 100 samplers per day depending on the number of sample locations that are covered with asphalt, concrete, or gravel surfacing. For retrieval of the Samplers, one person can retrieve approximately 50 samplers per day and patch the holes through the surfacing. It is anticipated that one day will be required to install the samplers and one day will be required for retrieval.

Figure 1 — Installation of Samplers with BESURE Sample Collection Kit™

1 The Marines Project: A Laboratory Study of Diffusive Sampling/Thermal Desorption/Mass Spectrometry Techniques for Monitoring Personal Exposure to Toxic Industrial Chemicals. April 2002. Warren Hendricks, Methods Developments Team, Industrial Hygiene Chemistry Division, OSHA Salt Lake Technical Center, Salt Lake City, UT 84115-1802.

Sample Custody Procedures

A chain-of-custody accompanies the field samples at all times from the time the samples are collected until final analysis. Field kits are shipped with tug-tight custody seals to ensure that samplers are not tampered with during transport. Once samples are received at BEACON's laboratory, the sample custodian receives the samples and logs the samples into the laboratory's Sample Receipt Log per BEACON's *Quality Assurance Program Plan for the Analysis of Soil-Gas Samples*.

BEACON's laboratory is maintained in a safe and secure manner at all times. The facility is locked when not occupied and is monitored for fire and unauthorized access. BEACON personnel escort all visitors at all times while inside the facility.

Analytical Procedures

Soil gas samples will be analyzed by BEACON using gas chromatography/mass spectrometry (GC/MS) instrumentation, following modified EPA Method 8260B procedures. Samples will be analyzed for those compounds on the attached list, including Total Petroleum Hydrocarbons (TPH). The laboratory will perform an ***initial five-point calibration***. In addition, a BFB tune is performed daily and a method blank is run following the daily calibration. ***Internal standards and surrogates*** are included with each sample analysis. The laboratory's reported quantitation level (RQL) for each of the targeted compounds is 25 nanograms (ng) and the RQL for TPH is 2,500 ng; however, the actual detection limits are even lower. Other specific analytes may be targeted, if requested prior to analysis. Two sets of adsorbent cartridges are included in each Sampler for duplicate or confirmatory analysis. At Yu and Associates's option, BEACON will analyze ***field sample duplicates*** from selected sample locations identified on the chain-of-custody.

BEACON provides the highest level of accuracy and quality assurance and quality control (QA/QC) procedures for the analysis of soil gas samples in the industry. The table below summarizes these analytical procedures.

Description	Included
Analysis by thermal desorption-gas chromatography/mass spectrometry (TD-GC/MS) following modified EPA Method 8260B	√
Analytical results based on 5-point initial calibration (10, 25, 50, 100, and 250 nanograms)	√
Internal standards and surrogates included with each run (100 nanograms per compound)	√
BFB tunes (5 to 50 nanograms through GC, per method)	√
Continuing calibration checks (50 nanograms per compound)	√
Method blanks	√

Notes: BEACON's five-point internal calibration method is based on quantities of the target compounds that range from 10 to 250 nanograms. And the reporting limit for each of the compounds is 25 nanograms to assure that the low concentrations reported are accurate and defensible... as dictated by EPA Method 8260B. When high concentrations of contaminants are identified, the sample can be split or diluted to maintain an accurate quantification.

Lesser passive soil gas methods are known to base their results on an external calibration method and calibrate at quantities that are greater than an order of magnitude above their reporting limits, but refer to the process as being Method 8260 (*i.e.*, claim a reporting limit of 25 ng but have 250 ng or higher as the low-point of the calibration). These methods also do not include internal standards or surrogates with each analysis to provide proof of performance that the analytical system was functioning properly for each and every analysis and to provide consistent reference points for comparison of measured quantities.

Analyses of the samples will be performed at BEACON's laboratory using state-of-the-art instruments that are listed below. The Markes thermal desorption instruments outperform the Perkin-Elmer and other older thermal desorption equipment, which cannot target as broad a range of compounds with as much sensitivity or accuracy.

- Agilent 6890-5973 Gas Chromatograph/Mass Spectrometer,
- Markes Unity thermal desorber,
- Markes UltrA autosampler, and
- Markes Mass Flow Controller Module.

Report

Preliminary laboratory data can be provided to Yu and Associates typically within five business days following the laboratory's receipt of samples. Within 10 business days of the laboratory's receipt of samples, a final report will be provided that will contain:

project objectives,
the investigation plan,
the QA/QC program and findings,
laboratory data (in nanograms),
a base map,
up to three color isopleth maps,
field procedures,
laboratory procedures,
Field Deployment Reports, and
Chain-of-Custody documentation.

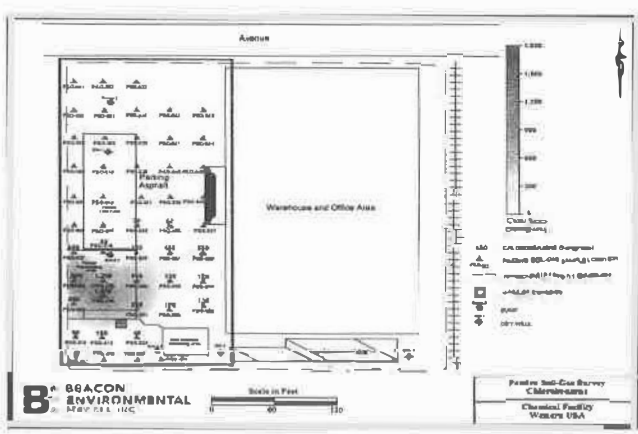


Figure 2 – Example Color Isopleth Map

BEACON requests that Yu and Associates provide electronically a CAD drawing of the site. BEACON can also incorporate GPS or GIS informational data into the maps. If requested, BEACON will return Yu and Associates' CAD drawing with the color isopleth maps provided as new layers to the file. BEACON will provide post survey support to assist in interpreting the data.

Key Personnel and Relevant Experience

The principals of BEACON have many years of experience in characterizing sites for organic contaminants using innovative soil-gas sampling technologies. BEACON was founded in 1999 by Mr. Harry O'Neill, who is the company president and has managed and reviewed data from 1,000s of soil gas surveys. Prior to forming BEACON, Mr. O'Neill managed the soil-gas sampling program for Quadrel Services, Inc., an innovative company that lead the acceptance of passive soil-gas sampling at the national and international level. Mr. Steve Thornley is the company's Laboratory Director, who is responsible for sample analyses and ensures that all project samples are analyzed and reported following the highest level of quality assurance procedures in the industry. Mr. Thornley has analyzed and reported data from more than 50,000 soil-gas samples and follows established analytical procedures that allow BEACON to provide accurate, reliable, and defensible data.

Following are a few references from clients who have applied BEACON's passive soil-gas services.

Edwards AFB, CA

Earth Tech, Inc.
Mr. Robert Kohlhardt
Sacramento, CA
Phone: 916-929-4143
Number of samples: 1,000+
Completion date: January 2001 to March 2004

BEACON has analyzed more than 1,000 passive soil-gas samples collected at various sites on Edwards Air Force Base. Sample delivery groups ranged from 82 to 416 samples to target a full range of volatile organic compounds (VOCs) and lighter semivolatile organic compounds (SVOCs). The objectives of the surveys were to identify source areas and migration pathways of targeted contaminants, with chlorinated solvents being the primary compounds of concern.

EPA Federal Superfund Site

Black & Veatch Special Projects Corp
Mr. Chris Wolfe
Philadelphia, PA
Phone: 215-928-2217
Number of samples: 240
Completion date: December 2004

Passive soil-gas samples were analyzed to delineate the lateral extent of chlorinated contaminants. A wide range of targeted compounds, including hexachlorobenzene and other chlorobenzene-related compounds, are being identified from contaminated soils and groundwater. The client and EPA selected BEACON to perform the work after reviewing other similar passive soil gas technologies.

Los Alamos National Laboratory, NM
Hanford Reservation, WA

Portage Environmental
Mr. Ken Kisiel
Los Alamos, NM
Phone: 505-662-7600
Number of samples: 400+
Completion date: August 2000 to August 2006

Passive soil-gas surveys have been performed at the Los Alamos National Laboratory (LANL) and the Hanford Reservation to delineate the extent of chlorinated and petroleum-related contaminants. BEACON has performed several extensive surveys at LANL, and all with great results, where the soils are tuff. In addition, multiple surveys have been performed at Hanford where carbon tetrachloride contamination was identified in soils at a 60-foot depth. The samplers for this survey were installed to a four-inch depth and remained in the field for only 72 hours.

Oak Ridge National Laboratory, TN

Formerly with NFT Incorporated
Mr. Steve Short
Oak Ridge, TN 37830
Phone: 865-482-1056
Number of samples scoped: 200
Completion date: July 2004

Passive soil-gas samples were analyzed to delineate the lateral extent of chlorinated contaminants. Data deliverables require CLP data packages and project specific electronic data deliverables (EDDs) uploaded to the client's site. The client visited BEACON's laboratory and other soil-gas vendors prior to selecting BEACON.

Beacon Project No. 2126
Target Compound List
Analysis by EPA Method 8260B

TPH C_5-C_9	1,2-Dibromoethane (EDB)
TPH C_{10}-C_{14}	Tetrachloroethene (PCE)
Vinyl Chloride	1,1,1,2-Tetrachloroethane
1,1-Dichloroethene	Chlorobenzene
trans-1,2-Dichloroethene	Ethylbenzene
Methyl-t-butyl ether (MTBE)	p & m-Xylene
1,1-Dichloroethane	Bromoform
cis-1,2-Dichloroethene	1,1,2,2-Tetrachloroethane
Chloroform	o-Xylene
2,2-Dichloropropane	1,2,3-Trichloropropane
1,2-Dichloroethane	Isopropylbenzene
1,1,1-Trichloroethane	1,3,5-Trimethylbenzene
1,1-Dichloropropene	1,2,4-Trimethylbenzene
Carbon Tetrachloride	1,3-Dichlorobenzene
Benzene	1,4-Dichlorobenzene
1,2-Dichloropropane	1,2-Dichlorobenzene
Trichloroethene (TCE)	n-Butylbenzene
1,1,2-Trichloroethane	1,2,4-Trichlorobenzene
Toluene	Naphthalene
1,3-Dichloropropane	1,2,3-Trichlorobenzene

Note: Additional compounds may be added to meet project specific requirements.
The reporting quantitation level (RQL) for each compound is 25 nanograms (ng) and the RQL for TPH is 2,500 ng; however, actual detection limits are lower.

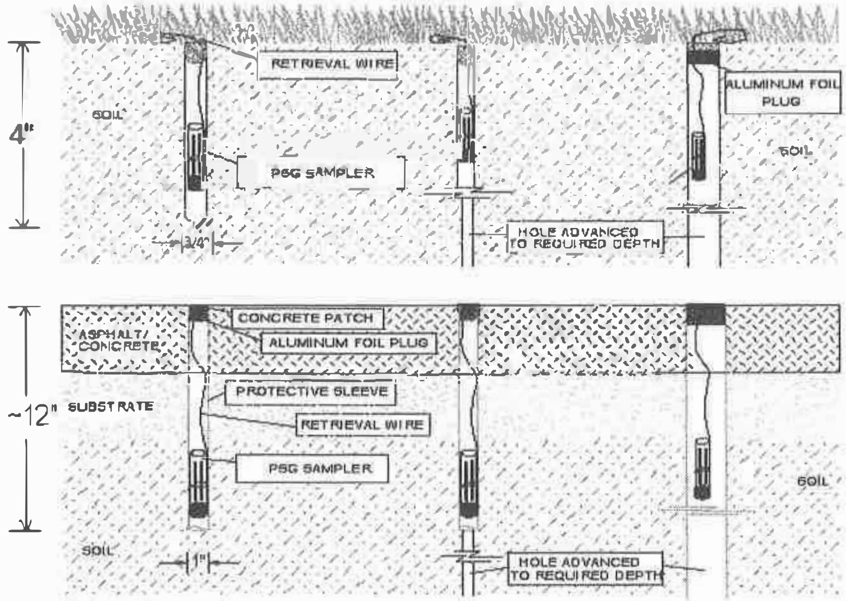
Attachment 1

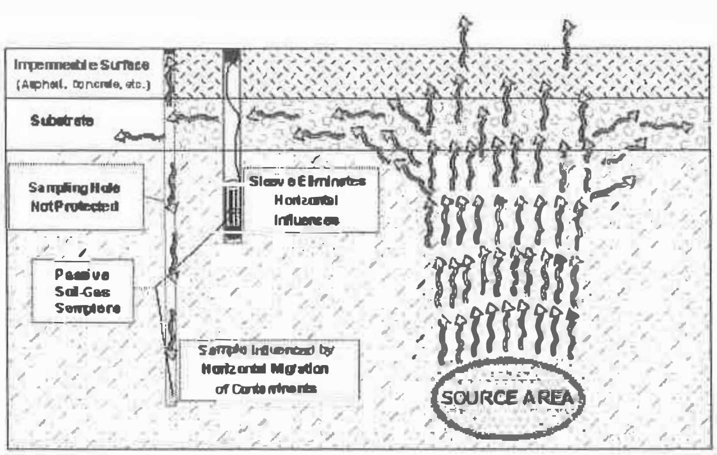
EFFECTIVE PASSIVE SOIL-GAS SAMPLING PROCEDURES

PSG Samplers need only be **installed to a 4-inch depth** because of the sensitivity of the method. However, the method is extremely versatile and installation procedures can be adapted to meet project objectives or client requirements.

When a PSG Sampler is installed in the ground, the top of the hole is completely sealed by collapsing the soils above the Sampler or patching the drilled hole through the surfacing. Other vendors use a permeable cork to plug their installation hole, which allows subsurface gases to escape before the adsorbent captures the organic compounds (reducing sensitivity) *and* permits vapors from above the surface, as well as surface water, to enter the hole (false positives). BEACON's PSG Samplers are not susceptible to these influences because they are effectively sealed in the subsurface.

As mentioned above, BEACON's Samplers are versatile and for some projects a higher sensitivity is required because contaminants are present at low concentrations or soils are fairly impermeable. In these situations, the sampling hole is advanced to a greater depth using a hammer drill, slide hammer, or direct push equipment. *Because the soil vapors that enter the hole will migrate upwards in this newly created preferential pathway, it is not necessary to push the Sampler to the bottom of the hole.* Therefore, the Sampler can still be installed in the upper 4-inches of the hole





Samplers installed through an impermeable surface are sleeved in pre-cleaned protective metal sleeves (provided by BEACON). These sleeves prevent any horizontal migration of vapors in the more porous substrate from influencing the soil-gas Samplers. As the accompanying diagram shows, the metal sleeves are advanced below the substrate and tapped into the underlying soils so that the Samplers will only be adsorbing compounds in soil gas that are moving vertically through the soils beneath, and not in the vapors that may be migrating laterally through the more porous substrate. Other soil-gas vendors simply create a hole 2 to 3 feet deep, and leave their samplers unprotected to the horizontal migration of vapors in the substrate. This easy-to-perform but important procedure is yet another reason why BEACON's method has achieved the reputation as being the most accurate and reliable soil gas technology available.

TOTAL QUOTATION

GORE
Creative Technologies Worldwide

To Place Order Contact: B025
W.L. GORE & ASSOCIATES INC
100 CHESAPEAKE BLVD
PO BOX 10
ELKTON MD 21922-0010

(410) 392-7600
(410) 506-4999

Account Representative GEORGE SHAW

Quote Nbr	Date	Page
229024 QT	06/05/08	1 / 2

Buyer Reference	Payment Terms
PO 08048	NET 30 DAYS

Quote Valid Through:

Consignee

Ship To Nbr
11307766

Buyer
YU & ASSOCIATES INC
200 RIVERFRONT BOULEVARD
ELMWOOD PARK 07407
U.S.A.

Customer Nbr
11307766

Phone: (201) 791-0075 X131

Contact: MICHAEL GRIFASI

Additional Information

Gore contact: DIANE COOPER
Phone: (410) 506-4776

Line Nbr	Item Number	Description	Qty	Unit Price/ UOM	Estimated Amount USD
1.000-	**ENGSSS-MOD**	SCREENING SURVEY MODULE	75.0	50.0000 Per EA	3,750.00
2.000-	**ENGSSS**	SCREENING SURVEY ANALYSIS	75.0	210.0000 Per EA	15,750.00
3.000-	**ENGSSS-TB**	SCREENING SURVEY TRIP BLANKS	5.0	.0000 Per EA	.00
4.000-	**EN-EST-SHIP**	ESTIMATED SHIPPING CHARGES	1.0	20.0000 Per EA	20.00

Standard GORE-SORBER® Modules for field installation (by CUSTOMER or its designee). laboratory analysis by TD/GC/MS.
A1 - GORE STANDARD TARGET VOCs/SVOCs - See Attached List
* Preparation of a data table
* Preparation of up to three (3) B-sized color contour maps

Additional charges will apply for non (Gore) standard data formats
Orders are subject to credit approval and terms and conditions on reverse side.

There will be a charge of $50.00 per module for unused returned or unreturned modules.(See Line 1)
To insure module integrity, deploy & return modules within 90 days.
Modules unused should be returned to be destroyed

Payment must be in U.S. funds. All monies due 30 days

after final report or issuance of invoice.

Accepted by: ____________________ PO # ________
E:dcooper@wlgore.com

TOTAL QUOTATION

GORE
Creative Technologies Worldwide

To Place Order Contact: B025
W.L. GORE & ASSOCIATES INC
100 CHESAPEAKE BLVD
PO BOX 10
ELKTON MD 21922-0010

(410) 392-7600
(410) 506-4999

Account Representative GEORGE SHAW

Quote Nbr	Date	Page
229024 QT	06/05/08	2 / 2

Buyer Reference	Payment Terms
PO 08048	NET 30 DAYS

Quote Valid Through:

Consignee

Ship To Nbr
11307766

Buyer
YU & ASSOCIATES INC
200 RIVERFRONT BOULEVARD
ELMWOOD PARK 07407
U.S.A.

Customer Nbr
11307766

Phone: (201) 791-0075 X131

Contact: MICHAEL GRIFASI

Line Nbr	Item Number	Description	Qty	Unit Price/ UOM	Estimated Amount USD

Delivery Instructions SITE:SPEONK SOLVENT PLUME
SPEONK (SOUTHAMPTON) NY

Subtotal	19,520.00
Tax	0.00
Invoice Total Currency USD	19,520.00

CONSULTING ENGINEERS • SURVEYORS • PLANNERS • LANDSCAPE ARCHITECTS

Keller & Kirkpatrick

Robert C. Kirkpatrick, P.E., L.S., P.P., Founder
Matthew L. Martini, P.L.S., P.P., President

Robert E. Brau, P.E., P.P.
Andrew Cangiano, P.E.
Arthur J. Elias, P.E., P.P.
Edward J. Formichella, P.L.S, P.P.
George P. James, P.E., P.P.

Werner A. Mall, P.L.S.
Michael J. Manning, P.L.S., P.P.
James K. McCormick, P.L.S., P.P
Jonathan C. Pera, P.E., P.P.

Brian E. Saltfelder, P.E.
Donald A. Scott, Jr., P.E., P.P.
Paul M. Szmaida, C.L.A.
William E. Thomas, P.L.S., P.P.

April 17, 2008

Mr. Michael Grifasi
Yu & Associates, Inc.
611 River Drive, Third Floor
Elmwood Park, New Jersey 07407

RE: Proposal for Professional Services
Speonk Solvent Plume
North Phillips Avenue
Speonk, Village of Southampton
Suffolk County, Long Island, New York

Dear Mr. Grifasi:

Thank you for this opportunity to provide a Proposal for Professional Services. Based upon your e-mail dated Wednesday, April 16th, 2008, and our subsequent telephone conversation, I understand you require surveying services at the site referenced above. Therefore, we specifically offer the following:

SCOPE OF SERVICES

We will establish two (2) control points at the above referenced site utilizing Global Positioning Systems (GPS) technology. Coordinates will be supplied in North American Datum (NAD'83) and North American Vertical Datum (NAVD'88) unless otherwise directed. Vertical measurements will be recorded to an accuracy of one hundredth of a foot (0.01'). We will perform the following tasks:

- Survey up to seventy-five (75) passive soil gas sample locations. We understand that the locations will be arranged in a grid shape and marked with flags and/or surveying tape
- Survey the surface of the geophysical transects which is estimated at ten (10) transects of about seven hundred fifty feet (±750') each in length
- Survey up to fifteen (15) soil borings and/or groundwater profiling locations
- Survey six (6) monitoring wells, three of which are in two (2) well clusters
- Survey twelve (12) groundwater profiling locations performed by others.

Once the fieldwork has been completed, Keller & Kirkpatrick will reduce the data and provide Yu & Associates with a working map of all locations, including the following information for each of the wells.

- Elevation of inner well risers
- Elevation of ground surface at wells

- Latitude and longitude of wells
- New Jersey State Plane Coordinates of wells

FEE: $15,500.00

Access to monitoring wells and keys must be made available prior to, or as soon as our field crew arrives on site. Any time lost on-site due to restriction of entry, equipment delays, obstructed access, etc. not related to Keller & Kirkpatrick's actions, will be billed as an extra charge per the hourly rates in effect at the time of service.

PRINTING/REPRODUCTION

All reproduction expenses will be invoiced in accordance with the following schedule:

Printing	Small	Regular 24" x 36"	Large
Prints (ea.)	$2.00	$2.50	$ 3.50
Mylars (ea.)	$3.00	$7.50	$10.00
Copies (8½" x 11")	$0.25/each		
Color Copies	$0.50/each		
Computer Disk/CD	$10.00/each		

We would be happy to meet with you to discuss any of these items, or to go over any other options that you wish for us to explore.

CONDITIONS

Schedules and deadlines do not account for extreme inclement weather, deed or title ambiguities acts of God strikes access delays lockouts accidents problems, or delays due to client personnel or their subcontractors, or other events beyond the control of Keller & Kirkpatrick.

The services outlined herein exclude equipment rental costs or subcontracting fees associated with entry into confined space areas requiring OSHA certification beyond the 40 Hour Hazardous Waste Operations course. Should entry into confined space be necessary, an addendum to this proposal will be forwarded to you to accomplish the work with either in-house personnel or by subcontracting.

Client has been advised and understands that the Professional practice of Land Surveying and Land Title is an imperfect science whereby record title and physical occupation may be in conflict. If such is the case, the Surveyor shall be deemed to have completed his/her survey once a record drawing has been produced by the Surveyor graphically setting forth the areas of discrepancy between record title and physical occupation of the land.

If desired, AutoCAD® disks will be supplied for informational purposes only. Signed and sealed maps provided by Keller & Kirkpatrick will be the documents of record of the services performed. Any discrepancies should be brought to our attention within ten (10) days.

Keller & Kirkpatrick accepts no responsibility for the accuracy of any information furnished by the client for use on this project. This includes, but is not limited to, previous boundary and topographic surveys, title data, soil logs, percolation tests, architectural plans, and other information on which Keller & Kirkpatrick is expected to rely.

All shipments will be sent by carrier of your choice at your expense. Keller & Kirkpatrick will not be responsible for damage or delays occurring during shipment.

Progress billings will be made monthly based upon the estimated percentage of completion of the various items outlined herein. All invoices are due upon receipt. All disputed invoices shall be resolved within ten (10) days of billing date. A charge of one percent (1%) per month will be made on all accounts not paid within forty-five (45) days from the date of billing. If invoices are not paid within 45 days of billing date, work on the project will be suspended until such time that account is brought current. If work is suspended due to non-payment of invoices, we will not be responsible for any damages or delays that may result.

If Keller & Kirkpatrick is forced to use an attorney or collection service to collect outstanding invoices, the cost of collection will be added to the amount owed in addition to the one percent per month charge.

In the event revisions or additional services are required, unless due to omission of required data, you will be notified in the form of an addendum to this proposal as to the reason for the revisions, the scope of any additional work, and our fee to accomplish these revisions. Upon execution of the aforementioned addendum, we will proceed with the additional work.

This proposal is subject to an inflation adjustment based on the Consumer Price Index every twelve months on January 1 of each year beginning on January 1, 2009. Hourly billing rates are also subject to review and adjustments every twelve months on January 1 of each year.

This proposal may be withdrawn by us if not accepted within 60 days.

All documents, including drawings, specifications, field notes, and calculations prepared or furnished by Keller & Kirkpatrick as the result of the work performed in accordance with this proposal are instruments of service. At the conclusion of the work, Keller & Kirkpatrick shall retain ownership and property interest therein. The client is entitled to copies for information and reference of all documents in connection with project, but these documents are not intended or represented to be suitable for reuse. Copies of documents will be furnished to the client provided that fees for services rendered have been paid in full.

In addition, the reasonable costs of research and reproduction for copies of records shall be paid.

Please review this proposal, and should you determine it to be acceptable, sign, date, and return one copy to us.

Very truly yours,

Werner A. Mall, P.L.S.
Director of Surveying Services

WAM:slhc
M:\proposal\wam\Grifasi@Yu&Associates 04-17-2008.wam.doc

cc: Matthew L. Martini, P.L.S., P.P., President

AGREEMENT

The undersigned accepts this proposal and the terms and conditions stated herein and authorizes Keller & Kirkpatrick to proceed with the services as outlined. The undersigned accepts full responsibility for payment for services performed as described above. Payment will be made by acceptor of this contract and will not be dependent upon receiving payment from a third party not directly under contract to Keller & Kirkpatrick.

Accepted this ____________________ day of ______________________________, 2008

By ______________________________ ______________________________
(Authorized Signature) (Corporate Title)

______________________________ ______________________________
(Type or Print Name) (E-Mail Address)

______________________________ ______________________________
(Phone Number) (Fax Number)

PROPOSAL NUMBER PAR-8112

Forgang, Patricia

From: Michael Grifasi [mgrifasi@yu-associates.com]
Sent: Thursday, June 12, 2008 11:16 AM
To: Chenenko, Ricky
Cc: Andrew Leung; Forgang, Patricia
Subject: Carroll Engineering Final Proposal
Attachments: YU Speonk-Proposal.pdf

Ricky,
Attached is the polished proposal for surveying from Carroll Engineering. Let me know if you have any questions.

Thanks,
Michael G. Grifasi
Senior Staff Geologist
YU & Associates, Inc.
200 Riverfront Boulevard
Elmwood Park, NJ 07407
Tel: 201 791 0075 Ext. 131
Cell: 917 770 8163
-----Original Message-----
From: Steve Mazurek [mailto:SMAZUREK@carrollengineering.com]
Sent: Thursday, June 12, 2008 10:43 AM
To: Michael Grifasi
Cc: Andrew Leung
Subject: RE: Speonk Site Figures

Gentlemen:
Attached Proposal—please review—if changes needed, please let me know.

Steven H. Mazurek PLS,PP
Carroll Engineering
105 Raider Boulevard
Suite 206
Hillsborough, NJ 08844
SMAZUREK@CARROLLENGINEERING.COM
Phone 908-874-7500 ext 223
Fax 908-874-5762

From: Michael Grifasi [mailto:mgrifasi@yu-associates.com]
Sent: Tuesday, June 10, 2008 9:46 AM
To: Steve Mazurek
Subject: Speonk Site Figures

Steve,

I'm attaching two figures of the proposed work area for your review. I can't tell you which of these locations are going to be part of the scoped surveying but at least the figures will give you an idea as to the general state of the site. Keep in mind that the monitoring wells and boring locations are not part of our proposed work (ie. sampling grids, transects).

If you have any other questions please do not hesitate to call or e-mail.

Thanks,

Michael G. Grifasi
Senior Staff Geologist
YU & Associates, Inc.
200 Riverfront Boulevard
Elmwood Park, NJ 07407
Tel: 201 791 0075 Ext. 131
Cell: 917 770 8163

Carroll Engineering

June 11, 2008

Mr. Michael Grifasi, Project Manager
YU & Associates, Inc.
200 River Front Blvd., 2nd floor
Elmwood Park, NJ 07407

Subject: Speonk Solvent Plume
Surveying Services
Speonk, NY

Dear Mr. Grifasi,

Carroll Engineering is pleased to submit this proposal for Surveying Services in reference to the above site. We propose to perform the following services associated with this project.

I. **Scope of Services**

It is our understanding the total site encompasses approximately 600 acres of residential, commercial and industrial properties in the Speonk, New York area. Based on the information supplied, we understand there is multiple survey tasks required which will require both field and office support. Also the exact locations and scope of the work will be determined at the time of mobilization for each of the tasks. You indicated there will be a minimum of six mobilizations. Our fees are based on a per mobilization phase. It is also based on 10 hour days at the site for each mobilization. Since the duration of the mobilizations will vary from one to two days, we proposed a daily rate for our field crews (by length of mobilization) and a daily office support rate.

The daily rate would include travel time portal to portal and all necessary equipment to perform the tasks. Tolls, mileage, and (lodging if needed for a two day mobilization) would be invoiced as additional.

All of CEC's field crews are 40 hour hazwopper certified and have current 8 hour certifications. We will only work up to Level C contamination and any disposables required will be the responsibility of the Site Contractor and or the Health and Safety Officer. We will supply our own PPE if required (Respirators, hard hat, glasses, steel shanked and tipped boots). We will also request to be included within the sites general Health and Safety Plan and will not submit an individual document. If a separate document is required, additional charges will be necessary.

The work would include the descriptions as noted in your RFP but may not be limited to same.

- The vertical and horizontal requirements of the work will be adhered to

949 Easton Road
Warrington, PA 18976
Telephone: (215) 343-5700
Fax: (215) 343-0875
Corporate Office

105 Raider Boulevard - Suite 206
Hillsborough, NJ 08844
Telephone: (908) 874-7500
Fax: (908) 874-5762
www.carrollengineering.com

555 Second Avenue - Suite G-101
Collegeville, PA 19426
Telephone: (610) 489-5100
Fax: (610) 489-2674

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- Surveying of up to 75 passive sample locations
- Surveying of an estimated 10 transects at about 750 in length each
- Surveying of various soil borings groundwater profile locations, monitoring wells
- It is estimated that there will be 2 (two) Two Day Mobilizations and 4 (four) One Day Mobilizations

$17,168 plus office support per day

II. **Fees**

The daily rates would be as follows:	Field:	One Day Mobilization	$ 2,368.00
		Two Day Mobilization	$ 3,848.00
	Office:	Office Support Per Day	$ 650.00

We understand we are working as a subcontractor to Yu and Associates and our invoices will be passed through to the prime contractor. In the result of a default by the Prime Contractor, payment from the prime contractor is not a contingency for payment of Carroll Engineering invoices.

III. **Schedule**

We are available to start this project one week after authorization to proceed.

Billing will be monthly based upon the percentage of work completed as estimated by Carroll Engineering. The fees stated herein are for the basic services described in this proposal. If additional services are required, fees will be invoiced on the basis of our standard hourly rates in addition to the basic fee stated herein following your written approval to proceed with the extra work. Services are to be rendered in accordance with the services described above and the 2008 Standard Consulting Contracting Terms and Conditions attached. Reimbursable expenses shall be in accordance with the attached 2008 Schedule and shall be considered extra to the stated fees.

This proposal represents the entire understanding between you and this office with respect to this project, and may only be modified in writing, signed by both of us. If this proposal satisfactorily sets forth your understanding of the arrangement between us, we would appreciate your signing the enclosed copy of this letter in the space provided below, and returning same to this office.

Thank you for the opportunity to present this proposal. If you have any questions, please feel free to contact this office.

Very truly yours,
CARROLL ENGINEERING

Steven H. Mazurek PLS, PP
Survey Manager

Accepted this 11TH day of JUNE, 20 08 for

Carroll Engineering by: Matthew M. Gerber, MCSE
Name

Signature

Vice President
Title

Accepted this ____ day of ___________, 20 ___ for

YU & Associates, Inc.
Company Name

by: ____________________
Name (Print)

____
Signature

____
Title

Carroll Engineering

2008 REIMBURSABLE EXPENSES

The following represent reimbursable expenses to all contracts for professional services. All such expenses shall represent an additional charge and shall not be included in the basic fee, unless otherwise noted in the contract.

Photocopies (includes labor, binding materials, etc.) –
Black - $.25 ea.
Color Image - $0.75 per image (8-1/2"x11") or $1.00 per image (11"x17")

Postage - Federal Express, Certified,
Insured, Overweight - 1.1 times actual cost

Film & Processing - 1.1 times actual cost

Vehicles - Mileage Maximum Federal Reimbursement Rate **
Tolls 1.1 times actual cost
Parking 1.1 times actual cost

Photoionization Detector (PID) - $100.00/day

Plan Reproduction (excluding labor):

Photocopies	$0.35 per square foot
Mylar	$1.75 per square foot
Color (vector-based)	$5.00 per square foot
Color (raster-based)	$10.00 per square foot

Minimum charge $15 (up to 2 prints)

Mounting Board (excluding labor) - $5.00 per square foot

Reimbursable Expense Labor (plan reproduction, board mounting, delivery/pickup) - $40.00 per hour

Subconsultants - 1.1 times actual cost (include engineering, laboratory, and other reimbursable charges).

Others - All other expenses directly assignable to a contract as an additional service shall be invoiced at 1.1 times actual cost. Equipment to be used in the performance of services will be itemized in the agreement as a reimbursable expense.

** Excluding commuting between home and office and equivalent mileage between home and job site.

Today's Commitment To Tomorrow's Challenges

105 Raider Boulevard, Suite 206
Hillsborough, NJ 08844
Telephone: (908) 874-7500
Fax: (908) 874-5762

www.carrollengineering.com

Forgang, Patricia

From:	Michael Grifasi [mgrifasi@yu-associates.com]
Sent:	Thursday, June 12, 2008 2:31 PM
To:	Chenenko, Ricky
Cc:	Forgang, Patricia; Andrew Leung
Subject:	Hirani Bid
Attachments:	Hirani Final Bid.pdf

Ricky,
Attached is a pdf containing Hirani's final bid.

Michael G. Grifasi
Senior Staff Geologist
YU & Associates, Inc.
200 Riverfront Boulevard
Elmwood Park, NJ 07407
Tel: 201 791 0075 Ext. 131
Cell: 917 770 8163

HIRANI GROUP
HIRANI ENGINEERING & LAND SURVEYING, P.C.
Engineers ■ Land Surveyors ■ Construction Managers
30 Jericho Executive Plaza, Suite 200C ● Jericho, NY 11753
(516) 248-1010 Fax: (516) 248-9018
www.hiranigroup.com

June 12, 2008

Mr. Michael G. Grifasi
Senior Staff Geologist
YU & Associates, Inc
200 Riverfront Blvd
Elmwood Park, NJ - 007407

Re: Speonk Solvent Plume, Speonk, NY.

Dear Mr. Grifasi,

Thank you for contacting Hirani Engineering and Land Surveying, P.C. (HE&LS) with your request for proposal (RFP) concerning the above referenced project. Based on the RFP and our telephone conversation & numerous e-mails we are pleased to respond as follows.

We shall provide the land surveying services in accordance with your RFP, elucidated by the accompanying Technical Assumptions, for a Not-to-Exceed (NTE) cost of Ninety Five Thousand ($95,000.00) Dollars. Please find herewith a copy of our standard insurance coverages that we assume to be adequate.

TECHNICAL ASSUMPTIONS

1. Billing shall be done in accordance with the following Rate Schedule:
   A. $1,450.00 / day for a two (2) person field crew, no partial day billing.
   B. $1,800.00 / day for a three (3) person field crew, no partial day billing.
   C. Fifty Five ($55.00) Dollars per hour for Administration.
   D. Seventy Five ($75.00) Dollars per hour for CAD Drafting.
   E. One Hundred and Five ($105.00) Dollars per hour for Technical Support.
   F. One Hundred and Thirty ($130.00) Dollars per hour for the services of a Licensed Land Surveyor.
   G. One Hundred and Seventy ($170.00) Dollars per hour, portal to portal for the services of the Principal Land Surveyor.
   H. These rates shall remain in effect through December 31. 2008 after which there will be an automatic 4% increase across the board and this escalator must also be included in any Purchase Order or Sub-Contract.

2. The project consists of ascertaining the three-dimensional coordinates (y,x,z) at a maximum of 140 locations located on the grounds of the Site & Study Area in Speonk, NY as shown on the information e-mailed to HE&LS on Monday June 9, 2008.

(Cont'd)

3. Surface appurtenances of underground utilities & underground utilities are not part of this project and shall not be field located or shown from record information. No physical entry into any manholes shall be performed.

4. The site is freely accessible for our crew to perform conventional land surveying operations between the hours of 7:00a and 3:30p Monday to Friday. No costs are included herein for entry permits; if any are required the Client shall procure and pay for said services.

5. No costs for Hydrological Data, Environmental Data, Wetland determination / delineation / location or any type of Tree Survey are included herein.

6. Properly Lines / ROW Lines are not part of this survey and shall not be shown or staked.

7. Any Locations where three-dimensional positions are required for our survey will be in place prior to HE&LS commencing our operations for the day and there shall be an agent from YU & Associates present to "point out" the locations to a HE&LS Party Chief and also open the well caps so we can obtain measurements "down" to the PVC pipe.

8. The Horizontal Coordinate System shall be New York State Plane Coordinate System (NYSPCS) Long Island Zone #3104 derived from NAD-83 (CORS) utilizing Global Positioning Satellite (GPS) technology). The Vertical Datum shall be NAVD-88 derived from the same source. Both shall be expressed in the U.S. Standard of Measurement. The Project Horizontal / Vertical control network shall be to Federal Geodetic Control Subcommittee (FGCS) 3rd Order, Class I specifications.

9. Final deliverables shall include an Excel Spreadsheet showing the three-dimensional coordinates of all ascertained locations. Final deliverables shall include three (3) blueprints in addition to a diskette formatted in AutoCAD 2008.

10. The site is not more restrictive than an OSHA Class "D" protection level designation requiring Boots, Hardhats, and Gloves. If more stringent protection levels are designated it automatically voids the cost estimate portion of this agreement.

11. These Technical Assumptions shall become of any contractual agreement, purchase order or other written agreement between our firms.

Work can commence upon written authorization from you and our acknowledgement with all final deliverables due two (2) weeks after our final mobilization. We can normally provide a field crew within three (3) business days after notification by you. If there are any further questions or concerns please contact me.

(Cont'd)

Billing shall be done monthly and Payment terms shall be net thirty (30) days.

Work shall be stopped for reason of delinquent payment with no consequences to HE&LS and the BUYER shall pay any costs for recovery of delinquent payments. Any controversy or claim arising out of or relating to this contract, or the breach thereof, shall be settled by arbitration administered by the American Arbitration Association.

Retainage shall not be withheld from payments to HE&LS.

Sincerely,

C. Richard Moravec, LS
Vice President
Division Officer - Land Surveying

CRM: mk
Encl.

cc: Manjula Krishnappa
Rebecca Lipscomb

Schedule 2.11 (e)
Cost Plus Fixed-Fee Subcontracts

Speonk Solvent Plume

May 7, 2008

NAME OF SUBCONTRACTOR	SERVICES TO BE PERFORMED	SUBCONTRACT PRICE
YEC, INC.	Passive Soil Gas and Survey	$49,051.02

A. Direct Salary Costs

Professional Responsibilty Level	Labor Classi-fication	Average Reimbursement Rate ($/Hr.)		Maximum Reimbursement Rate ($/Hr.)		Estimated Number of Hours	Total Estimated Direct Salary Cost ($)
Principal	VIII	2008	67.14	2008	72.53	16	1.074.24
Senior Geologist/Scientist/ Engineer/ Licensed Surveyor	V	2008	44.39	2008	48.83	40	1,775.60
Staff Geologist/ Scientist/Engineer	IV	2008	38.56	2008	42.45	0	0.00
Staff Geologist/ Scientist/Engineer/CAD Operator	III	2008	33.50	2008	37.16	161.5	5,410.25
Senior Technician/Staff Engineer/Scientist/Geologist	II	2008	24.76	2008	27.76	139.5	3,454.02
Technician/Draftsperson	I	2008	22.43	2008	25.15	0	0.00

Total Direct Salary Costs: 11,714.11

B. Indirect Costs - 117% of direct salary cost

Indirect Costs: 13,705.51

C. Maximum Reimbursement Rates for Direct Non-Salary Costs:

Item	Maxium Reimbursement Rate	Estimated No. of Units		
Mileage	0.505 /mi.	200 miles/trip	8 trips	808.00
Tolls	15.5 /day	8 trips		124.00
Lodging	127 /nights	8 nights		1,016.00
Meals	64 /day	14 meal days		896.00
Survey Equipment Rental	65 /day	9 days		585.00
CAD Equipment	15 /hour	0 hours		0.00
GPS Tie in	1200 /site	1 site		1,200.00
Level D Protection	15 /mnday	7 mandays		105.00
Hammer Drill	80 /day	3 days		240.00
Generator	54 /day	3 days		162.00
Equipment tax	0.08375 /dollar	507.00 dollars		42.46
Equipment shipment	0 /lump	1 lump sum		0.00
Sample cooler shipping	60 /shipment	1 shipments		60.00
Cell phone	10 /day	4 days		40.00
Misc. (mortar, foil, decon, shovels)	200.00 /lump	1 lump sum		200.00
*Sample kit and analysis	14,340.00 /lump	1 lump sum		14,340.00
		Total Direct Non Salary Costs:		19,818.46

D. Fixed Fee (15% of Total Direct and Indirect Salary Costs)

Fixed Fee: 3,812.94

Assumptions:

- Survey requires 6 mobilizations; Survey deliverable as Excel tabel suitable for input to GIS (no drawing)
- Passive Soil Gas requires 2 mobilizations (1-install, 1-retrieve). No air monitoring required during field activities.
- Assume CDM sets grid for soil gas points.
- *Use of Beacon Environmental for this bid was a requirement of CDM.

Matrix New World Engineering, Inc.
120 Eagle Rock Avenue Ste 207
East Hanover NJ 07936
973.240.1800 Fax 973.240.1818
www.matrixneworld.com

April 18, 2008

MATRIXNEWORLD
Enabling Progress

Mr. Ricky A. Chenenko
Camp, Dresser & McKee, Inc.
Raritan Plaza I, Raritan Center
Edison, New Jersey 08818

Re: PROPOSAL FOR PASSIVE SOIL GAS SERVICES & SURVEY SERVICES
SPEONK SOLVENT PLUME
PHILIPS AVENUE & SPEONK-RIVERHEAD ROAD
HAMLET OF SPEONK, TOWN OF SOUTHHAMPTON, SUFFOLK COUNTY, NEW YORK
MATRIX NO. 08-187E

Dear Mr. Chenenko:

Matrix New World Engineering, Inc. (Matrix) is pleased to present this proposal for site investigation activities related to the Speonk Solvent Plume located in the Hamlet of Speonk, Town of Southampton, Suffolk County, New York (Study Area). Matrix understands that a solvent plume exists in the vicinity of Philips Avenue and Speonk-Riverhead Road within the Study Area.

Matrix has reviewed the April 2008 Request for Proposal (RFP) and addendum/clarification prepared by Camp, Dresser & McKee, Inc. (CDM) of Edison, New Jersey. Based on the Project background and our understanding, Matrix has prepared the following scope of professional services. The professional services will be performed in general accordance with Environmental Protection Agency (EPA) and New York State Department of Environmental Conservation (NYSDEC) guidelines and regulations, along with the accepted, prevailing professional standards of care in the industry.

Task 1 – Passive Soil Gas Sample Device Installation
Matrix will provide the labor, equipment and materials to perform soil gas sampling services within the Study Area to investigate subsurface soil conditions as outlined in the RFP and directed by CDM. As specified in the RFP, Matrix will utilize the BeSure Sample Collection Kit™ manufactured by Beacon Environmental Services, Inc. (Beacon) of Bel Air, Maryland. Matrix will install up to 75 passive soil gas sampling devices to a maximum depth of three feet.

During the installation of the passive sampling devices, Matrix will document the following: a description of soils, classification of the soils, determination of groundwater elevations, recording of any physical evidence of soil or groundwater contamination, and screening of the soil cores removed from each boring with a photoionization detector (PID). Matrix has estimated that the 75 soil gas points can be installed within three days.

All installation, sampling and laboratory analysis will be performed in general accordance with the manufacturer's specifications.

Task 2 – Passive Soil Gas Sample Device Retrieval
As proposed in the RFP, Matrix will return to the Study Area following a two week absorption period by the passive soil gas samplers to collect and submit them for laboratory analysis. A total of 78 samples will be analyzed for volatile organic analysis by EPA Method 8260B, which also includes the analysis of three trip blanks. Upon retrieval of the passive samplers, Matrix will backfill with soil cuttings and seal all boreholes with concrete or asphalt where required.

Task 3 – Surveying
As specified in the RFP, Matrix will provide for the services of a licensed surveyor including our oversight, to survey 75 passive soil gas sample locations, geophysical transects, 15 soil borings, six monitoring wells, and 12 groundwater profiling locations. As specified in the RFP, Matrix is estimating that all surveying will be conducted over the course of six days. If additional days for surveying are required based upon the locations of the work areas and timeframe of survey requirements, additional costs will be incurred. These additional costs are not included in this proposal.

Task 4 – Reporting
Matrix will prepare a letter report detailing the findings of the investigation. The letter report will include an overview plan showing sample locations, soil boring logs, and a summary and tabulation of the analytical results.

ESTIMATED COSTS

The following cost estimate is provided relative to the tasks described above.

Task 1 – Passive Soil Gas Sample Device Installation

Labor	$4,200.00
Expenses	$6,300.00
Total Task 1	**$10,500.00**

Task 2 – Passive Soil Gas Sample Device Retrieval

Labor	$2,900.00
Analytical Analysis	$15,700.00
Expenses	$500.00
Total Task 2	**$19,100.00**

Task 3 – Surveying

Labor	$5,600.00
Expenses	$13,500.00
Total Task 3	**$19,100.00**

Task 4–Report Preparation

Labor	$4,800.00
Expenses	$175.00
Total Task 4	**$4,975.00**

Estimated Cost for Proposed Scope of Work $53,675.00

Matrix is prepared to start work on this project in August, as specified in the RFP, and will mobilize within five days after receipt of the notice to proceed. The return of a signed copy of this letter shall constitute authorization to proceed.

We thank you for the opportunity to be of service to you on this project. If you have any questions or require any additional information, do not hesitate to contact us at (973)240-1800.

Sincerely,

Michael Dempsey
Senior Project Manager

Clare P. Sullivan, CHMM, CSP
Vice President

Authorization to Proceed:______________________________ Date:____________

Price Quotation Schedule
NYSDEC Analytical Services Protocol

Type of Analysis	Analytical Method	Cost Per Sample – Aqueous Sample: NYSDEC ASP Category A Reporting	Aqueous Sample: NYSDEC ASP Category B Reporting	Aqueous Sample: Analyte Reporting DUSR	Non-Aqueous Sample: NYSDEC ASP Category A Reporting	Non-Aqueous Sample: NYSDEC ASP Category B Reporting	Non-Aqueous Sample: Analyte Reporting DUSR
Volatile Organics	624 8021B 8260B 524.2 502.2	$ – $ $ $ $	$ 22 $ 16 $ 22 $ 21 $ 16	$ 13 $ 10 $ 13 $ 13 $ 10	$ $ $ – $ $	$ 22 $ 16 $ 22 $ 21 $ 16	$ 13 $ 10 $ 13 $ 13 $ 10
Halogenated Volatile Organics	601 8010	$ – $	$ 15 $ 15	$ 9 $ 9	$ – $	$ 15 $ 15	$ 9 $ 9
Volatile Aromatics	602	$ –	$ 15	$ 9	$ –	$ 15	$ 9
Non-Halogenated Volatile Organics	8015	$ –	$ 16	$ 10	$ –	$ 16	$ 10
Semi-Volatile Organics	625 8270C	$ – $	$ 23 $ 23	$ 14 $ 14	$ – $	$ 23 $ 23	$ 14 $ 14
Phenols	604 8041	$ – $	$ 16 $ 16	$ 10 $ 10	$ $ –	$ 16 $ 16	$ 10 $ 10
Polynuclear Aromatic Hydrocarbons	610 8100	$ – $	$ 16 $ 16	$ 10 $ 10	$ – $	$ 16 $ 16	$ 10 $ 10
Organochlorine Pesticides/PCBs * 8081 A & 8082 are separate Runs	608 8081A/8082 *	$ $ –	$ 16 $ 30 (2 Runs)	$ 10 $ 18 (2 Runs)	$ – $	$ 16 $ 30 (2 Runs)	$ 10 $ 18 (2 Runs)
PCBs only (no pesticides)	8082	$ –	$ 15	$ 9	$ –	$ 15	$ 9
Organophosphorus compounds	8141A	$ –	$ 16	$ 10	$ –	$ 16	$ 10
Chlorinated Herbicides	8151A	$ –	$ 16	$ 10	$ –	$ 16	$ 10

Indicate, as a percentage of the above quoted costs, the cost for expedited testing and turnaround time for:

24 hour turnaround	– %
48 hour turnaround	– %
1 week turnaround	– %
2 week turnaround	30 %

Cost increase if contract is extended for second 12-month period 6.3 % EPS

* 8081 & 8082 are separate Runs
$15 each for full Validation
and $9 each for DUSR

ChemWorld Environmental, Inc.

Forgang, Patricia

From: Mancini, Liane
Sent: Thursday, May 01, 2008 12:34 PM
To: Forgang, Patricia
Subject: Truck Rental

Here's the scoop.

Ryder
732-985-4548
Daily - $45
Weekly - $225
Unlimited mileage
Driver must be 18 or older.
Their insurance is $20 per day.

Enterprise
732-516-1079
Daily $45
Weekly - $300
Unlimited mileage
If under 25 there is a $20 per day surcharge

Budget
732-297-3831
Daily -$85
Weekly - $395
Unlimited mileage
If under 25 there is an one time $25 charge

Liane Mancini
CDM
Raritan Plaza I, Raritan Center, Edison, NJ 08818
Direct: 732-590-4608
Office: 732-225-7000/Fax: 732-225-7851
mancinilj@cdm.com

Speonk Solvent Plume Equipment Vendor Price Comparisons					
Equipment Supply Company	**Amount**	**Units**	**Pine Environmental**	**US Environmental**	**Environmental Equipment and Supply**
PID (month)	2	month	$398.75	$390.00	$700.00
CGI (Pine monthly)	2	month	$247.50	$0.00	$0.00
CGI (week)	8	week	$0.00	$90.00	$450.00
Bailers, weighted teflon (3') (case of 12 & ea)	1	case of 12 + ea	$415.80	$409.80	$413.25
Submersible pump & controllers (week)	1	week	$159.50	$255.00	$365.00
Oil-Water Interface probe (day)	1	day	$24.75	$50.00	$50.00
Water level meter (week)	1	week	$27.50	$36.00	$70.00
Horiba U-22 Water Quality meter (week)	1	week	$165.00	$150.00	$300.00
3/8"IDx1/2"OD poly tubing	750	feet	$0.25	$0.08	$0.18
Generator (week)	1	week	$74.25	$75.00	$140.00
Low Flow Pump (<0.2 L/min) (day)	5	day	$24.75	$36.00	$85.00
Totals			**$2,471**	**$2,716**	**$6,898**

CDM

Subcontractor Conflict of Interest Certification

The undersigned, representing ChemWorld Environmental Inc. hereby certifies for the Speonk Solvent Plume Site No. 1-52-185:

1) That I have been informed by the Camp Dresser & McKee who the known potentially responsible parties are for the subject site, and

2) That to the best of my knowledge, ChemWorld Environmental, Inc. and the employees of the firm to be assigned to this project have no conflict of interest with the work proposed at this site, and

3) That presently ChemWorld Environmental, Inc. has no contracts with, nor imminent prospects of contracts with, potentially responsible parties associated with the above-named site, and

4) That ChemWorld Environmental, Inc. has no responsibilities to potentially responsible parties associated with the above-named site.

Certified By:

Andrea P. Schuessler, ANDREA P. SCHUESSLER
Signature of Subcontractor

Chemworld Environmental, Inc.
Subcontracting Firm

5-9-2008
Date

CDM

Subcontractor Conflict of Interest Certification

The undersigned, representing Miller Environmental Group, Inc. hereby certifies for the Speonk Solvent Plume Site No. 1-52-185:

1) That I have been informed by the Camp Dresser & McKee who the known potentially responsible parties are for the subject site, and

2) That to the best of my knowledge, Miller Environmental Group, Inc. and the employees of the firm to be assigned to this project have no conflict of interest with the work proposed at this site, and

3) That presently Miller Environmental Group, Inc. has no contracts with, nor imminent prospects of contracts with, potentially responsible parties associated with the above-named site, and

4) That Miller Environmental Group, Inc. has no responsibilities to potentially responsible parties associated with the above-named site.

Certified By: JAMES H. DAVEY

Signature of Subcontractor

Miller Environmental Group Inc

Subcontracting Firm

5-29-08

Date

CDM

Subcontractor Conflict of Interest Certification

The undersigned, representing Radar Solutions International hereby certifies for the Speonk Solvent Plume Site No. 1-52-185:

1) That I have been informed by the Camp Dresser & McKee who the known potentially responsible parties are for the subject site, and

2) That to the best of my knowledge, Radar Solutions International and the employees of the firm to be assigned to this project have no conflict of interest with the work proposed at this site, and

3) That presently Radar Solutions International has no contracts with, nor imminent prospects of contracts with, potentially responsible parties associated with the above-named site, and

4) That Radar Solutions International has no responsibilities to potentially responsible parties associated with the above-named site.

Certified By:

Katie Dowdy

Signature of Subcontractor

RADAR SOLUTIONS INT'L.

Subcontracting Firm

5/9/08

Date

CDM

Subcontractor Conflict of Interest Certification

The undersigned, representing Summit Drilling Co., Inc. hereby certifies for the Speonk Solvent Plume Site No. 1-52-185:

1) That I have been informed by the Camp Dresser & McKee who the known potentially responsible parties are for the subject site, and

2) That to the best of my knowledge, Summit Drilling Co., Inc. and the employees of the firm to be assigned to this project have no conflict of interest with the work proposed at this site, and

3) That presently Summit Drilling Co., Inc. has no contracts with, nor imminent prospects of contracts with, potentially responsible parties associated with the above-named site, and

4) That Summit Drilling Co., Inc. has no responsibilities to potentially responsible parties associated with the above-named site.

Certified By:

Signature of Subcontractor

Summit Drilling Co., Inc.

Subcontracting Firm

5-14-2008

Date

CDM

Subcontractor Conflict of Interest Certification

The undersigned, representing TestAmerica hereby certifies for the Speonk Solvent Plume Site No. 1-52-185:

1) That I have been informed by the Camp Dresser & McKee who the known potentially responsible parties are for the subject site, and

2) That to the best of my knowledge, TestAmerica and the employees of the firm to be assigned to this project have no conflict of interest with the work proposed at this site, and

3) That presently TestAmerica has no contracts with, nor imminent prospects of contracts with, potentially responsible parties associated with the above-named site, and

4) That TestAmerica has no responsibilities to potentially responsible parties associated with the above-named site.

* Please see attached.

Certified By:

Signature of Subcontractor

TestAmerica Laboratories, Inc.
Subcontracting Firm

5/9/08
Date

Conflict of Interest Statement for Speonk Solvent Plume Site

TestAmerica Laboratories, Inc. has implemented a Conflicts of Interest Policy, which establishes the procedures for checking for the existence of conflicts among our various assignments. We have identified the following projects/clients which may potentially constitute a conflict with regard to this project:
TestAmerica has no past or current contractual relationship nor conducted any work directly with the potentially responsible parties (PRPs) identified by CDM, however, in 2005, TestAmerica Burlington provided analytical services for air samples received through a consultant from a site in Speonk, New York.

Notwithstanding these potential conflicts, as a general matter, our analytical work is performed according to published methods and standard operating procedures which leave virtually no opportunity for bias. In addition, many samples are received with little or no information regarding the source of the samples, further limiting any opportunity for bias. However, TestAmerica is prepared to develop a Conflict of Interest Avoidance or Mitigation Plan specifically for this contract, with your input, should you determine that this would be appropriate. We believe that our services can be performed in such a manner that any potential conflict is minimal.

CDM

Subcontractor Conflict of Interest Certification

The undersigned, representing Yu & Associates, Inc. hereby certifies for the Speonk Solvent Plume Site No. 1-52-185:

1) That I have been informed by the Camp Dresser & McKee who the known potentially responsible parties are for the subject site, and

2) That to the best of my knowledge, Yu & Associates, Inc. and the employees of the firm to be assigned to this project have no conflict of interest with the work proposed at this site, and

3) That presently Yu & Associates, Inc. has no contracts with, nor imminent prospects of contracts with, potentially responsible parties associated with the above-named site, and

4) That Yu & Associates, Inc. has no responsibilities to potentially responsible parties associated with the above-named site.

Certified By:

Anthony (for)

Signature of Subcontractor

YU & Associates, Inc.

Subcontracting Firm

May 07, 2008

Date

New York State
Department of Environmental Conservation
Division of Environmental Remediation

Subcontract Certification

On behalf of the Contractor named below, I hereby certify that the subcontract named below was procured in accordance with the terms of the prime contract and all applicable requirements of the State of New York. I also hereby certify that the executed subcontract includes all appropriate language and all required documents were completed appropriately and were acceptable. Specifically, I hereby certify the following:

1. The Contractor has determined that the subcontractor is qualified. A statement of qualifications for the subcontractor is maintained. It does include a statement of compliance with all licenses, certifications and permits, if applicable. (Note: For laboratories, this can be determined at: http://www.wadsworth.org/labservices.htm).

2. The Contractor has determined the costs are reasonable. A procurement record supporting the determination is maintained.

3. The Contractor performed a Conflict of Interest (COi) check, if applicable, and documented it in writing. (Refer to Appendix B, clause III (e) for applicability. (Note that for standby subcontractors, the COi certification must be submitted to the project manager upon activation.)

4. For subcontracts in excess (or anticipated to be) of $10,000 the subcontractor submitted an acceptable New York State Uniform Contracting Questionnaire. For subconsultants in excess (or anticipated to be) of $10,000 the subconsultant submitted an acceptable New York State Vendor Responsibility Questionnaire. (Information related to vendor responsibility can be found at http://www.osc.state.ny.us/agencies/gbull/g221.htm.)

5. The subcontract includes pass down requirements from Appendix B of the prime contract related to Minority and Women Business Enterprises/WBE and Conflict of Interest (COI).

6. The Subcontract includes the termination clause required in the prime contract.

7. The subcontract does not include "pay if paid" type clauses which are unenforceable in New York State.

8. Insurance carriers associated with the subcontract are licensed to do business in New York State. The State of New York and the Department of Environmental Conservation are named as additional insurers on the policies. Insurance limits meet prime contract requirements. (Note that licensed insurance can be determined at: http://www.ins.state.ny.us and Best's Rating can be determined at http://www.ambest.com). Pollution liability insurance (for example, drilling subcontractors) and professional liability insurance (for example, subcontracts for professional services and laboratories) is included as appropriate.

9. Documentation supporting this certification is maintained and will be provided within 10 days of any request.

[signature] 5/28/08

Signature of Contractor's Authorized Representative — Date

CDM

Contractor Name — Contract No. WA No.

ChemWorld Environmental, Inc.

Subcontractor Name

New York State
Department of Environmental Conservation
Division of Environmental Remediation

Subcontract Certification

On behalf of the Contractor named below, I hereby certify that the subcontract named below was procured in accordance with the terms of the prime contract and all applicable requirements of the State of New York. I also hereby certify that the executed subcontract includes all appropriate language and all required documents were completed appropriately and were acceptable. Specifically, I hereby certify the following:

1. The Contractor has determined that the subcontractor is qualified. A statement of qualifications for the subcontractor is maintained. It does include a statement of compliance with all licenses, certifications and permits, if applicable. (Note: For laboratories, this can be determined at: http://www.wadsworth.org/labservices.htm).

2. The Contractor has determined the costs are reasonable. A procurement record supporting the determination is maintained.

3. The Contractor performed a Conflict of Interest (COI) check, if applicable, and documented it in writing. (Refer to Appendix B, clause III (e) for applicability. (Note that for standby subcontractors, the COI certification must be submitted to the project manager upon activation.)

4. For subcontracts in excess (or anticipated to be) of $10,000 the subcontractor submitted an acceptable New York State Uniform Contracting Questionnaire. For subconsultants in excess (or anticipated to be) of $10,000 the subconsultant submitted an acceptable New York State Vendor Responsibility Questionnaire. (Information related to vendor responsibility can be found at http://www.osc.state.ny.us/agencies/gbull/g221.htm.)

5. The subcontract includes pass down requirements from Appendix B of the prime contract related to Minority and Women Business Enterprises/WBE and Conflict of Interest (COI).

6. The Subcontract includes the termination clause required in the prime contract.

7. The subcontract does not include "pay if paid" type clauses which are unenforceable in New York State.

8. Insurance carriers associated with the subcontract are licensed to do business in New York State. The State of New York and the Department of Environmental Conservation are named as additional insurers on the policies. Insurance limits meet prime contract requirements. (Note that licensed insurance can be determined at: http://www.ins.state.ny.us and Best's Rating can be determined at http://www.ambest.com). Pollution liability insurance (for example, drilling subcontractors) and professional liability insurance (for example, subcontracts for professional services and laboratories) is included as appropriate.

9. Documentation supporting this certification is maintained and will be provided within 10 days of any request.

[signature] 5/28/08

Signature of Contractor's Authorized Representative — Date

CDM

Contractor Name — Contract No. WA No.

Delta Well & Pump Co., Inc.

Subcontractor Name

New York State
Department of Environmental Conservation
Division of Environmental Remediation

Subcontract Certification

On behalf of the Contractor named below, I hereby certify that the subcontract named below was procured in accordance with the terms of the prime contract and all applicable requirements of the State of New York. I also hereby certify that the executed subcontract includes all appropriate language and all required documents were completed appropriately and were acceptable. Specifically, I hereby certify the following:

1. The Contractor has determined that the subcontractor is qualified. A statement of qualifications for the subcontractor is maintained. It does include a statement of compliance with all licenses, certifications and permits, if applicable. (Note: For laboratories, this can be determined at: http://www.wadsworth.org/labservices.htm).

2. The Contractor has determined the costs are reasonable. A procurement record supporting the determination is maintained.

3. The Contractor performed a Conflict of Interest (COI) check, if applicable, and documented it in writing. (Refer to Appendix B, clause III (e) for applicability. (Note that for standby subcontractors, the COI certification must be submitted to the project manager upon activation.)

4. For subcontracts in excess (or anticipated to be) of $10,000 the subcontractor submitted an acceptable New York State Uniform Contracting Questionnaire. For subconsultants in excess (or anticipated to be) of $10,000 the subconsultant submitted an acceptable New York State Vendor Responsibility Questionnaire. (Information related to vendor responsibility can be found at http://www.osc.state.ny.us/agencies/gbull/g221.htm.)

5. The subcontract includes pass down requirements from Appendix B of the prime contract related to Minority and Women Business Enterprises/WBE and Conflict of Interest (COI).

6. The Subcontract includes the termination clause required in the prime contract.

7. The subcontract does not include "pay if paid" type clauses which are unenforceable in New York State.

8. Insurance carriers associated with the subcontract are licensed to do business in New York State. The State of New York and the Department of Environmental Conservation are named as additional insurers on the policies. Insurance limits meet prime contract requirements. (Note that licensed insurance can be determined at: http://www.ins.state.ny.us and Best's Rating can be determined at http://www.ambest.com). Pollution liability insurance (for example, drilling subcontractors) and professional liability insurance (for example, subcontracts for professional services and laboratories) is included as appropriate.

9. Documentation supporting this certification is maintained and will be provided within 10 days of any request.

h a Cl   5/28/08

Signature of Contractor's Authorized Representative   Date

CDM

Contractor Name   Contract No. WA No.

Environmental Data Resources, Inc.

Subcontractor Name   3/2/07

New York State
Department of Environmental Conservation
Division of Environmental Remediation

Subcontract Certification

On behalf of the Contractor named below, I hereby certify that the subcontract named below was procured in accordance with the terms of the prime contract and all applicable requirements of the State of New York. I also hereby certify that the executed subcontract includes all appropriate language and all required documents were completed appropriately and were acceptable. Specifically, I hereby certify the following:

1. The Contractor has determined that the subcontractor is qualified. A statement of qualifications for the subcontractor is maintained. It does include a statement of compliance with all licenses, certifications and permits, if applicable. (Note: For laboratories, this can be determined at: http://www.wadsworth.org/labservices.htm).

2. The Contractor has determined the costs are reasonable. A procurement record supporting the determination is maintained.

3. The Contractor performed a Conflict of Interest (COI) check, if applicable, and documented it in writing. (Refer to Appendix B, clause III (e) for applicability. (Note that for standby subcontractors, the COI certification must be submitted to the project manager upon activation.)

4. For subcontracts in excess (or anticipated to be) of $10,000 the subcontractor submitted an acceptable New York State Uniform Contracting Questionnaire. For subconsultants in excess (or anticipated to be) of $10,000 the subconsultant submitted an acceptable New York State Vendor Responsibility Questionnaire. (Information related to vendor responsibility can be found at http://www.osc.state.ny.us/agencies/gbull/g221.htm.)

5. The subcontract includes pass down requirements from Appendix B of the prime contract related to Minority and Women Business Enterprises/WBE and Conflict of Interest (COI).

6. The Subcontract includes the termination clause required in the prime contract.

7. The subcontract does not include "pay if paid" type clauses which are unenforceable in New York State.

8. Insurance carriers associated with the subcontract are licensed to do business in New York State. The State of New York and the Department of Environmental Conservation are named as additional insurers on the policies. Insurance limits meet prime contract requirements. (Note that licensed insurance can be determined at: http://www.ins.state.ny.us and Best's Rating can be determined at http://www.ambest.com). Pollution liability insurance (for example, drilling subcontractors) and professional liability insurance (for example, subcontracts for professional services and laboratories) is included as appropriate.

9. Documentation supporting this certification is maintained and will be provided within 10 days of any request.

RA Cl— 5/28/08

Signature of Contractor's Authorized Representative | Date

CDM

Contractor Name | Contract No. WA No.

Miller Environmental Group, Inc.

Subcontractor Name

New York State
Department of Environmental Conservation
Division of Environmental Remediation

Subcontract Certification

On behalf of the Contractor named below, I hereby certify that the subcontract named below was procured in accordance with the terms of the prime contract and all applicable requirements of the State of New York. I also hereby certify that the executed subcontract includes all appropriate language and all required documents were completed appropriately and were acceptable. Specifically, I hereby certify the following:

1. The Contractor has determined that the subcontractor is qualified. A statement of qualifications for the subcontractor is maintained. It does include a statement of compliance with all licenses, certifications and permits, if applicable. (Note: For laboratories, this can be determined at: http://www.wadsworth.org/labservices.htm).

2. The Contractor has determined the costs are reasonable. A procurement record supporting the determination is maintained.

3. The Contractor performed a Conflict of Interest (COI) check, if applicable, and documented it in writing. (Refer to Appendix B, clause III (e) for applicability. (Note that for standby subcontractors, the COI certification must be submitted to the project manager upon activation.)

4. For subcontracts in excess (or anticipated to be) of $10,000 the subcontractor submitted an acceptable New York State Uniform Contracting Questionnaire. For subconsultants in excess (or anticipated to be) of $10,000 the subconsultant submitted an acceptable New York State Vendor Responsibility Questionnaire. (Information related to vendor responsibility can be found at http://www.osc.state.ny.us/agencies/gbull/g221.htm.)

5. The subcontract includes pass down requirements from Appendix B of the prime contract related to Minority and Women Business Enterprises/WBE and Conflict of Interest (COI).

6. The Subcontract includes the termination clause required in the prime contract.

7. The subcontract does not include "pay if paid" type clauses which are unenforceable in New York State.

8. Insurance carriers associated with the subcontract are licensed to do business in New York State. The State of New York and the Department of Environmental Conservation are named as additional insurers on the policies. Insurance limits meet prime contract requirements. (Note that licensed insurance can be determined at: http://www.ins.state.ny.us and Best's Rating can be determined at http://www.ambest.com). Pollution liability insurance (for example, drilling subcontractors) and professional liability insurance (for example, subcontracts for professional services and laboratories) is included as appropriate.

9. Documentation supporting this certification is maintained and will be provided within 10 days of any request.

R A Cl 5/28/08

Signature of Contractor's Authorized Representative Date

CDM

Contractor Name Contract No. WA No.

Radar Solutions International

Subcontractor Name 3/2/07

New York State
Department of Environmental Conservation
Division of Environmental Remediation

Subcontract Certification

On behalf of the Contractor named below, I hereby certify that the subcontract named below was procured in accordance with the terms of the prime contract and all applicable requirements of the State of New York. I also hereby certify that the executed subcontract includes all appropriate language and all required documents were completed appropriately and were acceptable. Specifically, I hereby certify the following:

1. The Contractor has determined that the subcontractor is qualified. A statement of qualifications for the subcontractor is maintained. It does include a statement of compliance with all licenses, certifications and permits, if applicable. (Note: For laboratories, this can be determined at: http://www.wadsworth.org/labservices.htm).

2. The Contractor has determined the costs are reasonable. A procurement record supporting the determination is maintained.

3. The Contractor performed a Conflict of Interest (COI) check, if applicable, and documented it in writing. (Refer to Appendix B, clause III (e) for applicability. (Note that for standby subcontractors, the COI certification must be submitted to the project manager upon activation.)

4. For subcontracts in excess (or anticipated to be) of $10,000 the subcontractor submitted an acceptable New York State Uniform Contracting Questionnaire. For subconsultants in excess (or anticipated to be) of $10,000 the subconsultant submitted an acceptable New York State Vendor Responsibility Questionnaire. (Information related to vendor responsibility can be found at http://www.osc.state.ny.us/agencies/gbull/g221.htm.)

5. The subcontract includes pass down requirements from Appendix B of the prime contract related to Minority and Women Business Enterprises/WBE and Conflict of Interest (COI).

6. The Subcontract includes the termination clause required in the prime contract.

7. The subcontract does not include "pay if paid" type clauses which are unenforceable in New York State.

8. Insurance carriers associated with the subcontract are licensed to do business in New York State. The State of New York and the Department of Environmental Conservation are named as additional insurers on the policies. Insurance limits meet prime contract requirements. (Note that licensed insurance can be determined at: http://www.ins.state.ny.us and Best's Rating can be determined at http://www.ambest.com). Pollution liability insurance (for example, drilling subcontractors) and professional liability insurance (for example, subcontracts for professional services and laboratories) is included as appropriate.

9. Documentation supporting this certification is maintained and will be provided within 10 days of any request.

5/28/08

Signature of Contractor's Authorized Representative — Date

CDM

Contractor Name — Contract No. WA No.

Shider Consulting

Subcontractor Name

New York State
Department of Environmental Conservation
Division of Environmental Remediation

Subcontract Certification

On behalf of the Contractor named below, I hereby certify that the subcontract named below was procured in accordance with the terms of the prime contract and all applicable requirements of the State of New York. I also hereby certify that the executed subcontract includes all appropriate language and all required documents were completed appropriately and were acceptable. Specifically, I hereby certify the following:

1. The Contractor has determined that the subcontractor is qualified. A statement of qualifications for the subcontractor is maintained. It does include a statement of compliance with all licenses, certifications and permits, if applicable. (Note: For laboratories, this can be determined at: http://www.wadsworth.org/labservices.htm).

2. The Contractor has determined the costs are reasonable. A procurement record supporting the determination is maintained.

3. The Contractor performed a Conflict of Interest (COI) check, if applicable, and documented it in writing. (Refer to Appendix B, clause III (e) for applicability. (Note that for standby subcontractors, the COI certification must be submitted to the project manager upon activation.)

4. For subcontracts in excess (or anticipated to be) of $10,000 the subcontractor submitted an acceptable New York State Uniform Contracting Questionnaire. For subconsultants in excess (or anticipated to be) of $10,000 the subconsultant submitted an acceptable New York State Vendor Responsibility Questionnaire. (Information related to vendor responsibility can be found at http://www.osc.state.ny.us/agencies/gbull/g221.htm.)

5. The subcontract includes pass down requirements from Appendix B of the prime contract related to Minority and Women Business Enterprises/WBE and Conflict of Interest (COI).

6. The Subcontract includes the termination clause required in the prime contract.

7. The subcontract does not include "pay if paid" type clauses which are unenforceable in New York State.

8. Insurance carriers associated with the subcontract are licensed to do business in New York State. The State of New York and the Department of Environmental Conservation are named as additional insurers on the policies. Insurance limits meet prime contract requirements. (Note that licensed insurance can be determined at: http://www.ins.state.ny.us and Best's Rating can be determined at http://www.ambest.com). Pollution liability insurance (for example, drilling subcontractors) and professional liability insurance (for example, subcontracts for professional services and laboratories) is included as appropriate.

9. Documentation supporting this certification is maintained and will be provided within 10 days of any request.

5/28/08

Signature of Contractor's Authorized Representative — Date

CDM

Contractor Name — Contract No. WA No.

Summit Drilling Co., Inc.

Subcontractor Name

3/2/07

New York State
Department of Environmental Conservation
Division of Environmental Remediation

Subcontract Certification

On behalf of the Contractor named below, I hereby certify that the subcontract named below was procured in accordance with the terms of the prime contract and all applicable requirements of the State of New York. I also hereby certify that the executed subcontract includes all appropriate language and all required documents were completed appropriately and were acceptable. Specifically, I hereby certify the following:

1. The Contractor has determined that the subcontractor is qualified. A statement of qualifications for the subcontractor is maintained. It does include a statement of compliance with all licenses, certifications and permits, if applicable. (Note: For laboratories, this can be determined at: http://www.wadsworth.org/labservices.htm).

2. The Contractor has determined the costs are reasonable. A procurement record supporting the determination is maintained.

3. The Contractor performed a Conflict of Interest (COI) check, if applicable, and documented it in writing. (Refer to Appendix B, clause III (e) for applicability. (Note that for standby subcontractors, the COI certification must be submitted to the project manager upon activation.)

4. For subcontracts in excess (or anticipated to be) of $10,000 the subcontractor submitted an acceptable New York State Uniform Contracting Questionnaire. For subconsultants in excess (or anticipated to be) of $10,000 the subconsultant submitted an acceptable New York State Vendor Responsibility Questionnaire. (Information related to vendor responsibility can be found at http://www.osc.state.ny.us/agencies/gbull/g221.htm.)

5. The subcontract includes pass down requirements from Appendix B of the prime contract related to Minority and Women Business Enterprises/WBE and Conflict of Interest (COI).

6. The Subcontract includes the termination clause required in the prime contract.

7. The subcontract does not include "pay if paid" type clauses which are unenforceable in New York State.

8. Insurance carriers associated with the subcontract are licensed to do business in New York State. The State of New York and the Department of Environmental Conservation are named as additional insurers on the policies. Insurance limits meet prime contract requirements. (Note that licensed insurance can be determined at: http://www.ins.state.ny.us and Best's Rating can be determined at http://www.ambest.com). Pollution liability insurance (for example, drilling subcontractors) and professional liability insurance (for example, subcontracts for professional services and laboratories) is included as appropriate.

9. Documentation supporting this certification is maintained and will be provided within 10 days of any request.

[signature] 5/28/08

Signature of Contractor's Authorized Representative Date

CDM

Contractor Name Contract No. WA No.

TestAmerica

Subcontractor Name

New York State
Department of Environmental Conservation
Division of Environmental Remediation

Subcontract Certification

On behalf of the Contractor named below, I hereby certify that the subcontract named below was procured in accordance with the terms of the prime contract and all applicable requirements of the State of New York. I also hereby certify that the executed subcontract includes all appropriate language and all required documents were completed appropriately and were acceptable. Specifically, I hereby certify the following:

1. The Contractor has determined that the subcontractor is qualified. A statement of qualifications for the subcontractor is maintained. It does include a statement of compliance with all licenses, certifications and permits, if applicable. (Note: For laboratories, this can be determined at: http://www.wadsworth.org/labservices.htm).

2. The Contractor has determined the costs are reasonable. A procurement record supporting the determination is maintained.

3. The Contractor performed a Conflict of Interest (COI) check, if applicable, and documented it in writing. (Refer to Appendix B, clause III (e) for applicability. (Note that for standby subcontractors, the COI certification must be submitted to the project manager upon activation.)

4. For subcontracts in excess (or anticipated to be) of $10,000 the subcontractor submitted an acceptable New York State Uniform Contracting Questionnaire. For subconsultants in excess (or anticipated to be) of $10,000 the subconsultant submitted an acceptable New York State Vendor Responsibility Questionnaire. (Information related to vendor responsibility can be found at http://www.osc.state.ny.us/agencies/gbull/g221.htm.)

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9. Documentation supporting this certification is maintained and will be provided within 10 days of any request.

[signature] 5/25/10

Signature of Contractor's Authorized Representative | Date

CDM

Contractor Name | Contract No. WA No.

Yu & Associates

Subcontractor Name