Remedial Investigation/ Alternatives Analysis (RI/AA) Work Plan

2424 Hamburg Turnpike Site
Lackawanna, New York

Revised April 2016 0345-015-001

Prepared By:

BENCHMARK
ENVIRONMENTAL
ENGINEERING &
SCIENCE, PLLC

2558 Hamburg Turnpike, Suite 300, Buffalo, New York 14218 | phone: (716) 856-0635 | fax: (716) 856-0583

REMEDIAL INVESTIGATION/ ALTERNATIVES ANALYSIS WORK PLAN

2424 HAMBURG TURNPIKE SITE
BCP SITE NO. C915296
LACKAWANNA, NEW YORK

Revised April 2016 0345-015-001

Prepared for:

2424 Hamburg Turnpike, LLC

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1.0 INTRODUCTION

This document presents the proposed scope of work and implementation procedures for completion of a Remedial Investigation (RI) and Alternatives Analysis (AA) at the 2424 Hamburg Turnpike Site (Site), located at 2424 Hamburg Turnpike in the City of Lackawanna, Erie County, New York (see Figures 1 and 2).

The Applicant, 2424 Hamburg Turnpike, LLC, acting as a Volunteer, has elected to pursue cleanup and redevelopment of the Site under the New York State Brownfield Cleanup Program (BCP) and has signed a Brownfield Cleanup Agreement (BCA) with the New York State Department of Environmental Conservation (NYSDEC). The planned redevelopment is for commercial use.

The RI will be completed by Benchmark Environmental Engineering & Science, PLLC (Benchmark), in association with TurnKey Environmental Restoration, LLC (TurnKey), on behalf of 2424 Hamburg Turnpike, LLC. The work will be completed in general accordance with NYSDEC DER-10 guidelines (Ref. 1).

1.1 Background

The BCP Site consists of a 1.04 acre property, located in a highly developed mixed use industrial, commercial and residential area of the City of Lackawanna, Erie County, New York. Erie County Real Property identifies the Site as 2424 Hamburg Turnpike (SBL 141.59-5-2).

The Site is currently unoccupied with two vacant commercial buildings consisting of a former automobile service building with four repair bays and eight (8) in-ground hydraulic lifts and one (1) shed. The Site also includes asphalt paved areas as well as concrete slabs suspected to have been associated with former on-Site structures.

Previous environmental investigations completed at the Site have revealed evidence of environmental contamination related to the former uses of the Site. Elevated levels of volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), primarily polycyclic aromatic hydrocarbons (PAHs), have been detected on-Site at concentrations exceeding regulatory guidelines. Details of the previous investigations are presented in Section 2.8 below.

The Site is within the Lackawanna Brownfield Opportunity Area (BOA), which encompasses over 2,000 acres within the City of Lackawanna. The Lackawanna BOA is currently in Step 2- Nomination.

1.2 Project Objectives

For sites entering the BCP at the point of investigation, NYSDEC requires completion of a RI. The primary objectives of the RI are to:

- Collect additional soil/fill, groundwater, indoor air, outdoor (ambient) air and sub-slab vapor samples, under appropriate quality assurance/quality control criteria, to better delineate the nature and extent of contamination;
- Determine if the concentrations of constituents of concern in site soil, groundwater, and/or soil gas pose potential unacceptable risks to human health and the environment; and,
- Provide the data needed to evaluate potential remedial measures and determine appropriate actions to address potential significant risks.

As part of the RI process, sampling data will be used to evaluate whether remedial alternatives can meet the objectives. The intended uses of these data dictate the confidence levels. Two data confidence levels will be employed in the RI: screening level data and definitive level data. In general, screening level confidence will apply to field measurements, including photoionization detector (PID) measurements, groundwater elevation measurements, and field analyses (i.e., pH, temperature, dissolved oxygen, specific conductivity, and turbidity). Definitive level confidence will apply to samples for chemical analysis. The applicability of these levels of data will be further specified in the Quality Assurance Project Plan (QAPP) in Section 4.0. Sampling and analytical acceptance and performance criteria such as precision, accuracy, representativeness, comparability, completeness, and sensitivity, are defined in the QAPP.

1.3 Project Organization and Responsibilities

The Applicant, 2424 Hamburg Turnpike, LLC, has been accepted into the New York State BCP as a non-responsible party (volunteer) per ECL§27-1405. Benchmark, in association with TurnKey, will manage the brownfield cleanup on behalf of the Applicant. The NYSDEC Division of Environmental Remediation (Region 9), in consultation with the New York State Department of Health (NYSDOH) shall monitor the remedial actions to verify that the work is performed in general accordance with the anticipated Brownfield Cleanup Agreement (BCA), the Department's approved RI Work Plan, and DER-10 guidance (May 2010).

Benchmark personnel as well as proposed subcontractors for this project are listed below. Resumes for Benchmarks project personnel have been included in Appendix A. Once subcontract agreements are in place, and a field schedule determined, resumes for subcontractor personnel will be provided to the Department, if requested.

Role	Company	Name	Contact Information
BCP Project Manager	Benchmark EES	Michael Lesakowski	(716) 856-0599
Legal Counsel	The Slater Law Firm	Craig A. Slater	(716) 845-6760
Analytical Testing	TestAmerica Labs, Inc.	Brian Fischer	(716) 691-2600
Drilling Services	Natures Way	Eric Warren	(716) 572-6503
Data Validation	Data Validation Services	Judy Harry	(518) 251-4429

2.0 SITE DESCRIPTION

2.1 General

The Site, located on the east side of Hamburg Turnpike (aka Route 5), is bound by an active gasoline station to the north, a retail store to the south, vacant land to the east and Hamburg Turnpike followed by vacant industrial land to the west. The Site is zoned as mixed commercial and industrial. The area of the Site is predominantly zoned commercial and industrial along with the Bethlehem Redevelopment Area located west adjacent to the Site. Residential properties are located north and east of the Site beyond vacant/commercial properties.

2.2 Site Topography and Drainage

The Site is located within the Lake Erie-Niagara River Major Drainage Basin which is typified by little topographic relief and gentle slope toward Lake Erie, except in the immediate vicinity of major drainage ways. Generally, the Site is topographically flat and almost entirely covered by the existing buildings, concrete slabs and asphalt paving. Lake Erie is located approximately one (1) mile west of the Site and Smokes Creek is located approximately 0.4 miles south of the Site. The Site has an average elevation of approximately 580 feet above mean sea level based on USGS topographic mapping of the area. Precipitation (i.e., rain or snow melt) generally moves radially from the Site via overland flow to catch basins located along Hamburg Turnpike. Surface water infiltration and shallow groundwater flow are likely impacted by various cycles of development and filling, as well as utility lines and foundations.

2.3 Geology and Hydrogeology

2.3.1 Overburden

The U.S. Department of Agriculture Soil Conservation Service soil survey map of Erie County (Ref. 2) describes the general soil type at the Site as Urban Land (Ud). This soil type is indicative of the level to gently sloping land with at least 40 percent of the soil surface covered by asphalt, concrete, buildings, or other impervious structures typical of an urban environment. Based on the previously completed investigation (see Section 2.8 below) the subsurface soil/fill was typically characterized as non-native fill material varying in depth from 0-8 fbgs, overlying clay, peat and sand at varying depths to 16 fbgs. Groundwater was typically encountered at approximately 6 fbgs.

The geology of the Site will be further investigated as part of the RI activities.

2.3.2 Bedrock

Based on the bedrock geologic map of Erie County (Ref. 3), the Site is situated over the Onondaga Formation of the Middle Devonian Series. The Onondaga Formation is comprised of a varying texture from coarse to very finely crystalline with a dark gray to tan color and chert and fossils within. The unit has an approximate thickness of 110 to 160 feet. Structurally, the bedrock formations strike in an east-west direction and exhibit a regional dip that approximates 40 feet per mile (3 to 5 degrees) toward the south and southwest. As a result of this dip, the older Onondaga limestone outcrops or subcrops north of the Hamilton Group.

2.3.3 Hydrogeology

The Site is located in the Erie-Niagara River Basin. In the Erie-Niagara Basin, the major areas of groundwater are within coarser overburden deposits and limestone and shale bedrock. Regional groundwater flow is likely to the west towards the Lake Erie. Localized on-Site groundwater flow will be confirmed during the RI.

2.4 Climate

Western New York has a cold continental climate, with moisture from Lake Erie causing increased precipitation. Average annual precipitation is reportedly 40.5 inches and snowfall is 93.6 inches to the northern part of the watershed with over 150 inches per year falling on the southern portion of the watershed. Average monthly temperatures range from 24.5 degrees Fahrenheit in January to 70.8 degrees Fahrenheit in July (Ref. 4). The ground and lakes typically remain frozen from December to March. Winds are generally from the southwest (240 degrees) with a mean velocity of 10 miles per hour (Buffalo Airport, 1999).

2.5 Population and Land Use

The City of Lackawanna, encompassing 6.57 square miles, has a population of approximately 18,121 with a population density of approximately 2,758 people per square mile (2011 US Census Bureau). The Site is located in Census Tract 174, in the area of the city zoned for commercial/light industrial land use.

The Site is located in a highly developed mixed use commercial/industrial are of the City of Lackawanna. Properties adjacent to the Site include commercial and industrial properties.

The subject property has access to all major public and private utilities, including potable water, and sanitary sewer, electric, and natural gas.

2.6 Utilities and Groundwater Use

The subject property has access to all major public and private utilities, including potable water, sanitary and storm sewers, electric, and natural gas.

Groundwater at the Site is assigned Class "GA" by 6NYCRR Part 701.15. Currently, there are no deed restrictions on the use of groundwater at the Site; however, there are no groundwater supply wells on the property. Regionally, groundwater in the area is not used for industrial, agriculture, or public supply purposes. Municipal potable water service is provided on-site and off-site.

2.7 Wetlands and Floodplains

There are no State or Federal jurisdictional wetlands located on-Site. However, floodplains and federal wetlands are noted within ½ mile of the Site along Smokes Creek.

2.8 Previous Investigations

A summary of previous investigations relevant to the Site are presented below. The reports are attached electronically in Appendix B.

2.8.1 July 2013 Geophysical Survey

AMEC Environment and Infrastructure, Inc. (AMEC) completed a geophysical survey of the Site on July 23, 2013. AMEC identified four underground anomalies believed to be potential fueling operation equipment, including appurtenant piping to the dispenser islands and/or USTs.

2.8.2 January 2014 Phase II Environmental Investigation

TurnKey completed a Phase II Environmental Investigation consisting of ten (10) soil borings (SB-1 through SB-10), three of which were converted into temporary one-inch diameter monitoring wells (SB-4/TMW-1, SB-5/TMW-2 and SB-7/TMW-3), to assess subsurface conditions on-Site, including the area of potential contamination discovered during utility upgrade activities along Hamburg Turnpike (Spill No. 1204435) and areas proximate to the in-ground lifts within the service building and the four underground anomalies identified during the geophysical survey. Sample locations from the previous study are shown on Figure 3.

Elevated PID readings above background (0.0 ppm) and petroleum odors were identified in seven (7) of the ten (10) soil borings (SB-4 through SB-10) with the highest PID reading noted as 1,098 ppm at SB-6 (2-4'). In addition, approximately one-inch of floating petroleum product was noted in a monitoring well, TMW-1, completed north of the former UST excavation area.

Six soil samples were analyzed by the laboratory for Target Compound List (TCL) plus CP-51 VOCs and CP-51 SVOCs and two groundwater samples were analyzed for TCL plus CP-51 VOCs. [It should be noted that due to the presence of product at TMW-1, a groundwater sample was not selected for laboratory analysis from this location.] The following bullet points summarize laboratory analytical results:

- Petroleum VOCs were detected at concentrations above CP-51 and/or Part 375 Protection of Groundwater, Unrestricted and/or Restricted Residential Use SCOs in all six soil samples.
- Three soil samples exhibited S-VOC concentrations above CP-51 and/or Part 375 Protection of Groundwater, Unrestricted, Restricted Residential, Commercial and/or Industrial Use SCOs.
- Both groundwater samples exhibited petroleum VOCs at concentrations above Class GA Groundwater Quality Standards (GWQS) with the more significant concentrations (16,333 micrograms per liter (ug/L) total VOCs) identified at TMW-2. Due to the presence of product at TMW-1, concentrations exceeding GWQS are assumed to be present.

2.9 Primary Constituents of Potential Concern (COPCs)

Based on findings to date, the Constituents of Potential Concern (COPCs) are presented by media below:

- ***Soil:*** VOCs and SVOCs
- ***Groundwater:*** VOCs
- ***Subslab Vapor:*** VOCs

3.0 REMEDIAL INVESTIGATION SCOPE OF WORK

The Remedial Investigation scope of work is focused on defining the nature and extent of contamination on-site, identifying the source(s) of contamination, identifying the location(s) of subsurface piping, defining chemical constituent migration pathways, qualitatively assessing human health and ecological risks (if necessary), and obtaining data of sufficient quantity and quality to perform the alternatives analysis report. RI field activities will be performed in compliance with NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation, dated May 2010.

During intrusive outdoor RI activities, a Community Air Monitoring Plan (CAMP) will be followed. The CAMP is consistent with the requirements for community air monitoring at remediation sites as established by the New York State Department of Health (NYSDOH) and NYSDEC. Accordingly, it follows procedures and practices outlined under NYSDEC's DER-10 (May 2010) Appendix 1A (NYSDOH's Generic Community Air Monitoring Plan) and Appendix 1B (Fugitive Dust and Particulate Monitoring).

The subtasks described below are intended to accomplish the project objectives. Field team personnel will collect environmental samples in accordance with the rationale and protocols described in the QAPP in Section 5. USEPA and NYSDEC-approved sample collection and handling techniques will be used. Samples for chemical analysis will be analyzed in accordance with USEPA SW-846 methodology with an equivalent Category B deliverable package to meet the definitive-level data requirements. Analytical results will be evaluated by a third-party data validation expert in accordance with provisions described in the QAPP. Data submittals will be provided to the NYSDEC in accordance with the most current electronic data deliverables (EDD) protocols.

Field activities will be completed in accordance with the Site-specific Health and Safety Plan (HASP), included as Appendix C. The investigation approach is described below. The proposed RI sample locations are presented on Figure 4 and the planned sampling and analytical program is identified on Table 1.

3.1 General Field Activities

General field activities include site meetings, mobilization, implementing the health and safety plan, test pits, test borings, monitoring well installation, sampling and analytical testing, decontamination and handling of investigation wastes and surveying. Subcontractors will be used for test pits, drilling, and analytical testing.

3.1.1 Site Meeting

A Site "kick-off" meeting will be held prior to initiating field work to orient field team members and subcontractors with the Site and to familiarize Benchmark personnel and our subcontractor personnel with Site background, scope of work, potential dangers, health and safety requirements, emergency contingencies and other field procedures. NYSDEC staff are welcome to attend and will be notified at least seven (7) days in advance of the meeting.

3.1.2 Mobilization

Following approval of the Work Plan by NYSDEC, Dig Safely New York (Call 811) will be contacted to clear exploration locations. Utility clearance will require three working days by UFPO. Benchmark and its subcontractors then will mobilize necessary materials and equipment to the Site.

3.1.3 Health and Safety

It is anticipated that the work to be completed at the Site will be done at level D personal protection with the potential to upgrade to level C. Field workers will be instructed to keep level C equipment available should it be needed. Should health and safety monitoring during field activities indicate a threat to field personnel or warrant an upgrade beyond level C protection, work will stop and Site conditions will be re-evaluated by NYSDEC, NYSDOH and Benchmark. See Section 5.1 and Appendix C for additional information on Health and Safety.

3.1.4 Decontamination and Handling of Investigation Derived Waste

The sampling methods and equipment selected limit both the need for decontamination and the volume of waste material to be generated. Decontamination procedures specific to each of the field activities are described in the QAPP. Personal protective equipment (i.e., latex gloves) and disposable sampling equipment (i.e., polyethylene tubing) will be placed in plastic garbage bags for disposal as a solid waste at the Site.

Excess soil cuttings, not returned to the borehole, will be drummed and stored on-Site for future disposal unless the soil appears to be uncontaminated based upon measurements from a photoionization detector (PID). These measurements should be less than one part per million (ppm) in headspace screening[1] and the soils should appear to be visually clean. If less than one ppm and not grossly contaminated, the material will be placed on the ground near the exploration location.

Purge water will be placed on the ground adjacent to the well from which it was removed, provided it shows no sign of contamination (sheen, elevated PID readings, etc.), it infiltrates back into the ground rather than run-off to surface water and it is placed onto soils that are already of similar composition regarding contaminant levels. If the discharge of water onto the soil will result in contamination of soils or groundwater that are "clean", then the water will be drummed. Well development water shall be containerized in 55-gallon drums and stored on-Site until analytical results are received. If analytical results are non-detect, the drummed water will be discharged to the ground surface at the Site. If minor contaminants are present but meet the requirements of the local wastewater treatment facility, drummed water will be discharged to the sanitary sewer. If analytical results do not permit discharge to the storm or sanitary sewer, drummed water will be sampled and characterized for proper disposal.

The volume of material to be disposed from drums, if any, is unknown. Benchmark will coordinate with the Site owner if drums need to be tested and disposed. Benchmark will collect samples for testing, if requested.

3.2 Field Investigation Activities

A remedial investigation will be completed across the Site to further assess potential impacts related to the historic use. The investigation will include the collection of soil, groundwater, and subslab vapor, indoor air and outdoor (ambient) air samples, which will be completed via excavation of exploratory test pits (TPs), the advancement of soil borings

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[1] Headspace screening involves field measurements of the adjacent air during soil sampling plus measurements of the air volume or headspace above a soil sample placed in a plastic baggie, plastic or glass jar. Field measurements are made for total volatile organic compounds using a PID properly calibrated.

(SBs) and groundwater monitoring wells (MWs), as well as subslab sampling ports within the building.

En Core ® samplers will be used to collect VOC samples. All remaining samples will be collected using dedicated stainless steel sampling tools. Representative soil, groundwater and subslab vapor, co-located indoor air samples and an outdoor (ambient) air sample will be placed in pre-cleaned laboratory provided sample bottles/containers, cooled to 4°C in the field (as appropriate), and transported under chain-of-custody command to a NYSDOH Environmental Laboratory Approval Program (ELAP)-certified analytical laboratory. The proposed RI sample locations are presented on Figure 4 and a summary of the Sampling and Analytical Program is included on Table 1. Investigation samples will be reported by the laboratory with equivalent NYSDEC Category B deliverables to allow for independent third-party data usability assessment.

3.2.1 Surface Soil/Fill Investigation

Based on the current Site configuration, the Site is covered with an approximate 6,000 square-foot one-story building and the areas immediately around the building are predominantly either concrete or hard-packed gravel lot. A small area of vegetative cover is present north of the building; therefore, two surface soil/fill samples designated as SS-1 and SS-2 will be collected from the 0-2 inch intervals in that area. Additional surface soil samples will be collected should visible signs of surface contamination (i.e. staining or product) be observed on other portions of the Site.

3.2.2 Subsurface Soil/Fill Investigation

The subsurface soil/fill investigation will consist of six (6) test pits, and nine (9) soil borings across the Site (see Figure 4) to supplement previous soil borings completed on-Site. The test pits are designated TP-1 though TP-6 and the nine (9) soil boring locations are designated SB-11 through SB-14 (previous soil borings SB-1 through SB-10 were completed during the Phase II Investigation) and MW-1 through MW-5.

Test Pits

Six (6) test pits will be completed to further delineate the extent of contamination identified during the Phase II ESA and further characterize the Site. Four test pits will be completed for site-wide characterization and two test pits will be completed in the area of the previously removed USTs and soil excavation north of the building. The test pits will be completed with a track excavator with an approximate 15-foot reach. The reach of the machine, subsurface conditions, such as unstable excavation sidewalls or the water table, may limit the depth of the test pit excavations.

Soil Borings

Nine (9) soil borings will be completed, five (5) of which will be converted to monitoring wells; soil borings will be completed across the Site to provided site-wide data. Two soil borings will be completed within the footprint of the building to further assess subsurface impacts previously identified. Soil borings will be advanced at least 5 feet in to the upper water bearing zone, as further described in Section 3.2.3.

A field engineer/scientist/geologist will observe the test pits and soil borings, and will create a field log (including photograph) for each location. Real time air and particulate monitoring will be conducted during intrusive activities using a PID and particulate monitor. Excavated soil/fill will be placed on the ground near the test trench and/or test pit location. Soil/fill samples will be collected at two-foot intervals for classification, laboratory analysis and field screening with a PID equipped with a 10.6 eV lamp (or equivalent) and characterized for impacts via visual and olfactory observations. Select soil/fill samples collected for analytical testing will typically be collected from contaminated soils or material, based on visual, olfactory, field screening techniques and engineering judgment that warrant analysis. Excavated soil/fill shall be returned to the test pit in the general order that it was excavated. Photographs of each investigation location will be taken as documentation.

Upon reaching the completion depth of each investigation locations, PID, visual/olfactory results will be reviewed. The sample interval identified as the most impacted (i.e., greatest PID scan result and/or evidence of visual/olfactory impact) will be selected for analysis. If differentiable impacts are noted within a particular location, additional samples may be collected from more than one depth interval to characterize the differentiable impacts in that location. In the event that either the impacts are ubiquitous from grade to final depth or no impacts were identified, the soil/fill directly above water table will be selected for analysis. If the impacts are ubiquitous from grade to final depth or no impacts were identified and water is not encountered at a particular sample location, the sample interval will be selected based on the discretion of the field personnel and in consultation with the NYSDEC. In an effort to adequately characterize the soil horizon from 0-15 fbgs across the Site, as is required by the NYSDEC for BCP sites, we have planned for two soil samples from each of the test pit locations; in general, at least one sample will be collected in the upper approximate 4 fbgs and one sample will be collected greater than 4 fbgs, with sample selected for analysis as described above. Soil sample depths will be somewhat dependent on depth to groundwater; a minimum of 20% of subsurface soil samples will be collected from the 10 to 15 fbgs interval or within the unsaturated five-foot interval directly above the water table.

Subsurface soil/fill samples will be analyzed in accordance with the sampling and analysis plan (see Table 1). Furthermore, if elevated PID readings (i.e., sustained readings above 5 ppm) are observed in any sample, that sample will also be analyzed for TCL VOCs. Field personnel will be prepared to collect additional samples, in consultation with the Applicant and the Department, if additional potential impacts are encountered during the RI.

Grossly Contaminated Soil (GCS)

According to 6NYCRR Part 375-1.2(u), "Grossly Contaminated Media" means soil, sediment, surface water, or groundwater which contains sources or substantial quantities of mobile contamination in the form of non-aqueous phase liquid (NAPL), as defined in subdivision 375-1.2 (ac), that is identifiable either visually, through strong odor, by elevated contaminant vapor levels, or is otherwise readily detectable without laboratory analysis.

The nature and extent of Grossly Contaminated Soil (GCS), if present, will be based mainly on field observations, as opposed to laboratory analysis, with evidence of product, strong odors, and/or elevated PID readings. If encountered, TurnKey's observations of GCS will be documented during the work and GCS will be properly handled and placed on and covered with plastic sheeting.

3.2.3 *Groundwater Investigation*

Five (5) groundwater monitoring wells will be installed at the Site to assess groundwater flow direction and groundwater quality. Proposed groundwater monitoring well locations are identified on Figure 4. Monitoring well installation, well development, and groundwater sample collection details are discussed in the following sections.

3.2.3.1 Monitoring Well Installation

The soil borings will be completed with a drill rig capable of advancing hollow stem augers to install 2-inch inside diameter PVC monitoring wells. Each well location will be advanced to approximately 15 fbgs, or refusal, with a target minimum of 5 feet below the first encountered groundwater. Non-dedicated drilling tools and equipment will be decontaminated between boring locations using potable tap water and a phosphate-free detergent (e.g., Alconox).

Subsequent to boring completion, a 2-inch ID diameter flush-joint Schedule 40 PVC monitoring well will be installed at each location. Each well will be constructed with a minimum 5-foot flush-joint Schedule 40 PVC, 0.010-inch machine slotted well screen. Each well screen and attached riser will be placed at the bottom of each borehole and a silica sand filter pack (size #0) will be installed from the base of the well to a maximum of 2 feet above the top of the screen. A bentonite chip seal will then be installed and allowed to hydrate sufficiently to mitigate the potential for downhole grout contamination. The newly installed monitoring wells will be completed with keyed-alike locks, a lockable J-plug, and a steel flush mounted road box.

Drill cuttings will be spread on-Site unless GCS is encountered, in which case they will be placed in sealed NYSDOT-approved drums and labeled for subsequent characterization and disposal, if necessary.

3.2.3.2 Well Development

After installation, but not within 24 hours, the newly installed monitoring wells will be developed in accordance with Benchmark and NYSDEC protocols. Development of the monitoring wells will be accomplished with dedicated disposable polyethylene bailers via surge and purge methodology. Field parameters including pH, temperature, turbidity, dissolved oxygen, oxidation-reduction potential (ORP) and specific conductance will be measured periodically (i.e., every well volume or as necessary) during development. Field measurements will continue until they became relatively stable. Stability will be defined as variation between measurements of approximately 10 percent or less with no overall upward or downward trend in the measurements. A minimum of three (3) well volumes will be evacuated from each monitoring well. Development water from the monitoring wells will be discharged to the ground surface in the vicinity of the monitoring well being developed. If light non-aqueous phase liquid (LNAPL), dense non-aqueous phase liquid (DNAPL), odors, or sheen are encountered during well development water will be containerized in NYSDOT-approved drums and labeled per monitoring well location. Based on the RI groundwater analytical results, it will be determined, in consultation with the Department, if the containerized development water is acceptable for surface discharge, or requires subsequent on-Site treatment and/or off-Site disposal.

3.2.3.3 Groundwater Sample Collection

Prior to sample collection, static water levels will be measured and recorded from all on-Site monitoring wells to facilitate the preparation of a Site-wide isopotential map. Following water level measurement, field personnel will purge and sample monitoring wells using a submersible pump with dedicated pump tubing following low-flow/minimal drawdown purge and sample collection procedures. In the event of pump failure or the saturated unit does not permit the proper implementation of low-flow sampling, a dedicated polyethylene bailer will be used to purge and sample the well. Prior to sample collection via low-flow methodology, groundwater will be evacuated from each well at a low-flow rate (typically less than 0.1 L/min) while maintaining a generally consistent water level. Field measurements for pH, temperature, turbidity, DO, ORP, specific conductance and water level, as well as visual and olfactory field observations will be periodically recorded and monitored for stabilization. Low-flow purging will be considered complete when pH, specific conductivity, DO, ORP, and temperature stabilize and when turbidity measurements fall below 50 Nephelometric Turbidity Units (NTU), or become stable above 50 NTU regardless of volume purged. Purging via disposable bailer, if necessary, will be considered complete following the removal of three (3) well volumes and field parameter stabilization or to well dryness, whichever occurs first. In general, stability is defined as variation between field measurements of 10 percent or less and no overall upward or downward trend in the measurements. Upon stabilization of field parameters, groundwater samples will be collected and analyzed.

Prior to, and immediately following collection of groundwater samples, field measurements for pH, temperature, turbidity, DO, ORP, specific conductance and water level, as well as visual and olfactory field observations will be recorded. Collected groundwater samples will be placed in pre-cleaned, pre-preserved laboratory provided sample bottles, cooled to 4°C in the field, and transported under chain-of-custody command to a NYSDOH-approved laboratory for analysis.

3.2.3.4 Groundwater Sample Analyses

Groundwater samples will be collected from the five (5) groundwater wells. The groundwater sample analysis will include Target Compound List (TCL) VOCs, TCL SVOCs, Target Analyte List (TAL) Metals, PCBs, pesticides and herbicides in accordance with USEPA SW 846 methodology with equivalent NYSDEC Category B deliverables to allow for independent third-party data usability assessment. In the event groundwater sample turbidity levels exceed 50 NTUs, an additional groundwater sample will be collected and field filtered (or filtered in the laboratory) for dissolved Part 375 list Metals analysis.

3.2.4 *Subslab Vapor Assessment*

To evaluate the potential vapor intrusion into the existing building, one (1) subslab vapor (SSV) sample, one (1) indoor air (IA) sample and one (1) outdoor (ambient) air (OA) (i.e., background) sample will be collected. The SSV and IA samples will be collected from the historic office portion of the building. The sampling will be completed in conformance with the New York State Department of Health (NYSDOH) Soil Vapor Intrusion Guidance (October 2006) and Benchmark's *Ambient Air and Subslab Vapor Sampling* Field Operating Procedures (FOPs 090.0 and 004.4, respectively - see Appendix E). SSV, IA and OA samples will be collected and sent to a NYSDOH-approved laboratory for analysis of USEPA TCL VOCs in accordance with USEPA Method TO-15.

3.2.4.1 Subslab Vapor Pre-Sample Assessment

Prior to initiation of SV sampling, a pre-sampling inspection will be performed prior to each sampling event to identify and minimize conditions that may interfere with the proposed testing. The inspection will evaluate the type of structure, floor layout, airflows and physical conditions of the building. This information, along with information on sources of potential indoor air contamination, will be identified on a building inventory form.

3.2.4.2 Subslab Vapor Sample Collection

At the SV sampling location, Benchmark personnel will drill a hole through the concrete slab using a hand-held hammer drill. Temporary subslab vapor probes and tubing will utilized for the sample collection. Holes in the concrete slab will be filled and sealed after completion of the sampling event. The sub-slab vapor sample will be collected in the following general manner:

- After installation of the probes, complete a tracer gas test to verify the integrity of the soil vapor probe seal;
- Upon completion of a successful tracer gas test, three volumes (i.e., the volume of the sample probe and tube) will be purged prior to collecting the samples to ensure samples collected are representative;
- The subslab vapor probes will be sealed to the surface with permagum grout, melted beeswax, putty, or other non-VOC containing and non-shrinking products for temporary installation;
- Flow rates for both purging and collecting will not exceed 0.2 liters per minute to minimize outdoor air infiltration during sampling;
- Subslab vapor sample canisters will be equipped with an eight (8) hour regulator to allow the sample to be collected over an approximate eight (8) hour period; and,
- Samples will be collected in an appropriate container which meets the requirements of the sampling and analytical methods (e.g., low flow rate; Summa® canisters if analyzed by EPA Method TO-15), and is certified clean by the laboratory.

Concurrent with the subslab vapor sample, indoor air and outdoor air samples will be collected. The indoor air sample will be collected adjacent to the sub-slab vapor location based upon accessibility within the building. One outdoor, field located air sample will also be collected from a ground level location upwind of the facility, as determined on the day of sub-slab vapor sampling field activities. Indoor and outdoor air sample canisters will also be equipped with an eight (8) hour regulator to allow the samples to be collected over the same approximate eight (8) hour period as the subslab vapor sample.

Each canister, with an initial pressure of approximately 30 pounds per square inch (psi), will be fitted with a sampling valve that uses a critical orifice and mass flow controller to regulate the air flow into the canister for the selected sampling period. The mass flow controller will maintain a relative constant air flow rate throughout the sampling period. Summa canister valves will remain closed until the sample holes are complete and all of the canisters are in their respective positions. The valves will then be opened for the designated collection period.

3.2.4.3 Sub-slab Vapor Sample Analysis

Soil vapor samples will be collected in Summa® canisters, and once filled will be transported under chain-of-custody command to a NYSDOH-approved laboratory for analysis of USEPA TCL VOCs in accordance with USEPA Method TO-15 [the laboratory detection limits for trichloroethylene, carbon tetrachloride and vinyl chloride for indoor and outdoor (ambient) air samples should be 0.25 ug/m^3 or less]. Field documentation of sub-slab vapor investigation sampling activities will be consistent with the NYSDOH guidance.

3.3 Field Specific Quality Assurance/Quality Control Sampling

In addition to the soil/fill, groundwater and air samples described above, field-specific quality assurance/quality control (QA/QC) samples will be collected and analyzed to ensure the reliability of the generated data as described in the QAPP (see Section 5.0) and to support the required third-party data usability assessment effort. Site-specific QA/QC samples will include matrix spikes, matrix spike duplicates, blind duplicates, and trip blanks.

3.4 Site Mapping

A Site map will be developed during the field investigation. Investigation locations and relevant Site features will be located on the map. Benchmark will employ a Trimble GeoXT handheld GPS unit to identify the locations of investigation locations relative to State planar grid coordinates. Monitoring well elevations will be measured by Benchmark's surveyor. An isopotential map showing the general direction of groundwater flow will be prepared based on water level measurements relative to USGS vertical datum. Maps will be provided within the RI report.

4.0 QUALITY ASSURANCE PROJECT PLAN

A Quality Assurance Project Plan (QAPP) has been prepared in support of the RI activities. The QAPP dictates implementation of the investigation tasks delineated in this Work Plan. A Sampling and Analysis Plan (SAP) identifying methods for sample collection, decontamination, handling, and shipping, is provided as below.

The QAPP will assure the accuracy and precision of data collection during the Site characterization and data interpretation periods. The QAPP identifies procedures for sample collection to mitigate the potential for cross-contamination, as well as analytical requirements necessary to allow for independent data validation. The QAPP has been prepared in accordance with USEPA's Requirements for Quality Assurance Project Plans for Environmental Data Operations (Ref. 6); the EPA Region II CERCLA Quality Assurance Manual (Ref. 7), and NYSDEC's DER-10 Technical Guidance for Site Investigation and Remediation (May 2010) (Ref. 1).

4.1 Scope of the QAPP

This QAPP was prepared to provide quality assurance (QA) guidelines to be implemented during the RI activities. This document may be modified for subsequent phases of investigative work, as necessary. The QAPP provides:

- A means to communicate to the persons executing the various activities exactly what is to be done, by whom, and when.
- A culmination to the planning process that ensures that the program includes provisions for obtaining quality data (e.g., suitable methods of field operations).
- A historical record that documents the investigation in terms of the methods used, calibration standards and frequencies planned, and auditing planned.
- A document that can be used by the Project Manager's and QA Officer to assess if the activities planned are being implemented and their importance for accomplishing the goal of quality data.
- A plan to document and track project data and results.

- Detailed descriptions of the data documentation materials and procedures, project files, and tabular and graphical reports.

The QAPP is primarily concerned with the quality assurance and quality control aspects of the procedures involved in the collection, preservation, packaging, and transportation of samples; field testing; record keeping; data management; chain-of-custody procedures; laboratory analyses; and other necessary matters to assure that the investigation activities, once completed, will yield data whose integrity can be defended.

QA refers to the conduct of all planned and systematic actions necessary to perform satisfactorily all task-specific activities and to provide information and data confidence as a result of such activities. The QA for task-specific activities includes the development of procedures, auditing, monitoring and surveillance of the performance.

QC refers to the activity performed to determine if the work activities conform to the requirements. This includes activities such as inspections of the work activities in the field (e.g., verification that the items and materials installed conform to applicable codes and design specifications).

4.2 QAPP Organization and Responsibility

The principal organizations involved in verifying achievement of data collection goals for the 2424 Hamburg Turnpike Site include: the NYSDEC; NYSDOH; 2424 Hamburg Turnpike, LLC (Volunteer Applicant); Benchmark Environmental Engineering and Science, PLLC and TurnKey Environmental Restoration, LLC (Applicants Engineering and Environmental Consultants); the drilling subcontractor(s); the independent environmental laboratory; and the independent third party data validator. Roles, responsibilities, and required qualifications of these organizations are discussed in the following subsections. Resumes are included in Appendix A.

4.2.1 NYSDEC and NYSDOH

It is the responsibility of the New York State Department of Environmental Conservation (NYSDEC), in conjunction with the New York State Department of Health, to review the RI Work Plan and supporting documents, for completeness and conformance with the site-specific cleanup objectives and to make a decision to accept or reject these documents based on this review. The NYSDEC also has the responsibility and authority to review and approve all QA documentation collected during brownfield cleanup construction and to confirm that the QA Plan was followed.

4.2.2 Applicant

2424 Hamburg Turnpike, LLC ("Applicant") will be responsible for complying with the QA requirements as specified herein and for monitoring and controlling the quality of the Brownfield cleanup construction either directly or through their designated environmental consultant and/or legal counsel. The Applicants will also have the authority to select Remedial Action Contractor(s) to assist them in fulfilling these responsibilities. The designated Project Manager is responsible for implementing the project, and has the authority to commit the resources necessary to meet project objectives and requirements.

4.2.3 Benchmark Environmental Engineering & Science, PLLC

Benchmark Environmental Engineering & Science, PLLC (Benchmark) in association with TurnKey Environmental Restoration, LLC (TurnKey), are the prime engineering and scientific consultants, respectively, on this project and are responsible for the implementation of the RI Work Plan, including, but not limited to, field operations, laboratory testing, data management, data analysis and reporting. Any one member of Benchmark's or TurnKey's staff may fill more than one of the identified project positions (e.g., field team leader and site safety and health officer). The various quality assurances, field, laboratory, and management responsibilities of key project personnel are defined below.

- *Benchmark/TurnKey Project Manager (PM):* *Michael Lesakowski.*

  The Benchmark/TurnKey PM has the responsibility for ensuring that the project meets the Work Plan objectives. The PM will report directly to the Applicant Project Coordinator and the NYSDEC/NYSDOH Project Coordinators and is responsible for technical and project oversight. The PM will:

  - Define project objectives and develop a detailed work plan schedule.
  - Establish project policy and procedures to address the specific needs of the project as a whole, as well as the objectives of each task.

- Acquire and apply technical and corporate resources as needed to assure performance within budget and schedule constraints.
- Develop and meet ongoing project and/or task staffing requirements, including mechanisms to review and evaluate each task product.
- Review the work performed on each task to assure its quality, responsiveness, and timeliness.
- Review and analyze overall task performance with respect to planned requirements and authorizations.
- Review and approve all deliverables before their submission to NYSDEC.
- Develop and meet ongoing project and/or task staffing requirements, including mechanisms to review and evaluate each task product.
- Ultimately be responsible for the preparation and quality of interim and final reports.
- Represent the project team at meetings.

- *Benchmark/TurnKey FTL/SSHO:* *Bryan Mayback*

  The Field Team Leader (FTL) has the responsibility for implementation of specific project tasks identified at the Site, and is responsible for the supervision of project field personnel, subconsultants, and subcontractors. The FTL reports directly to the Project Manager. The FTL will:

  - Define daily work activities.
  - Orient field staff concerning the project's special considerations.
  - Monitor and direct subcontractor personnel.
  - Review the work performed on each task to ensure its quality, responsiveness, and timeliness.
  - Assure that field activities, including sample collection and handling, are carried out in accordance with this QAPP.

  For this project the FTL will also serve as the Site Safety and Health Officer (SSHO). As such, he is responsible for implementing the procedures and required components of the Site Health and Safety Plan (HASP), determining levels of protection needed during field tasks, controlling site entry/exit, briefing the field team and subcontractors on site-specific health and safety issues, and all other responsibilities as identified in the HASP.

4.3 Quality Assurance (QA) Responsibilities

The QA Officer will have direct access to corporate executive staff as necessary, to resolve any QA dispute, and is responsible for auditing the implementation of the QA program in conformance with the demands of specific investigations and Benchmark policies, and NYSDEC requirements.

The QA Officer has sufficient authority to stop work on the investigation as deemed necessary in the event of serious QA issues.

- *Project QA Officer:* *Lori Riker*

  Specific function and duties include:
  - Performing QA audits on various phases of the field operations
  - Reviewing and approving QA plans and procedures
  - Providing QA technical assistance to project staff
  - Reporting on the adequacy, status, and effectiveness of the QA program on a regular basis to the Project Manager for technical operations
  - Responsible for assuring third party data review of all sample results from the analytical laboratory

4.4 Field Responsibilities

Benchmark/TurnKey field staff for this project is drawn from a pool of qualified resources. The Project Manager will use staff to gather and analyze data, and to prepare various task reports and support materials. All of the designated technical team members are experienced professionals who possess the degree of specialization and technical competence required to effectively and efficiently perform the required work.

4.5 Quality Assurance Objectives for Measurement Data

The overall objectives and criteria for assuring quality for this effort are discussed below. This QAPP addresses how the acquisition and handling of samples and the review and reporting of data will be documented. The objectives of this QAPP are to address the following:

- The procedures to be used to collect, preserve, package, and transport groundwater samples.
- Field data collection.
- Record keeping.
- Data management.
- Chain-of-custody procedures.
- Precision, accuracy, completeness, representativeness, decision rules, comparability and level of quality control effort conformance for sample analysis and data management by TestAmerica under EPA analytical methods.

4.6 Level of QC Effort for Sample Parameters

Field blank, method blank, trip blank, field duplicate, laboratory duplicate, laboratory control, standard reference materials (SRM) and matrix spike samples will be analyzed to assess the quality of the data resulting from the field sampling and analytical programs. QC samples are discussed below.

- Field and trip blanks consisting of distilled water will be submitted to the analytical laboratories to provide the means to assess the quality of the data resulting from the field-sampling program. Field (equipment) blank samples are analyzed to check for procedural chemical constituents at the facility that may cause sample contamination. Trip blanks are used to assess the potential for contamination of samples due to contaminant migration during sample shipment and storage.
- Method blank samples are generated within the laboratory and used to assess contamination resulting from laboratory procedures.
- Duplicate samples are analyzed to check for sampling and analytical reproducibility.
- MS/MSD and MS/Duplicate samples provide information about the effect of the sample matrix on the digestion and measurement methodology. Depending on site-specific circumstances, one MS/MSD or MS/Duplicate should be

collected for every 20 or fewer investigative samples to be analyzed for organic and inorganic chemicals of a given matrix.

The general level of QC effort will be one field (blind) duplicate and one field blank (when non-dedicated equipment is used) for every 20 or fewer investigative samples of a given matrix. Additional sample volume will also be provided to the laboratory to allow one site-specific MS/MSD or MS/Duplicate for every 20 or fewer investigative samples of a given matrix. One trip blank consisting of distilled, deionized water will be included along with each sample delivery group of aqueous VOC samples.

4.7 Sampling and Analysis Plan

The selection and rationale for the RI sampling program is discussed in the RI Work Plan. Methods and protocol to be used to collect environmental samples (i.e., soil, groundwater, and sub-slab vapor) for this investigation are described in the Benchmark/TurnKey Field Operating Procedures (FOPs) presented in Appendix E.

The number and types of environmental samples to be collected is summarized on Table 1. Sample parameter lists, holding times and sample container requirements are summarized on Table 2. The sampling program and related site activities are discussed below. To the extent allowed by existing physical conditions at the facility, sample collection efforts will adhere to the specific methods presented herein. If alternative sampling locations or procedures are implemented in response to facility specific constraints, each will be selected on the basis of meeting data objectives. Such alternatives will be approved by NYSDEC before implementation and subsequently documented for inclusion in the project file.

4.7.1 Custody Procedures

Sample custody is controlled and maintained through the chain-of-custody procedures. Chain of custody is the means by which the possession and handling of samples will be tracked from the source (field) to their final disposition, the laboratory. A sample is considered to be in a person's custody if it is in the person's possession or it is in the person's view after being in his or her possession or it was in that person's possession and that person has locked it in a vehicle or room. Sample containers will be cleaned and preserved at the laboratory before shipment to the Site. The following section and FOPs for

Sampling, Labeling, Storage, and Shipment, located in Appendix E, describe procedures for maintaining sample custody from the time samples are collected to the time they are received by the analytical laboratory.

4.7.2 Sample Storage

Samples are stored in secure limited-access areas. Walk-in coolers or refrigerators are maintained at 4°C, ± 2°C, or as required by the applicable regulatory program. The temperatures of all refrigerated storage areas are monitored and recorded a minimum of once per day. Deviations of temperature from the applicable range require corrective action, including moving samples to another storage location if necessary.

4.7.3 Sample Custody

Sample custody is defined by this document as when any of the following occur:

- It is in someone's actual possession.
- It is in someone's view after being in his or her physical possession.
- It was in someone's possession and then locked, sealed, or secured in a manner that prevents unsuspected tampering.
- It is placed in a designated and secured area.

Samples are removed from storage areas by the sample custodian or analysts and transported to secure laboratory areas for analysis. Access to the laboratory and sample storage areas is restricted to laboratory personnel and escorted visitors only; all areas of the laboratory are therefore considered secure. If required by the applicable regulatory program, internal chain-of-custody is documented in a log by the person moving the samples between laboratory and storage areas.

Laboratory documentation used to establish COC and sample identification may include the following:

- Field COC forms or other paperwork that arrives with the sample.
- The laboratory COC.
- Sample labels or tags are attached to each sample container.

- Sample custody seals.
- Sample preparation logs (i.e., extraction and digestion information) recorded in hardbound laboratory books that are filled out in legible handwriting, and signed and dated by the chemist.
- Sample analysis logs (e.g., metals, GC/MS, etc.) information recorded in hardbound laboratory books that are filled out in legible handwriting, and signed and dated by the chemist.
- Sample storage log (same as the laboratory COC).
- Sample disposition log, which documents sample disposal by a contracted waste disposal company.

4.7.4 Sample Tracking

All samples are maintained in the appropriate coolers prior to and after analysis. The analysts remove and return their samples as needed. Samples that require internal COC are relinquished to the analysts by the sample custodians. The analyst and sample custodian must sign the original COC relinquishing custody of the samples from the sample custodian to the analyst. When the samples are returned, the analyst will sign the original COC returning sample custody to the sample custodian. Sample extracts are relinquished to the instrumentation analysts by the preparatory analysts. Each preparation department tracks internal COC through their logbooks/spreadsheets.

Any change in the sample during the time of custody will be noted on the COC (e.g., sample breakage or depletion).

4.7.5 Split Sampling

The Department may split any soil, groundwater, or collect additional air samples at the Department's expense, during this RI. Benchmark personnel will cooperate with the Department to facilitate split sampling, as requested.

4.8 Calibration Procedures and Frequency

This section describes the calibration procedures and the frequency at which these procedures will be performed for both field and laboratory instruments.

4.8.1 Field Instrument Calibration

Quantitative field data to be obtained during groundwater sampling include pH, turbidity, specific conductance, temperature, and depth to groundwater. Quantitative water level measurements will be obtained with an electronic sounder or steel tape, which require no calibration. Quantitative field data to be obtained during soil sampling include screening for the presence of volatile organic constituents using a photoionization detector (PID).

FOPs located in Appendix E describe the field instruments used to monitor for these parameters and the calibration methods, standards, and frequency requirements for each instrument. Calibration results will be recorded on the appropriate field forms and in the Project Field Book.

4.9 Analytical Procedures

Samples collected during this investigation field sampling activities will be analyzed by a NYSDOH-approved laboratory.

4.9.1 Field Analytical Procedures

Field procedures for collecting and preserving groundwater and soil samples are described in FOPs located in Appendix E. A summary of the FOPs is presented on Table 3. As indicated, soil samples for VOC analysis will be collected using core samplers for VOC analytical method certification.

4.10 Data Usability Evaluation

Data usability evaluation procedures shall be performed for both field and laboratory operations as described below.

4.10.1 Procedures Used to Evaluate Field Data Usability

Procedures to validate field data for this project will be facilitated by adherence to the FOPs identified in Appendix E. The performance of all field activities, calibration checks on all field instruments at the beginning of each day of use, manual checks of field calculations, checking for transcription errors and review of field log books is the responsibility of the Field Team Leader.

4.10.2 Procedures Used to Evaluate Laboratory Data Usability

Data evaluation will be performed by the third party data validator using the most current methods and quality control criteria from the USEPA's Contract Laboratory Program (CLP) *National Functional Guidelines for Organic Data Review* (Ref. 8), and Contract Laboratory Program, *National Functional Guidelines for Inorganic Data Review* (Ref. 9). The data review guidance will be used only to the extent that it is applicable to the SW-846 methods; SW-846 methodologies will be followed primarily and given preference over CLP when differences occur. Also, results of blanks, surrogate spikes, MS/MSDs, and laboratory control samples will be reviewed/ evaluated by the data validator. All sample analytical data for each sample matrix shall be evaluated. The third party data validation expert will also evaluate the overall completeness of the data package. Completeness checks will be administered on all data to determine whether deliverables specified in this QAPP are present. The reviewer will determine whether all required items are present and request copies of missing deliverables.

5.0 INVESTIGATION SUPPORT DOCUMENTS

5.1 Health and Safety Protocols

Benchmark has prepared a Site-Specific Health and Safety Plan (HASP) for use by our employees in accordance with 40 CFR 300.150 of the NCP and 29 CFR 1910.120. The HASP, provided in Appendix C, includes the following site-specific information:

- A hazard assessment.
- Training requirements.
- Definition of exclusion, contaminant reduction, and other work zones.
- Monitoring procedures for site operations.
- Safety procedures.
- Personal protective clothing and equipment requirements for various field operations.
- Disposal and decontamination procedures.

The HASP also includes a contingency plan that addresses potential site-specific emergencies, and a Community Air Monitoring Plan that describes required particulate and vapor monitoring to protect the neighboring community during intrusive site investigation and remediation activities.

Health and safety activities will be monitored throughout the field investigation. A member of the field team will be designated to serve as the on-site Health and Safety Officer throughout the field program. This person will report directly to the Project Manager and the Corporate Health and Safety Coordinator. The HASP will be subject to revision as necessary, based on new information that is discovered during the field investigation and/or remedial activities.

5.1.1 Community Air Monitoring

Real-time community air monitoring will be performed during all ground intrusive RI activities at the Site. A CAMP is included within Benchmark's HASP (see Appendix C). Particulate and VOC monitoring will be performed along the downwind perimeter of the work area during subgrade excavation, grading and soil/fill handling activities in accordance with this plan. The CAMP is consistent with the requirements for community air monitoring at remediation sites as established by the New York State Department of Health (NYSDOH) and NYSDEC. Accordingly, it follows procedures and practices outlined under NYSDEC's DER-10 (May 2010) Appendix 1A (NYSDOH's Generic Community Air Monitoring Plan) and Appendix 1B (Fugitive Dust and Particulate Monitoring).

5.2 Citizen Participation Activities

NYSDEC will coordinate and lead community relations throughout the course of the project. Benchmark will support NYSDEC's community relations activities, as necessary. A Citizen Participation Plan has been prepared by Benchmark and submitted to NYSDEC under separate cover upon acceptance into the BCP and execution of the BCA. The Citizen Participation Plan follows NYSDEC's Citizen Participation Plans template for Brownfield Cleanup Program sites entering the BCP at the point of site investigation per NYSDEC DER-23 (January 2010).

6.0 REPORTING AND SCHEDULE

Upon completion of the RI fieldwork, a comprehensive RI and Alternatives Analysis Report (RI/AAR) will be completed summarizing the RI tasks completed as described below.

6.1 Remedial Investigation Reporting

The RI section of the RI/AAR will include the following information and documentation, consistent with the NYSDEC's DER-10 Technical Guidance for Site Investigation and Remediation (May 2010).

- Introduction and background.
- A description of the site and the investigation areas.
- A description of the field procedures and methods used during the RI.
- A discussion of the nature and rationale for any significant variances from the scope of work described in this RI Work Plan.
- The data obtained during the RI and historical data considered by Benchmark to be of useable quality. This will include geochemical data, field measurements, etc.
- Comparative criteria that may be used to calculate cleanup levels during the alternatives analysis report (AAR) process, such as NYSDEC Soil Cleanup Objectives and other pertinent regulatory standards or criteria.
- A discussion of contaminant fate and transport. This will provide a description of the hydrologic parameters of the Site, and an evaluation of the lateral and vertical movement of groundwater.
- Conclusions regarding the extent and character of environmental impact in the media being investigated;
- The conclusions of the qualitative human health exposure assessment and ecological risk assessment, including any recommendations for more detailed assessments, if applicable.
- Supporting materials for RI data. These will include boring logs, monitoring well construction diagrams, laboratory analytical reports, and similar information.

In addition, as discussed in Section 4.0, Benchmark will require third-party data review by a qualified, independent data validation expert. Specifically, a Data Usability Summary Report (DUSR) will be prepared, with appropriate data qualifiers added to the results. The DUSR will follow NYSDEC format per the NYSDEC's September 1997 DUSR guidelines and May 2010 DER-10 guidance. The DUSR and any necessary qualifications to the data will be appended to the RI report.

Benchmark will provide all submittals to the NYSDEC in accordance with electronic data deliverables (EDD) requirements.

6.1.1 Alternatives Analysis Report

As part of the RI Report, an Alternatives Analysis Report (AAR) will be completed to provide a forum for evaluating and selecting a recommended remedial approach. Based on the findings of the RI, a list of remedial action objectives will be developed with the requirement for the selected remedial measures to be protective of human health and the environment under the proposed future use scenario. Proposed soil cleanup objectives (SCOs) for the property will also be presented based on the proposed future use of the Site. SCOs will be based on published standards, criteria, and guidance (SCGs) and other NYSDEC and NYSDOH-accepted values.

Based on the remedial action objectives and SCOs, volumes and areas of media potentially requiring additional remediation will be calculated. General response actions will then be delineated to address each of the site problem areas. These response actions will form the foundation for the development and screening of applicable remedial alternatives against the following criteria as described in 6NYCRR 375-1.10:

- Overall Protection of Human Health and the Environment
- Compliance with Standards, Criteria, & Guidance (SCGs)
- Long-term Effectiveness & Permanence
- Reduction of Toxicity, Mobility, or Volume
- Short-term Effectiveness
- Implementability
- Cost
- Land Use

In addition, the criteria of community acceptance will be considered based on public comments on the AAR and proposed remedial action. Following the screening of alternatives, a comparative analysis will be performed against the above criteria. The comparative analysis will allow for better understanding of the relative advantages and disadvantages of each of the alternatives, and will facilitate identification of a recommended remedial approach.

6.2 Project Schedule

An estimated project schedule for the RI and major environmental tasks to be performed is presented on Figure 5.

7.0 REFERENCES

1. New York State Department of Environmental Conservation. *DER-10; Technical Guidance for Site Investigation and Remediation.* May 2010.

2. United States Department of Agriculture (USDA), Soil Conservation Service. *Soil Survey of Erie County, New York*. December 1986.

3. Edward J. Buehler & Irving H. Tesmer, Buffalo Society of Natural Sciences. *Geologic Map of Erie County, New York Bedrock Geology*. 1963.

4. National Oceanic & Atmospheric Administration (NOAA) Satellites and Information. Data Tables through 2000.

5. U.S. Environmental Protection Agency, *Methods for Chemical Analysis of Water and Wastes*, EPA 600/4-70-020. 1983b.

6. U.S. Environmental Protection Agency. *Requirements for Quality Assurance Project Plans for Environmental Data Operations (EPA QA/R-5)*. October 1998.

7. U.S. Environmental Protection Agency, Region II. *CERCLA Quality Assurance Manual, Revision I*. October 1989.

8. U.S. Environmental Protection Agency. National Functional Guidelines for Organic Data Review (EPA-540/R-94-012), 1994a.

9. U.S. Environmental Protection Agency. National Functional Guidelines for Inorganic Data Review (EPA-540/R-94-013), 1994b.

TABLES

TABLE 1

SAMPLING AND ANALYSIS PLAN

RI-AA WORK PLAN

2424 HAMBURG TURNPIKE SITE

BUFFALO, NEW YORK

Matrix	Investigation Location		Estimated Number of Samples[2]	TCL VOCs	TCL SVOCs	TAL Metals	PCBs	Pesticide	Herbicide	TO-15 VOC List
Soil/Fill	SS-1	Surface	1		1	1	1	1	1	
	SS-2		1		1	1	1	1	1	
	MW-1	Subsurface	1	1	1					
	MW-2		1	1	1					
	MW-3		1	1	1					
	MW-4		1	1	1					
	MW-5		1	1	1					
	TP-1		2	2	2					
	TP-2		2	2	2	1	1	1	1	
	TP-3		2	2	2	1	1	1	1	
	TP-4		2	2	2					
	TP-5		2	2	2	1	1	1	1	
	TP-6		2	2	2					
	SB-11	Interior Subsurface	1	1	1	1	1			
	SB-12		1	1	1	1	1			
	SB-13	Exterior Subsurface	2	2	2					
	SB-14		2	2	2					
Air	SSV-1	Sub-slab Soil Vapor	1							1
	IA-1	Indoor Air	1							1
	OA-1	Outdoor (Ambient) Air	1							1
QA/QC	Soil	MS	1	1	1	1	1	1	1	
		MSD	1	1	1	1	1	1	1	
		Blind Dup	1	1	1	1	1	1	1	
	SSV	Blind Dup								1
			31	**26**	**28**	**10**	**10**	**8**	**8**	**4**
Groundwater	MW-1	Groundwater	1	1	1	1	1	1	1	
	MW-2		1	1	1	1	1	1	1	
	MW-3		1	1	1	1	1	1	1	
	MW-4		1	1	1	1	1	1	1	
	MW-5		1	1	1	1	1	1	1	
QA/QC	Groundwater	MS	1	1	1	1	1	1	1	
		MSD	1	1	1	1	1	1	1	
		Blind Dup	1	1	1	1	1	1	1	
	Submersible Pump	Equipment Blank	1	1	1	1	1	1	1	
			9	**9**	**9**	**9**	**9**	**9**	**9**	**0**

Notes:

1. GW field parameters including: pH, specific conductance, temperature, DO, ORP, and turbidity will be collected and recorded.
2. This is an estimated number of samples. The number of samples may be increased based on the type and extent of contamination identified.

Acronyms:

VOCs = volatile organic compounds
SVOCs = semi-volatile organic compounds
TCL = Target Compound List
TAL= Target Analyte List
PCBs = Polychlorinated Biphenyls

TABLE 2

SAMPLE CONTAINER, VOLUME, PRESERVATION & HOLDING TIME REQUIREMENTS

2424 HAMBURG TURNPIKE SITE
LACKAWANNA, NEW YORK

Matrix	Parameter [1]	Method [1]	Container Type	Minimum Volume	Preservation (Cool to 2-4 °C for all samples)	Holding Time from Sample Date
Soil	TCL VOCs	8260B	EnCore Sampler	(3) 5 oz. / 16 oz.	Cool to 2-4 °C, Zero Headspace	14 days
	TCL SVOCs	8270C	WMG	16 oz.	Cool to 2-4 °C	14 days extrac./40 days
	TAL Metals	6010B	WMG	4 oz.	Cool to 2-4 °C	6 months/Hg 28 days
	Pesticides	8081	WMG	8oz	Cool to 2-4 °C	14 days extrac./40 days
	Herbicides	8151	WMG	8oz	Cool to 2-4 °C	14 days extrac./40 days
	PCBs	8082	WMG	4 oz.	Cool to 2-4 °C	14 days extrac./40 days
Groundwater	TCL VOCs	8260B	glass vial	3 - 4 oz.	HCl to pH<2, Zero Headspace, Cool to 2-4 °C	14 days
	TCL SVOCs	8270C	amber glass	1000 ml	Cool to 2-4 °C	7 days extrac/40 days
	TAL Metals	6010B	plastic	600 ml	HNO_3 to pH<2, Cool to 2-4 °C	6 months/Hg 28 days
	Pesticides	8081	amber glass	1000 ml	Cool to 2-4 °C	7 days extrac/40 days
	Herbicides	8151	amber glass	1000 ml	Cool to 2-4 °C	7 days extrac/40 days
	PCBs	8082	amber glass	1000 ml	Cool to 2-4 °C	7 days extrac/40 days
Air/Soil Vapor	TCL VOCs	TO-15	Summa Cannister	6 liters	None	Analyze within 14 days of sample date of collection

References:

1. Test Methods for Evaluating Solid Wastes, USEPA SW-846, Update III, 1991.

Notes:

1. EPA-approved methods published in Reference 1 above may be used. The list of analytes, laboratory method and the method detection limit for each parameter are included in Tables 1 and 2 of the QAPP.

Acronyms:

VOCs = Volatile Organic Compounds
SVOCs = Semi-Volatile Organic Compounds
TCL = Target Compound List
TAL = Target Analyte List
WMG = Wide Mouth Glass

TABLE 3

SUMMARY OF FIELD OPERATING PROCEDURES

2424 HAMBURG TURNPIKE SITE

FOP Number	Description
001.1	Abandonment of Borehole Procedures
004.4	Soil Vapor Sample Collection Procedure
007.0	Calibration and Maintenance of Portable Dissolved Oxygen Meter
008.0	Calibration and Maintenance of Portable Field pH/Eh Meter
009.0	Calibration and Maintenance of Portable Field Turbidity Meter
011.1	Calibration and Maintenance of Portable Photoionization Detector
012.0	Calibration and Maintenance of Portable Specific Conductance Meter
015.0	Documentation Requirements for Drilling and Well Installation
017.0	Drill Site Selection Procedure
018.0	Drilling and Excavation Equipment Decontamination Procedures
021.0	Establishing Horizontal and Vertical Control
022.0	Groundwater Level Measurement
024.1	Groundwater Sample Collection Procedures
026.1	Hollow Stem Auger (HSA) Drilling Procedures
031.2	Low Flow (Minimal Drawdown) Groundwater Purging & Sampling Procedure
032.1	Management of Investigation-Derived Waste (IDW)
033.0	Monitoring Well Construction for Hollow Stem Auger Boreholes
036.0	Monitoring Well Development Procedures
046.0	Sample Labeling, Storage and Shipment Procedures
047.0	Screening of Soil Samples for Organic Vapors During Drilling Activities
054.2	Soil Description Procedures Using The Visual-Manual Method
057.0	Soil Sample Collection for VOC Analysis - EnCore Sampling
063.2	Surface and Subsurface Soil Sampling Procedures
073.2	Real-Time Air Monitoring During Intrusive Activities
078.0	Geoprobe Drilling Procedures
084.0	Calibration and Maintenance of Portable Particulate Meter
090.0	Outdoor Ambient Air VOC Sample Collection Procedure

FIGURES

F:\CAD\Benchmark\2424 Hamburg Turnpike, LLC\BCP App\Figure 1; Site Location and Vicinity Map.dwg

FIGURE 1

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BENCHMARK
ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0599

SITE LOCATION & VICINITY MAP

RI - AA WORK PLAN

2424 HAMBURG TURNPIKE SITE

LACKAWANNA, NEW YORK

PREPARED FOR

2424 HAMBURG TURNPIKE, LLC

PROJECT NO.: 0345-015-001

DATE: DECEMBER 2015

DRAFTED BY: KRR

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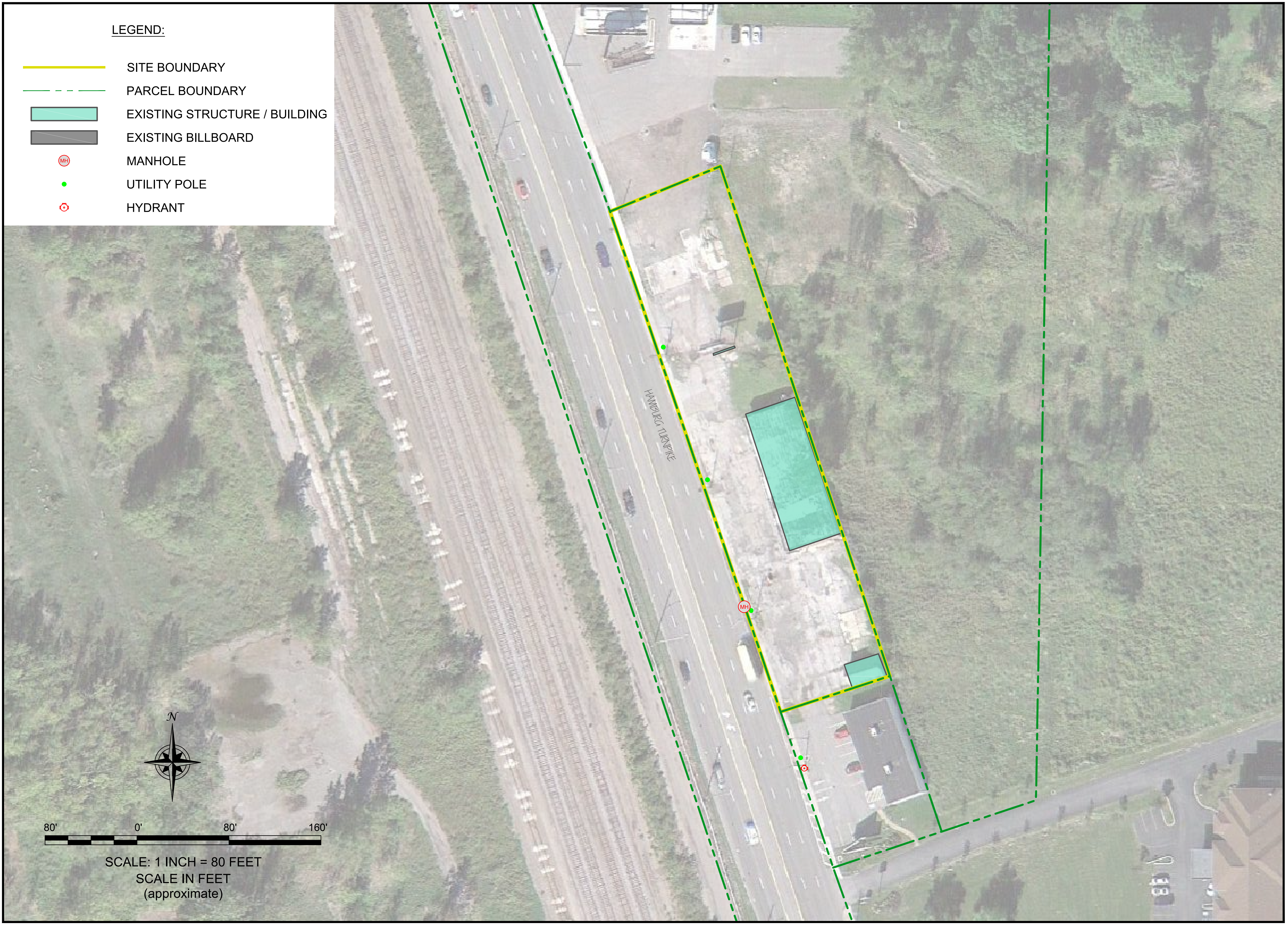
F:\CAD\Benchmark\2424 Hamburg Turnpike, LLC\RI-AA Work Plan\Figure 2; Site Plan.dwg



DATE: DECEMBER 2015
DRAFTED BY: KRR

SITE PLAN

RI - AA WORK PLAN
2424 HAMBURG TURNPIKE SITE
LACKAWANNA, NEW YORK
PREPARED FOR
2424 HAMBURG TURNPIKE, LLC

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ENGINEERING &
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2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0599

JOB NO.: 0345-015-001

FIGURE 2

F:\CAD\Benchmark\2424 Hamburg Turnpike, LLC\RI-AA Work Plan\Figure 3; Phase II Environmental Investigation Sample Locations.dwg

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PHASE II ENVIRONMENTAL INVESTIGATION LOCATIONS

RI - AA WORK PLAN
2424 HAMBURG TURNPIKE SITE

LACKAWANNA, NEW YORK
PREPARED FOR
2424 HAMBURG TURNPIKE, LLC

BENCHMARK
ENVIRONMENTAL
ENGINEERING &
SCIENCE, PLLC

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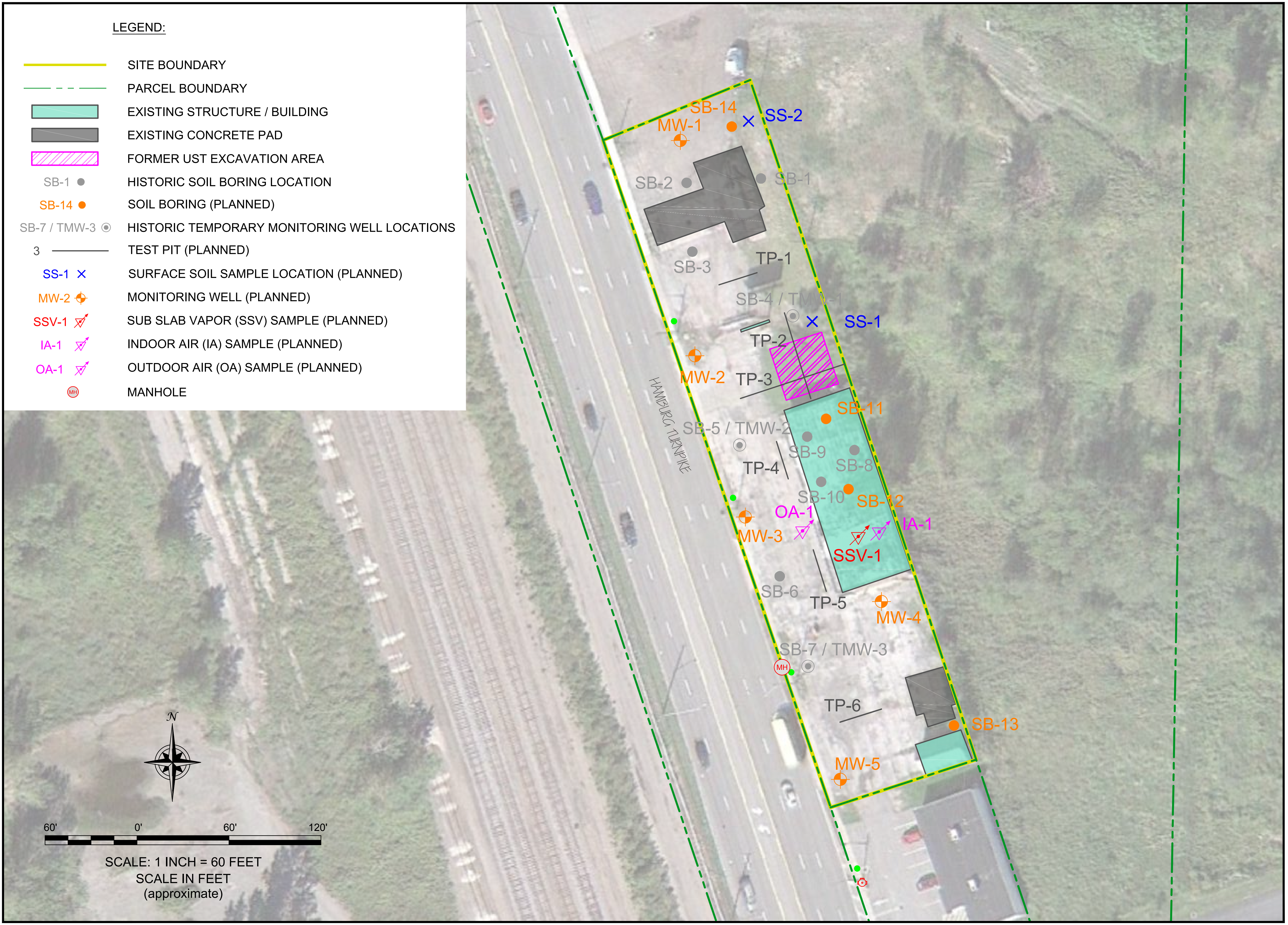
SUITE 300
BUFFALO, NY 14218
(716) 856-0599

JOB NO.: 0298-014-001

FIGURE 3

F:\CAD\Benchmark\2424 Hamburg Turnpike, LLC\RI-AA Work Plan\Figure 4; Planned RI Sample Locations.dwg



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SUITE 300
BUFFALO, NY 14218
(716) 856-0599

JOB NO.: 0298-014-001

PROPOSED REMEDIAL INVESTIGATION LOCATIONS

RI - AA WORK PLAN

2424 HAMBURG TURNPIKE SITE

LACKAWANNA, NEW YORK

PREPARED FOR

2424 HAMBURGH TURNPIKE, LLC

FIGURE 4

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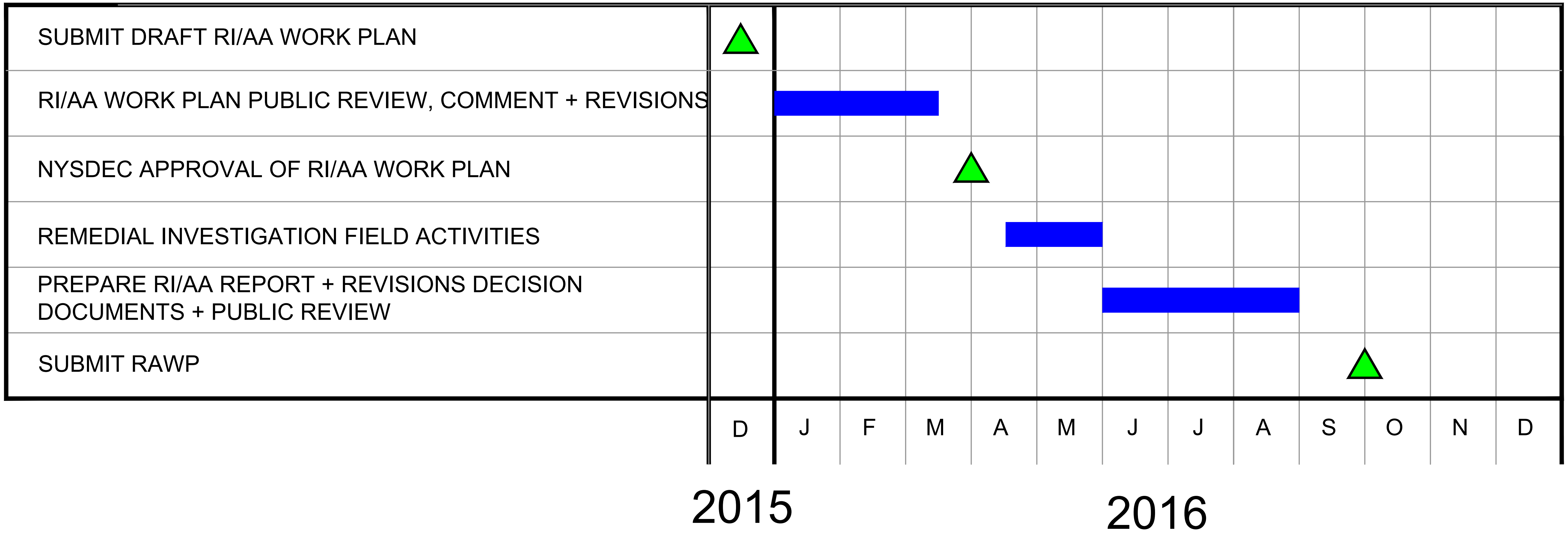
F:\CAD\Benchmark\2424 Hamburg Turnpike, LLC\RI-AA Work Plan\Figure 5; Project Schedule.dwg

PROJECT TASKS:



2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0599

BENCHMARK
ENVIRONMENTAL
ENGINEERING &
SCIENCE, PLLC

JOB NO.: 0345-015-001

PROJECT SCHEDULE

RI - AA WORK PLAN
2424 HAMBURG TURNPIKE SITE
LACKAWANNA, NEW YORK
PREPARED FOR
2424 HAMBURG TURNPIKE, LLC

FIGURE 5

DATE: DECEMBER 2015
DRAFTED BY: KRR

APPENDIX A

RESUMES

MICHAEL A. LESAKOWSKI
SR. PROJECT MANAGER

SUMMARY OF EXPERIENCE

Michael A. Lesakowski is a Principal and Senior Project Manager with the Benchmark and TurnKey Companies. Mr. Lesakowski has over 15 years experience in the environmental engineering and consulting field at numerous industrial, commercial and hazardous waste sites throughout the northeast United States. Mr. Lesakowski has been involved with all aspects of projects within the New York Brownfield Cleanup Program, New York State Superfund Program and the New York Petroleum Spills Department. Mr. Lesakowski has completed over 1,000 Phase I Environmental Site Assessments and more than 200 Phase II Site Investigations associated with property acquisition and divestiture, including several multi-site portfolio environmental due diligence assignments, working with purchasers and lenders to facilitate multi-million dollar real estate transactions.

Mr. Lesakowski has managed assessments, investigations and remediation projects on properties with a multitude of historic uses (including petroleum refineries, storage terminals, gas stations, automobile dealerships, rail yards, foundries, drycleaners, steel manufacturing, metallurgical plants, metal plating operations, junk yards), media types (including surface and subsurface soil, groundwater, sediments, soil vapor, indoor air, building materials) and contaminants (including volatile organic compounds, semi-volatile organic compounds, PCBs, heavy metals).

From 2010 through 2013, Mr. Lesakowski played a key role in developing a liability transfer arrangement of a former petroleum refinery in Olean, New York. Major tasks included technical review of historic Remedial Investigation data, remedial alternative selection and cost estimating, preparation of technical and liability transfer program proposal and negotiation with ExxonMobil technical and business representatives. The deal involved purchase of three New York Brownfield Cleanup Program (BCP) sites that required a multi-million dollar remedial cleanup, which is currently in process.

Mr. Lesakowski is currently managing fifteen New York BCP sites, one NY Superfund Site, and several New York Spill Sites. Some highlighted projects in western New York currently managed by Mr. Lesakowski include six BCP sites that were part of the historic Socony-Vacuum petroleum refinery in Olean (aka ExxonMobil Legacy Site) the former Trico Building, 300 and 399 Ohio Street BCP Sites proximate the Buffalo River, former Buffalo Gun Club BCP Site in Amherst, Seneca Harbor Hotel in Watkins Glen and the former Batavia Gas Light Company manufactured gas plant (MGP) site.

EDUCATION

Master of Science (Environmental Engineering Science), University of Buffalo, 2008
Bachelor of Science (Biology), State University of New York at Fredonia, 1994

THOMAS H. FORBES, P.E.
PRINCIPAL ENGINEER

EDUCATION

BS (Chemical Engineering) 1988; State University of New York at Buffalo
Graduate of State University of New York at Buffalo School of Management Center for Entrepreneurial Leadership; 2002
Graduate-level courses in Biological Principles of Engineering and Hazardous Waste Management through the State University of New York at Buffalo Department of Environmental Engineering

REGISTRATION AND AFFILIATIONS

Professional Engineer, New York
Professional Engineer, Ohio
ISO 14000 Certified Lead Auditor - April 1998
Member - American Institute of Chemical Engineers
Member – New York Water Environment Association, Inc.

SUMMARY OF EXPERIENCE

Mr. Forbes has nearly 25 years of environmental engineering experience, with a particular focus on brownfield and hazardous waste site investigation and remediation; petroleum-impacted site remediation; due diligence for environmentally-impaired properties; groundwater and industrial wastewater treatment; and environmental regulatory compliance. Investigations and cleanups Mr. Forbes has directed have included well over 100 sites contaminated with a wide range of materials, including chlorinated solvents, PCBs, dioxins, heavy metals, cyanide, radioactive isotopes, and petroleum contamination. He has evaluated and successfully implemented on a conventional and design-build basis cost-saving and innovative treatment technologies (e.g. in-situ and ex-situ physical-chemical, thermal, and biological treatment) as well as removal and containment methods for remediation.

REPRESENTATIVE PROJECT EXPERIENCE

June 1998 to Present: **Benchmark Environmental Engineering & Science, PLLC**

- Served as project manager for the investigation and hydrogeological assessment of the 2001 Webster Block site on behalf of the City of Buffalo. Work included a Phase II Site investigation, underground storage tank removal, groundwater pump test, and utility capacity evaluation performed under USEPA Pilot grant.

- Currently managing NYSDEC Brownfield Cleanup Program (BCP) investigation of the former Millard Fillmore Gates Circle hospital complex in Buffalo, NY.

- Project officer for NYSDEC BCP investigation and cleanup of a proposed charter school development site and a separate proposed mixed use residential/commercial site in the City of Buffalo.

- Serving as project manager for remedial investigation, alternatives analysis, and remedial construction to facilitate redevelopment of over 450-acres of former steel manufacturing site property encompassing 33 separate BCP sub-parcel sites in Lackawanna, New York. Contaminants of concern primarily include petroleum organics/solvents and heavy metals.

- Project manager for RI/FS, remedial design and remedial construction at the Sycamore Village Site, a 4-acre NY State Environmental Restoration Program (ERP) site in Buffalo, NY. Responsible for all technical and administrative aspects of the project, involving removal of over 18,000 cubic yards of soil from an impacted residential neighborhood and site restoration.

- Assisted western NY client's legal counsel prepare legal defense related to a multi-PRP suit by Orange County Water District, Fullerton, CA for primary drinking water aquifer contamination by chlorinated solvents and emergent organic contaminants. Served as technical consultant during mediation and settlement discussions; prepared expert report and lead technical arguments on behalf of defendant to support bankruptcy claim dismissal.

- Served as project manager and supervising contractor for design-build remedial activities at the Markhams National Priority List (NPL) site in Dayton, NY. Successfully implemented remedial measures leading to USEPA-designated Preliminary Site Closeout status in October 2008 and delisting in 2009.

- Served as project manager representing multiple potential responsible party (PRP)-led remedial construction activities to address heavy metal and chlorinated solvent impacts at the Peter Cooper Landfill NPL site. Responsible for oversight and coordination of RI/FS planning and implementation activities, lead technical contact with USEPA, and remedial measures design and construction. Achieved site closeout in 2011.

- Served as project manager for design-build cleanup of the Urbana Landfill Site, a Class 2 Hazardous Waste Landfill Site. Designed and successfully implemented a Soil Vapor Extraction system to address source area chlorinated organics in soils, achieving soil cleanup goals with 12 months, Also responsible for design, startup and continued operation of a downgradient perimeter groundwater extraction well system and groundwater remediation utilizing advanced oxidation treatment.

- Assisted in the development of a voluntary cleanup plan for remediation of a 120-acre former steel manufacturing site in Buffalo, NY which was contaminated with volatile organic compounds, heavy metals, poly-nuclear aromatic hydrocarbons. Specific assistance involved design of a soil vapor extraction (SVE) system to address VOC and SVOC source area impacts proximate to a residential neighborhood and development and implementation of a Community Air Monitoring Plan involving quantitative monitoring (Summa Canister and respirable particulate analysis) and qualitative monitoring (field instruments).

- Served as Project Manager for RI/FS and cleanup activities related to solvent releases from a former paint and specialty coatings manufacturing facility in Buffalo, NY. The work, carried out under NY State Superfund program, included insitu treatment of soils and groundwater impacted by chlorinated and non-chlorinated volatile organics and heavy metals.

- Assisted confidential client's legal counsel negotiate a consent decree with New Mexico Environment Department related to cleanup of chlorinated solvent releases to the fractured bedrock aquifer from a former manufacturing operation in Albuquerque, NM. Presently managing insitu groundwater cleanup and monitoring work.

- Currently serving as Project Manager for NY State Voluntary Cleanup efforts for chlorinated solvent cleanup at a former degreasing and electroplating facility in Rochester, NY. Designed and implemented interim remedial measures involving low-profile air stripping and insitu hydrogen infusion.

- Served as Project Manager for multiple EPA Pilot-Grant funded investigations for City of Buffalo Department of Strategic Planning.

- Project manager for remedial investigation, alternatives analysis, and remedial construction to facilitate redevelopment of over 450-acres of former steel manufacturing site property in Lackawanna, New York. Contaminants of concern primarily include petroleum organics and heavy metals.

- Managed design-build cleanup of former New 7th Street Brownfield Cleanup Program Site in Buffalo, New York. The project involved design-build removal of several hundred tons of petroleum-impacted soil and fill material and preparation of related engineering reports resulting in Certificate of Completion issuance.

- Led remedial efforts for petroleum releases at a Western New York refinery and major oil storage facility, achieving site inactivation within 3 months of the release.

- Managed spill site investigation and cleanup work including underground storage tank removal work at numerous petroleum and chemical spill sites in Western New York.

- Led design-build construction of a 5 MGD capacity cooling water pH adjustment system for PVS Chemical Corporation. The project included design of feed forward pH control system, adjustment tank and mixer construction, process and chemical feed piping modifications to neutralize sulfuric acid discharges. Successfully implemented startup and demonstration testing.

- Designed a 75 gpm groundwater treatment system and served as quality assurance officer for remedial efforts at the Steelfields site (former LTV Steel/Hanna Furnace Site), Buffalo, NY. The treatment system removes petroleum-based volatile organic and semi-volatile organic compounds prior to discharge to the Buffalo Sewer Authority.

June 1988 to June 1998 **Malcolm Pirnie, Inc.**

- Assisted the City of Buffalo Department of Community Development in implementing an emergency PCB-contaminated soil removal effort from a residential neighborhood in Buffalo, NY. Responsibilities included coordination of hazmat excavation contractor and secure landfill, preparation of an emergency excavation and confirmatory sampling plan, and oversight of community air monitoring during the removal work.

- Designed and successfully implemented an innovative groundwater treatment system for the Mercury Aircraft, Inc. Class 2 hazardous waste site in Dresden, New York. Responsibilities included preparation of design plans and specifications for an advanced oxidation process and low profile air stripper, construction oversight and treatment system start-up.

- Performed a Feasibility Study and prepared an Engineering Design Report for remediation of PCB-contaminated soils and sediments at the Columbus McKinnon Corporation, Tonawanda, New York. Responsibilities included detailed evaluation of several remedial processes, completion of design calculations and remedial cost estimates, and preparation of a final report for submission to NYSDEC.

- Assisted in performance of a Feasibility Study for the West Valley Nuclear Demonstration Site. The Feasibility Study evaluated alternatives for remediation of groundwater contaminated with radioactive isotopes from a former containment area release.

- Assisted in the design and performed start-up of a groundwater remediation system for Moog, Inc., an aerospace parts manufacturer. The project, performed on a design-build basis, involved preparation of design plans, securing contractor bids for construction, and start-up of the remediation system, which incorporates filtration and air stripping to remove chlorinated volatile organic contaminants from groundwater.

- Designed and implemented groundwater monitoring well decommissioning procedures for the Love Canal site, Niagara Falls NY. The project was performed on behalf of NYSDEC and included abandoning of monitoring wells no longer used in the Love Canal landfill or in adjoining neighborhoods.

- Prepared an environmental monitoring plan for remediation of PCB-contaminated sediments in the St. Lawrence River along the General Motors, Inc. Powertrain Division facility in Massena, New York.

- Assisted in the performance of a Feasibility Study for remediation of volatile organic, PCB and heavy metal-contaminated soils and ground water at the Rochester Fire Academy, Rochester, New York.

PUBLICATIONS/PRESENTATIONS

Forbes, Thomas H. and Frappa, Richard H. "Innovative Remedial Measures for the Mercury Aircraft Site" Proceedings of the Purdue University 50th Annual Industrial Waste Conference, May 1995.

Frappa, Richard H., Forbes, Thomas H. and McManus, Anne Marie "A Blast to Remediate" Industrial Wastewater, July/August 1996.

Forbes, Thomas H. and McManus, Anne Marie "Advanced Oxidation Technology and Application" Proceedings of the University at Buffalo 28th Mid-Atlantic Industrial and Hazardous Waste Conference, July 1996.

Forbes, Thomas H. et al - "Pay to Throw in Buffalo" Proceedings of 1997 Solid Waste Association of North America annual conference.

Forbes, T.H. & Werthman, P.H. "Development of Site-Specific Cleanup Levels for Commercial Redevelopment of a Large Former Steel Works," presented at the Brownfields 2000 Conference, Atlantic City NJ, October 2000.

Forbes, Thomas H. and Frappa, Richard H. "Innovative Remedial Measures Almost 10 Years Later at the Former Mercury Aircraft Site" Proceedings of the National Groundwater Association Northeast Conference, October 2002.

Forbes, Thomas H. "Ins and Outs of the New York State Brownfield Cleanup Program" Air & Waste Management Association, Niagara Frontier Section, Annual Environmental Seminar (presentation), April 2006.

Forbes, Thomas H. "Brownfield Redevelopment" Proceedings of Half Moon Seminar’s “New York Environmental Compliance for Design Professionals” conference, September 2008.

Forbes, Thomas H. “New York State Brownfield Cleanup Program Update" Air & Waste Management Association Annual Environmental Seminar (presentation), April 2009.

LORI E. RIKER, P.E.
PROJECT MANAGER

EDUCATION

BASc (Civil Engineering) 1992; University of Waterloo, Ontario, Canada
MASc (Environmental Engineering) 1994; University of Guelph, Ontario, Canada

REGISTRATION AND AFFILIATIONS

Professional Engineer, New York
Certified OSHA 40-Hour Hazardous Waste Site Training
Air and Waste Management Association, Member

SUMMARY OF EXPERIENCE

Ms. Riker has 20 years of environmental and civil engineering experience that has focused on industrial regulatory compliance assistance; Phase I environmental site assessments; hazardous waste site investigations and remedial evaluations; detailed design; and construction administration. Ms. Riker's regulatory compliance experience includes: petroleum bulk storage (PBS) and chemical bulk storage (CBS) auditing and the associated spill prevention reporting; Emergency Planning and Community Right-to-Know Act (EPCRA) Tier II and Toxic Release Inventory (Form R) reporting; Title V air permitting (Title V, State facility, minor facility registrations), compliance reporting, and emission statement preparation; Resource Conservation and Recovery Act (RCRA) hazardous waste reporting; storm water permitting and preparing discharge monitoring reports (DMRs), storm water pollution prevention plans (SWPPPs), and Best Management Practices (BMP) Plans; and hazardous waste annual reporting and reduction plans. Ms. Riker's site investigation and remediation experience has been under various New York State Department of Environmental Conservation (NYSDEC) remedial programs including the: Brownfield Cleanup Program (BCP); RCRA Corrective Action Program; and Voluntary Cleanup Program (VCP).

REPRESENTATIVE PROJECT EXPERIENCE

May 2003 to Present	**Benchmark Environmental Engineering & Science, PLLC**
Nov 1997 to May 2002	**Malcolm Pirnie, Inc.**
Feb 1995 to Oct 1997	**ENVIRON Corporation**

- Assisted in the RCRA Corrective Measures Study (CMS) for the Former Bethlehem Steel Coke Oven Division Site located in Lackawanna, NY. Duties included preparing work plans for Interim Corrective Measures (ICMs); reviewing analytical data obtained for the solid waste management units (SWMUs) and water courses; reviewing reports/assessments prepared by other consultants retained by NYSDEC and other agencies; and evaluating numerous slag/fill and groundwater remedial alternatives and recommending a final remedial approach in the CMS Report.
- Assisted former steel manufacturing facility with regulatory compliance during shutdown of operations in Lackawanna, NY. Current activities for former steel manufacturing company in Lackawanna, NY include: SPDES permitting; Industrial Water System compliance, including successfully obtaining a Water Withdrawal Permit for 50 MGD and implementing required upgrades to the water metering system; and preparing annual RCRA Hazardous Waste Reports.

- Assisted with environmental regulatory compliance audits at Gibraltar Steel's NY facilities, and coordinated audits at Gibraltar Steel's other facilities nationwide. The audits covered major existing environmental regulatory programs, as well as applicable local or state regulations and potential upcoming regulatory requirements.
- Assisted in preparing numerous successful NYSDEC BCP applications for former steel plant sites and industrial/commercial properties in western NY. Prepared Remedial Investigation (RI) Work Plans, RI Reports, Remedial Action Work Plans, Final Engineering Reports, and Site Management Plans. Contaminants of concern primarily include petroleum organics/solvents and heavy metals.
- Providing/managing on-going environmental compliance assistance to scrap metal recycling facilities in NY and PA including: permitting, sampling, inspection, and reporting requirements under the Multi-Sector General Permit (MSGP) for Storm Water Associated with Industrial Activity and NYSDEC State Pollutant Discharge Elimination System (SPDES) Permits; PBS inspections and preparing SPCC Plans; EPCRA Tier II reporting; preparing landfill disposal application; preparing Water Treatment Chemical notifications; hazardous waste annual reporting; and air permitting modifications, compliance reporting, and annual emission statement preparation.
- Providing/managing on-going environmental compliance assistance to industrial facilities including: air permit applications and modifications; storm water permitting, BMP Plan/SWPPP preparation, compliance monitoring, and DMR preparation; water withdrawal and sewer metering reports; PBS registration, SPCC Plan preparation, and tank inspection; and annual hazardous waste reporting.
- Providing environmental compliance assistance to NOCO Energy Corp. for its major petroleum distribution terminal and warehouse in Tonawanda, NY and multiple retail gasoline stations in NY and VT. Specific projects include: storm water permitting and preparation of a SWPPP; preparation of Spill Response, Control & Countermeasure (SPCC) Plans and a Spill Prevention Report (SPR); Title V air permitting assistance and emission statement preparation; EPCRA Form R reporting; review of and recommendations for updating the USCG Facility Response Plan; and permitting and conceptual design for upgrades to a PBS warehouse facility.
- Served as the environmental compliance manager for a porcelain insulator manufacturing facility and completed regulatory reporting requirements including TP550 forms, Form R reports, Tier II reports, hazardous waste reports, storm water permitting, and DMRs.
- Performed environmental compliance audits of multiple retail gasoline station and lube oil shops in western NY, focusing on the NYSDEC PBS regulations, and preparing SPCC Plans and an overall BMP Plan.
- Assisted in performing environmental regulatory compliance audits for numerous active industrial facilities. Responsibilities included researching and interpreting applicable environmental regulations, and preparing reports to summarize the findings and prioritize corrective measures.
- Prepared PBS and CBS applications for tank registration under NYSDEC's bulk storage programs and prepared the associated SPCC Plans and SPRs for industrial facilities.
- Assisted in preparing an SPCC Plan for General Electric Company's Tonawanda facility. Work included review of numerous federal and state regulations pertaining to PCB-contaminated oil and waste.

PUBLICATIONS/PRESENTATIONS

- Riker, L. E., McManus, A. C., "Energize Your Business," presented at the Fall Seminar of the New York Water Environment Association, Genesee Valley Chapter, Industrial Issues Committee, Webster NY, November 1, 2001.
- Riker, L. E., McManus, A. C., Sanders, L. A., "Life After Registration: Integrating Environmental Management Systems into Business and Operating Cultures," Proceedings, 94th Annual Conference and Exhibition of the Air & Waste Management Association, Orlando FL, June 26, 2001.
- Riker, L. E., McManus, K. R., Kreuz, D. E., Mistretta, M. V., "Trash to Treasure: Revitalization of Buffalo's Waterfront," presented at a Conference of the New York State Society of Professional Engineers, Erie/Niagara Chapter, Environmental Affairs Committee, Buffalo NY, January 10, 2001.
- Secker, L. E., Talley, J. W., "Bioremediating a Buffalo Brownfield: A Comparison of Bench-Scale Soil Biotreatability Results to Full-Scale Remediation," Proceedings, Thirtieth Mid-Atlantic Industrial & Hazardous Waste Conference, Villanova University, Philadelphia PA, July 12, 1998.

BRYAN W. MAYBACK
SENIOR PROJECT SCIENTIST

EDUCATION

Bachelors of Science (Earth Sciences, Environmental Concentration) 2002; State University of New York, College at Buffalo
Associates in Applied Science (graduated with high distinction), Environmental Technology (1999)
Trocaire College, Buffalo, New York

REGISTRATION AND AFFILIATIONS

Hazardous Material Handling 40 hour (OSHA)
Hazardous Material Handling 8 hour Supervisor Training (OSHA)
Environmental Site Assessments for Property Transfer (ASTM Conference)
New York State and EPA Certified Asbestos Air and Project Monitoring Technician
Construction Safety Training 10 hour (OSHA)

SUMMARY OF EXPERIENCE

Since 2002, Bryan Mayback has been involved in various aspects of the environmental field. While with one of the largest due diligence firms in the northeast, Mr. Mayback was involved with hundreds of lenderbased environmental studies. These studies included Phase I and Phase II environmental site assessments in Western New York and throughout the U.S. Mr. Mayback provided project management as well as the completion of the field work, written reports, and final report reviews. He has also provided consulting services for major petroleum companies such as ExxonMobil. Mr. Mayback was involved with large scale excavation projects (removal of up to 15,000 tons of impacted soil and treatment of over 200,000 gallons of groundwater), sensitive receptor surveys, hydrogeologic studies, impact delineation studies, and pilot testing relative to alternative remedial measures (other than soil excavation). He has performed groundwater monitoring activities, including well gauging, purging (bailers and low-flow) and sampling. Through the years, Mr. Mayback has been responsible for the closure/reclassification of many NYSDEC listed spills based on results of remedial activities that he was involved with and proposed.

REPRESENTATIVE PROJECT EXPERIENCE

June 2009 to July 2014: **RJS Environmental, Inc.**
Vice President (2009), President

- **Environmental Due Diligence Projects.** Project Officer and Manager for all Environmental Site Assessment projects including Phase I and intrusive (Phase II) studies, for banks, developers, lawyers, owners, etc. Responsible for client communications, report reviews, and project management ensuring projects are completed on time and within budget.

September 2007 – June 2009 **Groundwater and Environmental Services, Inc**

- **Major Petroleum Companies, NY**. Provided consulting services for ExxonMobil and other major petroleum companies that facilitated active New York State DEC listed spills towards closure. These sites were environmentally challenged properties in differing stages of remediation located mostly in Western New York. As Case Manager/Environmental Scientist provided oversight for various environmental activities, including soil excavation, dewatering/groundwater treatment and discharge, soil boring and monitoring well installation, remedial pilot testing, test pits and product recovery. Also responsible for completion and review of Remedial Action Work Plans, Excavation Reports, Quarterly Site Monitoring Reports, and pilot test reports for submittal to the NYSDEC and ExxonMobil.

November 2002 – September 2007 **Lender Consulting Services**

- As Senior Environmental Analyst, involved in developing hundreds of lender-based Phase I and Phase II environmental site assessments (including site inspections, municipal record reviews, soil/groundwater sampling, and UST removals) in Western New York as well as throughout the U.S. Responsible for review of Environmental Site Assessment Reports, and training and supervising staff involved in site assessments. Communicated property related potential environmental issues and solutions to clients.

Summer 2000 **AFI Environmental**

- As Environmental Specialist, supervised the removal of impacted soil via excavation at a site in Buffalo, New York. Groundwater was treated with activated carbon and discharged to the storm sewer. Also Constructed a remediation field for impacted soil and groundwater; collected soil and groundwater samples for laboratory analysis; and reviewed analytical data and report preparation.

APPENDIX B

PREVIOUS REPORTS

(PROVIDED ELECTRONICALLY)

Phase II Environmental Investigation Report

2424 Hamburg Turnpike Site
Lackawanna, New York

January 2014 0298-014-001

Prepared For:

Franklin Asset Management, LLC

Prepared By:

TurnKey Environmental Restoration, LLC

PHASE II ENVIRONMENTAL INVESTIGATION REPORT

2424 Hamburg Turnpike Site
Lackawanna, New York

January 2014 0298-014-001

Prepared for

Franklin Asset Management, LLC

PHASE II ENVIRONMENTAL INVESTIGATION REPORT

2424 Hamburg Turnpike Site

Lackawanna, New York

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PHASE II ENVIRONMENTAL INVESTIGATION REPORT
2424 Hamburg Turnpike Site
Lackawanna, New York

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LIST OF TABLES

LIST OF FIGURES

ATTACHMENT

1.0 BACKGROUND AND SITE DESCRIPTION

TurnKey Environmental Restoration, LLC (TurnKey) performed a Phase II Environmental Site Investigation on behalf of Franklin Asset Management, LLC at 2424 Hamburg Turnpike, Lackawanna, New York (Site; see Figure 1). This investigation was performed to assess potential contamination discovered during utility upgrade activities along Hamburg Turnpike and the associated New York State Department of Environmental Conservation (NYSDEC) Spill file 1204435.

The Site is located in a historically heavy industrial, commercial and residential area of the City of Lackawanna, New York. The approximate 1.0 acre property was formerly utilized as an automobile filling and service station (Stop-N-Gas) since at least 1957. The Site is improved with a municipally-condemned former automobile service building, including four-bay repair area with eight (8) in-ground hydraulic lifts, and one (1) shed building of unknown contents. Two (2) concrete pads were also noted on the northern and southern portions of the Site (see Figure 2). The northern concrete pad may be related to former car wash.

1.1 Historical Information and Previous Investigations

NYSDEC Petroleum Bulk Storage records for the Site (Site ID No. 9-386383) indicate that three (3) 10,000 gallon underground storage tanks (USTs) were installed on-Site in 1957. PBS records indicate the USTs were closed/removed in 1994.

NYSDEC Spill Incident database indicates five (5) recorded spills associated with the Site, including:

- 9102471 (dated 6/1/1991) – Tank Failure (Diesel) which impacted groundwater. Spill was closed on 8/14/1992
- 9102643 (dated 6/5/1991) – Tank Failure (Gasoline) which impacted groundwater. Spill file was closed on 6/11/1991.
- 9204849 (dated 7/24/1992) – Waste Oil/Used oil spill of approximately 5 gallons. Spill fiel was closed on 7/30/1992.
- 9407600 (dated 9/2/1994) – Contaminated soil discovered during tank removal and free product noted in excavation. Detailed review of spill records provided below. Spill file was made inactive on 9/29/1995.

- 1204435 (dated 7/10/2012) – petroleum contamination discovered during roadside utility upgrades. Spill file is currently open.

1.1.1 NYSDEC Spill File - 9407600

The 9407600 spill record indicates that three (3) 10,000 gallon USTs were removed in 1994. During USTs excavation, petroleum-impacted soil and groundwater was discovered. The approximate location of the former USTs and excavation area is presented on Figure 2. Approximately 500 cubic yards of contaminated soil was excavated and stockpiled on-Site on both the south and north side of the existing building. The spill record indicates that confirmatory soil samples from the excavation exceeded the soil cleanup guidelines and that the contamination extended under the building.

The soil was bio-remediated on Site by the excavation contractor and returned to the excavation. Groundwater from the excavation was pumped into a temporary holding tank, treated through activated carbon and discharged to ground on-Site.

1.1.2 NYSDEC Spill File – 1204435

The 1204435 spill record indicates that petroleum contamination was discovered during utility upgrades being completed along Hamburg Turnpike. Specifically, petroleum odors were apparent in the telecommunications manhole located along the property boundary of the Site. Location of the manhole is presented on Figure 2. The spill record indicates that a geophysical survey was completed.

1.1.3 2013 Geophysical Survey Results

AMEC Environment and Infrastructure, Inc. (AMEC) completed a geophysical survey of the site on July 23, 2013. The AMEC report identifies four underground anomalies that suggest of potential fueling operation equipment, including appurtenant piping to the dispenser islands and/or USTs.

Copies of the NYSDEC PBS and Spill database records, the 9407600 and 1204435 spill records, and geophysical survey are provided electronically in Attachment 1.

2.0 METHODS OF INVESTIGATION

2.1 Subsurface Soil and Groundwater Investigation

On January 14, 2014, TurnKey personnel conducted a subsurface soil and groundwater investigation at the Site. The subsurface investigation included advancing ten (10) soil borings and the installation of three (3) temporary monitoring wells. Sample locations are presented on Figure 2.

2.1.1 Soil Borings

Ten (10) soil borings, identified as SB-1 through SB-10, were advanced across the Site to further assess the findings of the spill records and geophysical survey. Soil borings were advanced with a track-mounted direct-push drill rig equipped with an approximate 1.5-inch diameter, 48-inch long macro-core sampler. Soil samples were generally collected within each borehole continuously from the ground surface until approximately 14-16 feet below the ground surface (fbgs) (i.e., the target depth), or until equipment refusal was encountered. Any down-hole equipment was decontaminated between boreholes. Seven soil borings, SB-1 through SB-7 were advanced across the exterior portion of the Site, and three (3) soil borings, SB-8, SB-9, and SB-10 were advanced within the building adjacent to the in-ground hydraulic lifts.

The physical characteristics of all soil boring samples were classified using the Unified Soil Classification System (USCS). TurnKey personnel noted any visual and/or olfactory observations, and scanned soils for total volatile organic vapors with a field photoionization detector (PID) equipped with a 10.6 eV lamp. Boring logs are presented in Attachment 2.

2.1.2 Soil Sample Collection and Analysis

Six (6) soil samples, SB-4 though SB-9, were collected from the boring macro-cores using dedicated stainless steel sampling tools. Representative soil samples were placed in pre-cleaned sample bottles and submitted under chain-of-custody to Alpha Analytical, Inc. for analysis for Target Compound List (TCL) plus NYSDEC CP-51 volatile organic compounds (VOCs) and NYSDEC CP-51 semi-volatile organic compounds (SVOCs), via

Method 8260 and 8270, respectively. Soil analytical results are summarized on Table 1. Laboratory analytical data packages are provided electronically in Attachment 3.

2.1.3 Temporary Monitoring Wells

Following borehole advancement as described above, one-inch diameter temporary monitoring wells were installed within SB-4/TMW-1, SB-5/TMW-2, and SB-7/TMW-3. Well details are provided on the associated boring logs presented in Attachment 2. It should be noted that TWM-1 was not sampled due to the presence of approximately one-inch of floating product in the well

Groundwater samples were collected from TWM-2 and TWM-3 using dedicated disposable polyethylene bailers. The samples were transferred into laboratory-provided pre-preserved sample vials, cooled to 4 °C in the field, and transported to Alpha Analytical, Inc. under chain-of-custody for analysis of TCL plus NYSDEC CP-51 VOCs via USEPA Method 8260.

3.0 INVESTIGATION FINDINGS

A summary of the soil sample results from the soil boring are presented in Table 1. For comparison purposes, Table 1 soil analytical results are compared against NYSDEC CP-51 Soil Cleanup Levels (SCLs) for gasoline and fuel oil contaminated soils. Table 2 groundwater analytical results are compared to NYSDEC Division of Water Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations (GWQS), Technical and Operational Guidance Series (TOGS) 1.1.1. Laboratory analytical data packages are included in Attachment 3.

3.1 Qualitative Soil Screening

Soil samples were screened via headspace for VOCs using a handheld PID. Elevated PID readings above background (i.e., 0.0 ppm) and petroleum odors were observed in seven (7) of the ten (10) boring, including SB-4 though SB-10, with the highest PID reading of 1,098 ppm being detected in SB-6. Approximately one-inch of floating product was noted in TMW-1, which is located north of the former UST excavation area (see Figure 2).

3.2 Site Geology

The subsurface soil/fill was typically characterized as non-native fill material varying in depth from 0-8 fbgs, overlying clay, peat and sand at varying depths to 16 fbgs. Groundwater was typically encountered at approximately 6 fbgs. Boring logs are included in Attachment 2.

3.3 Soil Analytical Results

Six (6) soil samples, SB-4 through SB-9, were analyzed for VOCs and SVOCs. As indicated in Table 1, elevated VOCs above CP-51 SCLs were detected in SB-4, SB-5, SB-6, SB-8 and SB-9. Elevated SVOCs above SCLs were detected in SB-4, SB-5, SB-6, and SB-8.

3.4 Groundwater Analytical Results

As noted above, approximately one-inch of floating product was noted in TMW-1, and therefore was not analyzed. TMW-2 and TMW-3 were analyzed for TCL plus CP-51 list VOCs. Analytical results are presented on Table 2. Elevated VOCs above GWQS were detected on both TMW-2 and TMW-3, with total VOCs highest in TMW-2 at a concentration of 16,333 ug/L.

4.0 SUMMARY AND RECOMMENDATIONS

Based on the results of this soil and groundwater investigation, TurnKey offers the following conclusions and recommendations:

Summary

- Municipal records and previous investigations indicate the presence of former fuel system equipment and residual contamination present on-Site.
- Apparent petroleum contamination, including elevated PID readings and petroleum odors, was observed in SB-4 though SB-10 during fieldwork.
- Elevated concentrations of VOCs were detected above NYSDEC CP-51 in six of the seven soil sample locations.
- Elevated concentrations of SVOCs were detected above NYSDEC CP-51 in five of the seven soil boring locations.
- Floating product was detected in TMW-1, adjacent to the former excavation area.
- Elevated concentration of VOCs were detected above GWQS (i.e., up to 16,333 ug/L total VOCs) in both groundwater samples.

Recommendations

- Based on the findings of this report, additional investigation to delineate the extent of soil and groundwater impacts and Site remediation appears warranted. The existing in-ground hydraulic lifts should be removed in accordance with NYSDEC protocols and impacted soil should be properly handled. The disposition of the former fueling dispenser islands and appurtenant piping should be properly handled.
- The findings of this report should be provided to the NYSDEC for review and comment.
- TurnKey understands that the Site may be redeveloped with a new commercial facility. Consideration should be given to applying to the New York Brownfield Cleanup Program (BCP) prior to Site redevelopment.

5.0 LIMITATIONS

This report has been prepared for the exclusive use of Franklin Asset Management, LLC. The contents of this report are limited to information available at the time of the site investigation activities and to data referenced herein, and assume all referenced information sources to be true and accurate. The findings herein may be relied upon only at the discretion of Franklin Asset Management, LLC. Use of or reliance upon this report or its findings by any other person or entity is prohibited without written permission of TurnKey Environmental Restoration, LLC.

TABLES

TABLE 1

SUMMARY OF SOIL ANALYTICAL RESULTS

2424 HAMBURG TURNPIKE SITE

LACKAWANNA, NEW YORK

PARAMETER[1]	CP-51 Contaminated Soils SCLs [2]	Restricted Residential Use SCOs [3]	Commercial Use SCOs [3]	Sample Location (Depth)					
				SB-4 (6-8')	SB-5 (6-8')	SB-6 (2-4')	SB-7 (2-4')	SB-8 (6-8')	SB-9 (6-8')
				01/14/2014					
Volatile Organic Compounds (VOCs) - mg/Kg [4]									
1,2,4-Trimethylbenzene	**3.6**	**52**	**190**	**180**	**74**	**14**	3.1	**110**	**49**
1,3,5-Trimethylbenzene	**8.4**	**52**	**190**	**21**	**21**	3.3	0.96	**35**	**10**
Benzene	**0.06**	**4.8**	**44**	**1 J**	**0.8**	**1.5**	**0.083**	**11**	**1.6**
Ethylbenzene	**1**	**41**	**390**	**14**	**14**	**5.7**	0.25	**39**	**8**
Isopropylbenzene (Cumene)	**2.3**	**--**	**--**	**9.9**	2.1	0.46	0.046 J	**3.2**	1.6
Methylcyclohexane	**--**	**--**	**--**	43	16	1.8	0.39	49	12
n-Butylbenzene	**12**	**100**	**500**	**26**	4.4	0.6	0.23	5.2	3.2
n-Propylbenzene	**3.9**	**100**	**500**	**48**	**11**	2.5	0.23	**18**	**8.2**
p-Isopropyltoluene	**10**	**--**	**--**	4.6	0.9	0.14	0.056 J	0.81	0.62
sec-Butylbenzene	**11**	**100**	**500**	8.2	1.3	0.22	0.06	1.5	0.98
Toluene	**0.7**	**100**	**500**	**2.3 J**	**8.3**	**16**	0.26	**2.2**	**1**
Total Xylenes	**0.26**	**100**	**500**	**12.6 J**	**79**	**29.3**	**1.88**	**16.36**	**16.87**
Semi-Volatile Organic Compounds (SVOCs) - mg/Kg [4]									
Acenaphthene	**20**	**100**	**500**	0.49	3.3	ND	ND	ND	0.083 J
Acenaphthylene	**100**	**100**	**500**	0.34	21	ND	0.1 J	ND	0.2
Anthracene	**100**	**100**	**500**	0.86	39	0.76 J	0.075 J	0.074 J	0.36
Benzo(a)anthracene	**1**	**1**	**5.6**	**1.1**	**71**	**1.6 J**	0.19	0.11 J	0.47
Benzo(a)pyrene	**1**	**1**	**1**	0.76	**63**	**1.6 J**	0.19	0.071 J	0.39
Benzo(b)fluoranthene	**1**	**1**	**5.6**	**1.2**	**79**	**2.3 J**	0.26	0.12 J	0.48
Benzo(ghi)perylene	**100**	**100**	**500**	0.47	38	1.6 J	0.13 J	0.06 J	0.25
Benzo(k)fluoranthene	**0.8**	**3.9**	**56**	0.38	**33**	**1 J**	0.096 J	0.051 J	0.21
Chrysene	**1**	**3.9**	**56**	**1.2**	**71**	**1.6 J**	0.18	0.16	0.46
Dibenzo(a,h)anthracene	**0.33**	**0.33**	**0.56**	0.12 J	**10**	ND	ND	ND	0.051 J
Fluoranthene	**100**	**100**	**500**	3.2	**140**	3.4	0.27	0.3	1
Fluorene	**30**	**100**	**500**	1.3	24	1.4 J	0.056 J	0.13 J	0.35
Indeno(1,2,3-cd)pyrene	**0.5**	**0.5**	**5.6**	**0.54**	**41**	**1.8 J**	0.14 J	0.06 J	0.25
Naphthalene	**12**	**100**	**500**	8	**50**	**48**	0.6	10	3.3
Phenanthrene	**100**	**100**	**500**	3.8	**130**	3.2	0.18	0.42	1.3
Pyrene	**100**	**100**	**500**	2.3	**110**	2.7	0.22	0.23	0.76

Notes:

1. Only those parameters detected at a minimum of one sample location are presented in this table; all other compounds were reported as non-detect.
2. Values per NYSDEC CP-51 Soil Cleanup Levels (SCLs).
3. Values per NYSDEC Part 375 Soil Cleanup Objectives (SCOs) (December 2006).
4. Sample results were reported by the laboratory in ug/kg and converted to mg/kg for comparisons to SCOs.

Definitions:

ND = Parameter not detected above laboratory detection limit.
"--" = No value available for the parameter. Or parameter not analysed for.
J = Estimated value; result is less than the sample quantitation limit but greater than zero.

🟩 **Bold**	= Exceeds CP-51 Table 2 & 3 SCLs
🟦 **Bold**	= Exceeds Restricted Residential Use SCOs
🟨 **Bold**	= Exceeds Commercial Use SCOs

TABLE 2

SUMMARY OF GROUNDWATER ANALYTICAL RESULTS

2424 HAMBURG TURNPIKE SITE

LACKAWANNA, NEW YORK

PARAMETER[1]	NYS GWQS [2]	SAMPLE LOCATION	
		TMW-2	TMW-3
		01/14/2014	
Volatile Organic Compounds (VOCs) - ug/L			
1,2,4-Trimethylbenzene	**5**	**2000**	**85**
1,2-Dichloroethane (EDC)	**0.6**	ND	0.34 J
1,3,5-Trimethylbenzene	**5**	**490**	**22**
Acetone	**50**	**140 J**	15
Benzene	**1**	**520**	**6.3**
Carbon disulfide	**--**	ND	1.1 J
Cyclohexane	**--**	180 J	5.4 J
Ethylbenzene	**5**	**1500**	**8.6**
Isopropylbenzene (Cumene)	**5**	**56 J**	1.8 J
Methylcyclohexane	**--**	97 J	8.8 J
Naphthalene	**10**	**340**	9.2
n-Butylbenzene	**5**	ND	2 J
n-Propylbenzene	**5**	**210**	**6.7**
sec-Butylbenzene	**5**	ND	0.79 J
Toluene	**5**	**3000**	**12**
Total Xylenes	**5**	**7800**	**70**
Total VOCs	**--**	16333	255

Notes:

1. Only those parameters detected at a minimum of one sample location are presented in this table; all other compounds were reported as non-detect.
2. Values per NYSDEC TOGS 1.1.1 Class GA Groundwater Quality Standards.
3. SB-4/TMW-1 was not sampled due to visible floating product.

Definitions:

ND = Parameter not detected above laboratory detection limit.

"--" = No value available for the parameter. Or parameter not analysed for.

J = Estimated value; result is less than the sample quantitation limit but greater than zero.

Bold = Exceeds NYS GWQS

FIGURES

F:\CAD\TurnKey\Franklin Asset Management\2424 Hamburgh Turnpike\Phase II\Figure 1; Site Location and Vicinity Map.dwg

FIGURE 1

TURNKEY ENVIRONMENTAL RESTORATION, LLC

2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0635

PROJECT NO.: 02□□-014-001

DATE: JANUARY 2014

DRAFTED BY: BLR

SITE LOCATION & VICINITY MAP

PHASE II ENVIRONMENTAL INVESTIGATION REPORT

2424 HAMBURG TURNPIKE SITE

LACKAWANNA, NEW YORK

PREPARED FOR

FRANKLIN ASSET MANAGEMENT, LLC

F:\CAD\TurnKey\Franklin Asset Management\2424 Hamburgh Turnpike\Phase II\Figure 2: Site Plan.dwg

DATE: JANUARY 2014
DRAFTED BY: BLR

SITE PLAN

PHASE II ENVIRONMENTAL INVESTIGATION REPORT

2424 HAMBURG TURNPIKE SITE

LACKAWANNA, NEW YORK

PREPARED FOR

FRANKLIN ASSET MANAGEMENT, LLC

TurnKey Environmental Restoration, LLC
2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0635

JOB NO.: 02□□-014-001

FIGURE 2

ATTACHMENT 1

NYSDEC RECORDS AND PREVIOUS INVESTIGATIONS

NEW YORK STATE
DEPARTMENT OF
ENVIRONMENTAL CONSERVATION

Bulk Storage Database Search Details

First Site | Previous Site | Next Site | Last Site

Facility Information

Site No.: 9-386383
Status: Unregulated
Expiration Date: 08/17/1992
Site Type: PBS
Site Name: STOP N GAS
Address: 2424 HAMBURG TURNPIKE
Locality: LACKAWANNA
State: NY
Zipcode: 14218
County: ERIE

Owner(s) Information

Facility Owner: SAM SIEGEL-LEASED TO SADO GAS
47 FAIRWAYS BLVD . WILLIAMSVILLE , NY. 14221
Mail Contact: SAM SIEGEL-LEASED TO SADO GAS
47 FAIRWAYS BLVD . WILLIAMSVILLE , NY. 14221

Tank Information

3 Tanks Found

Tank No	Tank Location	Status	Capacity (Gal.)
1	Underground	Closed - Removed	10000
2	Underground	Closed - Removed	10000
3	Underground	Closed - Removed	10000

Back to Search Results

Refine Current Search

NEW YORK STATE
DEPARTMENT OF
ENVIRONMENTAL CONSERVATION

Bulk Storage Database Search Details

Tank Information

Next Tank Last Tank

Site No: 9-386383
Site Name: STOP N GAS
Tank No: 1
Tank Location: Underground
Tank Status: Closed - Removed
Tank Install Date: 01/01/1957
Tank Closed Date: 09/01/1994
Tank Capacity: 10000 gal.
Product Stored: Gasoline
Percentage: 100%
Tank Type: 01 - Steel/Carbon Steel/Iron
Tank Internal Protection: None
Tank External Protection: Painted/Asphalt Coating
Tank Secondary Containment: None
Tank Leak Detection: Groundwater Well
Overfill: None
Spill Prevention: None
Dispenser: Pressurized Dispenser
Pipe Location: Underground/On-ground
Pipe Type: Fiberglass Reinforced Plastic (FRP)
Pipe External Protection: Fiberglass
Piping Secondary Containment: None
Piping Leak Detection: None
Tank Next Test Due:
Tank Last Test: 11/01/1987
Tank Test Method: Horner EZ Check I or II

Refine Current Search

Back to Facility Info

NEW YORK STATE
DEPARTMENT OF
ENVIRONMENTAL CONSERVATION

Bulk Storage Database Search Details

Tank Information

First Tank | Previous Tank | Next Tank | Last Tank

Site No: 9-386383
Site Name: STOP N GAS
Tank No: 2
Tank Location: Underground
Tank Status: Closed - Removed
Tank Install Date: 01/01/1957
Tank Closed Date: 09/01/1994
Tank Capacity: 10000 gal.
Product Stored: Gasoline
Percentage: 100%
Tank Type: 01 - Steel/Carbon Steel/Iron
Tank Internal Protection: None
Tank External Protection: Painted/Asphalt Coating
Tank Secondary Containment: None
Tank Leak Detection: Groundwater Well
Overfill: None
Spill Prevention: None
Dispenser: Pressurized Dispenser
Pipe Location: Underground/On-ground
Pipe Type: Fiberglass Reinforced Plastic (FRP)
Pipe External Protection: Fiberglass
Pipe External Protection: Retrofitted Impressed Current
Piping Secondary Containment: None
Piping Leak Detection: None
Tank Next Test Due:
Tank Last Test: 11/01/1987
Tank Test Method: Horner EZ Check I or II

Refine Current Search

Back to Facility Info

NEW YORK STATE
DEPARTMENT OF
ENVIRONMENTAL CONSERVATION

Bulk Storage Database Search Details

Tank Information

First Tank Previous Tank

Site No: 9-386383
Site Name: STOP N GAS
Tank No: 3
Tank Location: Underground
Tank Status: Closed - Removed
Tank Install Date: 01/01/1957
Tank Closed Date: 09/01/1994
Tank Capacity: 10000 gal.
Product Stored: Diesel
Percentage: 100%
Tank Type: 01 - Steel/Carbon Steel/Iron
Tank Internal Protection: None
Tank External Protection: Painted/Asphalt Coating
Tank Secondary Containment: None
Tank Leak Detection: None
Overfill: None
Spill Prevention: None
Dispenser: Suction Dispenser
Pipe Location: Underground/On-ground
Pipe Type: Fiberglass Reinforced Plastic (FRP)
Pipe External Protection: Fiberglass
Piping Secondary Containment: None
Piping Leak Detection: None
Tank Next Test Due:
Tank Last Test: 11/01/1987
Tank Test Method: Horner EZ Check I or II

Refine Current Search

Back to Facility Info

NEW YORK STATE
DEPARTMENT OF
ENVIRONMENTAL CONSERVATION

Spill Incidents Database Search Results

Record Count: 5 Rows: 1 to 5

Export XLS Export CSV

Spill Number	Date Spill Reported	Spill Name	County	City/Town	Address
1. 9102471	06/01/1991	SAMUEL SIEGEL	ERIE	LACKAWANNA	2424 HAMBURG TURNPIKE
2. 9102643	06/05/1991	ODOR AT 2424 HAMBURG	ERIE	LACKAWANNA	2424 HAMBURG TURNPIKE
3. 9204849	07/24/1992	TURNPIKE AUTO REPAIR	ERIE	LACKAWANNA	2424 HAMBURG TURNPIKE - 5
4. 9407600	09/02/1994	STOP & GAS - SEIGEL	ERIE	LACKAWANNA	2424 HAMBURG TURNPIKE
5. 1204435	07/17/2012	NYSDOT ROAD WORK	ERIE	LACKAWANNA	2424 HAMBURG TURNPIKE

Refine Current Search

NYSDEC SPILL REPORT FORM

DEC REGION: 9
SPILL NUMBER: 1204435
SPILL NAME: NYSDOT ROAD WORK
DEC LEAD: FXGALLEG

CALLER NAME: GREGORY KHARLIP
NOTIFIER'S NAME:
CLR'S AGENCY: NYSDOT
NOTIFIER'S AGENCY:
CALLER'S PHONE: (716) 796-8963
NOTIFIER'S PHONE:

SPILL DATE: 07/10/2012
SPILL TIME: 10:00 am
DISPATCHER:
CALL RECEIVED DATE: 07/17/2012
RECEIVED TIME: 11:00 am

SPILL LOCATION

PLACE: NYSDOT ROAD WORK
COUNTY: Erie
STREET: 2424 HAMBURG TURNPIKE
TOWN/CITY: Lackawanna (c)
COMMUNITY: LACKAWANNA
CONTACT:
CONTACT PHONE:

CONT. FACTOR: Other
SPILL REPORTED BY: Other
FACILITY TYPE: Gasoline Station
WATERBODY:

CALLER REMARKS:

While NYSDOT was installing the fiber optic line in front of 2424 Hamburg Turnpike, discovered petroleum contamination.

MATERIAL	CLASS	SPILLED	RECOVERED	RESOURCES AFFECTED
Gasoline	Petroleum	0.00 G	0.00 G	Soil,

POTENTIAL SPILLERS

COMPANY	ADDRESS	CONTACT

Tank No.	Tank Size	Material	Cause	Source	Test Method	Leak Rate	Gross Failure

DEC REMARKS:

8/3/12 ACCORDING TO THE CITY OF LACKAWANNA REAL PROPERTY OFFICE, THE CURRENT OWNER OF THE PROPERTY IS SAMUEL SIEGEL, ATTN: DAVID SIEGEL, 300 MAIN ST, BUFFALO NY 14202.
FG SENT A ROE LETTER REQUESTING A RESPONSE BY 8/27/12.

8/6/12 DAVID SIEGEL CALLED IN RESPONSE TO THE LETTER. HE SAID WORK WAS DONE IN 1994 AND HE BELIEVED THE CLEANUP WAS COMPLETE. FG TOLD MR. SIEGEL THAT THERE MAY BE ANOTHER SOURCE ON THE PROPERTY AND IT NEEDS TO BE INVESTIGATED. MR. SIEGEL SAID THAT THE ESTATE HAS NO MONEY. FG TOLD HIM THAT THE STATE COULD DO THE WORK BUT THERE WOULD BE A CHARGE BACK TO THE RESPONSIBLE PARTY. HE WILL GET BACK TO THE DEPARTMENT WITH A DECISION ON HOW HE WISHES TO PROCEED.

2/14/13 FG SPOKE TO DAVID SIEGEL. HE WILL PROVIDE A RESPONSE TO THE DEPARTMENT WITHIN THE NEXT WEEK IF HE WILL COMPLETE THE WORK OR ALLOW NYSDEC TO COMPLETE T HE WORK ON SITE.

Created On: 08/03/2012
Date Printed: 12/4/2013 Last Updated: 11/15/2013

NYSDEC SPILL REPORT FORM

DEC REGION: 9 **SPILL NUMBER:** 1204435

SPILL NAME: NYSDOT ROAD WORK **DEC LEAD:** FXGALLEG

2/26/13 FG SPOKE TO DAVID SIEGEL. HE SAID HE SPOKE TO A CONTRACTOR WHO TOLD HIM TO CALL BACK WHEN THERE IS NO SNOW. MR. SIEGEL SAID HE WOULD CALL THE CONTRACTOR TODAY OR TOMORROW AND GET BACK TO ME.

4/17/13 DAVID SIEGEL SENT A LETTER STATING THAT HE SENT NATURES WAY ALL OF THE INFORMATION AND IS WAITING TO HEAR BACK FROM THEM.

5/14/13 FG LEFT A MESSAGE FOR DAVID SIEGEL FOR A STATUS UPDATE. 854-1300

8/23/13 FG LEFT A MESSAGE FOR DAVID SIEGEL FOR A STATUS UPDATE. 854-1300

FG SPOKE TO NICOLE SAVAGE WITH NATURES WAY WHO SAID THAT THE GEOPHYSICAL WAS COMPLETED AND THERE APPEARS TO BE SOME PIPING REMAINING AND POSSIBLE USTS. SHE WILL SPEAK TO DAVID SIEGEL AND GET ME THE RESULTS AND A WORKPLAN.

11/7/13 DAVID SIEGEL CALLED WITH AN UPDATE. HE SAID THAT THE BUIDLING IS TO BE DEMOLISHED. HE WILL BE IN COURT NEXT WEEK ON THE MATTER. HE SAID THAT HE WILL NOTIFY NATURES WAY THAT THEY CAN GIVE US A COPY OF THE GEOPHYSICAL SURVEY THAT WAS COMPLETED ON THE SITE.

PIN	T & A	COST CENTER

CLASS: C3 **CLOSE DATE:** **MEETS STANDARDS:** False

NYSDEC INITIAL SPILL RESPONSE FORM

REGION ____ INCOMING LIN[illegible]18 / 800

SPILL NUMBER 9[illegible]07600

SPILL NAME 2424 Hamburg Turnpike

RESPONDER ____

CALLER'S NAME: ____

NOTIFIER'S NAME: John OTTO

CALLER'S AGENCY: ____

NOTIFIER'S AGENCY: DEC

CALLER'S PHONE: ( ) ____

NOTIFIER'S PHONE: ( ) ____

SPILL DATE: 9/2/94 TIME: 1130 hrs.

CENT OFF DATE: 9/7/94 TIME: 1308 hrs.

REG OFF DATE: 9/2/94 TIME: 1130 hrs.

ANS SVC DATE: __/__/__ TIME: ____ hrs.

FIRST CALL: A, [✓ B] C ANS SVC OPER ____

SARA Title III/CERCLA Notification Y / N

PETROLEUM SPILLED

[✓ 1 - Gasoline] 4 - #6 Fuel 7 - Waste Oil 10 - Kerosene
2 - #2 Fuel [✓ 5 - Diesel] 8 - Non-PCB Oil 11 - Unknown
3 - #4 Fuel 6 - Jet Fuel 9 - PCB Oil

MATERIAL CLASS

[✓ 1 - Petroleum] 3 - Hazardous Material 5 - Unknown
2 - Non-Petro/Non-Haz 4 - Raw Sewage

QUANTITY: ____ gals/lbs

Amount Recovered ____

Other Material Spilled ____

SPILL LOCATION

PLACE: STOP-N-GAS

STREET: 2424 HAMBURG TURNPIKE

T/C/V LACKAWANNA CO: ERIE

CONTACT: ____

PHONE: ( ) ____

SPILLER (If Different)

NAME: HERB SIEGEL

STREET: 300 MAIN ST.

CITY/ST/ZIP: Bflo.

CONTACT: ____

PHONE: ( ) ____

OTHER INFO: ____

SPILL CAUSE

1 - Human Error 5 - Tank Test Failure [✓ 9 - Tank Failure]
2 - Traffic Accident 6 - Housekeeping 10 - Tank Overfill
3 - Equipment Failure 7 - Deliberate 11 - Other
4 - Vandalism 8 - Abandoned Drums 12 - Unknown

SPILL SOURCE

1 - Comm/Indust [✓ 5 - Gas Station] 9 - Private Dwelling
2 - Non-Comm/Inst 6 - Passenger Vehicle 10 - Vessel
3 - Major Facility 400,000 gal 7 - Comm Vehicle 11 - Railroad Car
4 - Non-Maj Facility 1,100 gal 8 - Tank Truck 12 - Unknown

RESOURCE AFFECTED

1 - On Land [✓ 3 - Groundwater] 5 - Air
2 - In Sewer 4 - Surface Water

Waterbody ____

Drainage Basin/Sub-Basin ____

DEC NOTIFIED BY:

1 - Responsible Party 5 - Tank Tester 9 - Local Agency b. Tank Contractor
2 - Affected Persons [✓ 6 - DEC] 10 - Federal Gov't c. Clean-up Contractor
3 - Police Department 7 - Citizen 11 - Other d. Envir. Consultant
4 - Fire Department 8 - Health Dept. a. Fuel Supplier e. ____

REMARKS: REMOVING TANKS, DISCOVERED CONTAMINATED SOIL + FREE PRODUCT IN EXCAVATION.

CONTRACTOR - NATURE'S WAY

PIN #	T&A	Cost Center	
Status: Active / Closed	Env. Complete / /	ISR to Central Office / /	
Non-PIN Closed / /	Last inspection / /	Penalty Y / N	Inspector FQ

Tank Test Failure Y / N Tank Size ____ Gal. Test Method ____ System/Tank/Line

Leak Rate ____ GPH PBS # 9 ____ Tank I.D.#'s ____ Manifold Y / N

Cleaner: 1 - State 2 - Spiller 3 - Local 4 - No Action		History / /
UST Trust Eligible Y / N	Site: A B C D E Resp. Party 1 2 3 4 5 6	

Regional Contact ____ Central Duty Ofcr ____ EDO: Y/N ____ DATA INPUT [ ]

Revised 08/14/92

Logged 9-6-94 #353

COPY

NYSDEC INITIAL SPILL RESPONSE FORM

REGION____ INCOMING LINE: 5[redacted]00

SPILL NUMBER [redacted]

SPILL NAME

RESPONDER

CALLER'S NAME:

NOTIFIER'S NAME: John Otto

CALLER'S AGENCY:

NOTIFIER'S AGENCY: DEC

CALLER'S PHONE: ( )

NOTIFIER'S PHONE: ( )

SPILL DATE: 9/2/94 TIME: 1130 hrs.

ANS SVC DATE: / / TIME: hrs.

CENT OFF DATE: / / TIME: hrs.

FIRST CALL: A, [✓ B] C ANS SVC OPER

REG OFF DATE: 9/2/94 TIME: 1130 hrs.

SARA Title III/CERCLA Notification Y / N

PETROLEUM SPILLED

- [✓ 1 - Gasoline]
- 2 - #2 Fuel
- 3 - #4 Fuel
- 4 - #6 Fuel
- [✓ 5 - Diesel]
- 6 - Jet Fuel
- 7 - Waste Oil
- 8 - Non-PCB Oil
- 9 - PCB Oil
- 10 - Kerosene
- 11 - Unknown

MATERIAL CLASS

- [✓ 1 - Petroleum]
- 2 - Non-Petro/Non-Haz
- 3 - Hazardous Material
- 4 - Raw Sewage
- 5 - Unknown

QUANTITY: gals/lbs

Amount Recovered

Other Material Spilled

SPILL LOCATION

PLACE: STOP-N-GAS

STREET: 2424 HAMBURG TURNPIKE

T/C/V LACKAWANNA CO: ERIE

CONTACT:

PHONE: ( )

SPILLER (If Different)

NAME: HERB SIEGEL

STREET: 300 MAIN ST. 426 Franklin

CITY/ST/ZIP: Bflo. NY Bfflo, NY 14202

CONTACT:

PHONE: ( ) 881-5800

OTHER INFO:

SPILL CAUSE

- 1 - Human Error
- 2 - Traffic Accident
- 3 - Equipment Failure
- 4 - Vandalism
- 5 - Tank Test Failure
- 6 - Housekeeping
- 7 - Deliberate
- 8 - Abandoned Drums
- [✓ 9 - Tank Failure]
- 10 - Tank Overfill
- 11 - Other
- 12 - Unknown

SPILL SOURCE

- 1 - Comm/Indust
- 2 - Non-Comm/Inst
- 3 - Major Facility 400,000 gal
- 4 - Non-Maj Facility 1,100 gal
- [✓ 5 - Gas Station]
- 6 - Passenger Vehicle
- 7 - Comm Vehicle
- 8 - Tank Truck
- 9 - Private Dwelling
- 10 - Vessel
- 11 - Railroad Car
- 12 - Unknown

RESOURCE AFFECTED

- 1 - On Land
- 2 - In Sewer
- [✓ 3 - Groundwater]
- 4 - Surface Water
- 5 - Air

Waterbody

Drainage Basin/Sub-Basin

DEC NOTIFIED BY:

- 1 - Responsible Party
- 2 - Affected Persons
- 3 - Police Department
- 4 - Fire Department
- 5 - Tank Tester
- [✓ 6 - DEC]
- 7 - Citizen
- 8 - Health Dept.
- 9 - Local Agency
- 10 - Federal Gov't
- 11 - Other
- a. Fuel Supplier
- b. Tank Contractor
- c. Clean-up Contractor
- d. Envir. Consultant
- e.

REMARKS: REMOVING TANKS DISCOVERED CONTAMINATED SOIL + FREE PRODUCT IN EXCAVATION.

CONTRACTOR - NATURE'S WAY

PIN #	T&A	Cost Center	
Status: Active / Closed	Env. Complete / /	ISR to Central Office / /	
Non-PIN Closed / /	Last Inspection / /	Penalty Y / N	Inspector FQ

Tank Test Failure Y / N Tank Size Gal. Test Method System/Tank/Line

Leak Rate GPH PBS # 9 Tank I.D.#'s Manifold Y / N

Cleaner: 1 - State 2 - Spiller 3 - Local 4 - No Action		History / / :
UST Trust Eligible Y / N	Site: A B C D E Resp. Party 1 2 3 4 5 6	

Regional Contact

Central Duty Ofcr

EDO: Y/N

DATA INPUT [ ]

Revised 08/14/92

NYS DEC Region 9

History Records For Spill Number 9407600

09/21/95

DATE	HISTORY
08/28/95	SOIL PILE RESULTS SHOW LEVELS BELOW STARS. UST EXCAV RESULTS SHOW LEVELS EXCEED STARS ONLY SLIGHTLY. SITE CAN BE MADE INACTIVE.
07/26/95	FG SITE VISIT 7/26/95. MET NATURE'S WAY REP ON SITE. CHECKED SOIL FOR PETRO ODOR-NONE FOUND IN 4 LOCATIONS. NATURE'S WAY COLLECTED SAMPLE ON 7/25/95.
05/03/95	FG SITE VISIT 5/3/95. NATURE'S WAY SPRAYING NUTRIENTS ON SOIL.
04/11/95	SITE SCHEDULE SUBMITTED. NATURE'S WAY TO CALL THIS OFFICE WHENEVER THEY WORK ON SITE.
03/16/95	LTR SENT REQUESTING SCHEDULE OF ACTIVITIES FOR SITE. RESPONSE DUE BY 3/31/95.
12/22/94	FG SITE VISIT 12/15/94. MET R. SAVAGE ON SITE. BERMS HAD BEEN SET UP ADEQUATELY. 4 DRUMS OF SLUDGE FROM UST'S HAVE TO BE DISPOSED OF. TOLD MR. SAVAGE COVER ON SOILS NECESSARY. HEAGREED.
12/08/94	FG RESPONDED TO LTR FROM R. SAVAGE12/7/94. MUST COVER SOILS & COLLECT & TREAT RUNOFF WATERS. DEC WAS NOT NOTIFIED OF EXCAV BEHIND BLDGS.
12/07/94	J. BALCARCZYK W/LACKA COMPLAINED-CONTRACTOR NEVER APPLIED FOR PERMIT TO REMOVE TANKS. CITIZENS HAVE BEEN COMPLAINING ABOUT SOIL AT SITE. WANTS TO HAVE SOIL REMOVED FROM SITE.
11/17/94	FG SITE VISIT 11/16/94. SOIL PILES REMAIN UNTOUCHED. COVER IS OFF.
09/08/94	FG SPOKE TO R. SAVAGE W/NATURE'S WAY 9/8/94. TOLD HIM TO SAMPLE & ANALYZE WATER IN TEST PIT. HE SAID OWNER DECIDING ON REMEDIATION OPTIONS.
09/08/94	FG MF SITE VISIT 9/7/94. 2ND TANK REMOVED 3RD TANK UNCOVERED. TEST PITS WERE DUG. WATER IN ONE HAD A PETROLEUM ODOR & A SHEEN.
09/07/94	9/6/94 TREATMENT LTR SENT TO RP H. SIEGEL. REQUIRE RESPONSE BY 9/21/94.
09/07/94	FG SITE VISIT 9/7/94. MET NATURE'S WAY & REP OF THE OWNER ON SITE. CONTAM EXTENDS UNDER BLDG, TOWARD ST & POSSIBLY BEHIND BLDG. REMED OPTIONS TO BE CONSIDERED AFTER UST'S REMOVED.
09/06/94	FG SPOKE TO R. SAVAGE-NATURE'S WAY 9/2/94. GROUNDWATER COLLECTED TO BE SAMPLED PRIOR TO DISCHARGE. WATERS HELD IN TANK ON SITE. WATERS TO BE TREATED THROUGH CARBON.
09/06/94	FG SITE VISIT 9/2/94. CONTAMINATED SOIL REMOVED & STOCKPILED ON SITE. PRODUCT FOUND IN THE EXCAVATION. CONTACTED H. SIEGEL,OWNER, TOLD HIM NYSDEC REQUIREMENTS. ONE TANK REMOVED-NO HOLES.

APPLICATION FOR ˙CCESS TO RECORDS

(See Instructi on Reverse Side)

APPLICANT

- TO THE DEPARTMENT OF ENVIRONMENTAL CONSERVATION:

I hereby apply to inspect the following records under the provisions of the Freedom of Information Law:

Spill File #9407600

After inspection, should I desire copies of all or part of the records inspected, I will identify the records to be copied and hereby offer to promptly pay the established fees. (Cost of reproduction or 25¢ per page as applicable). Contact me if cost will exceed $ ________.

Name (Print or type) Don Allen Telephone No. 800-352-0050

Attention of: ________

Mailing Address 3530 Post Rd Southport, CT Date 10-26-99

Signature

RECORDS CUSTODIAN

- TO THE APPLICANT:

—Records Provided

☐ The reproduction costs for the records provided are $ ________

☐ Records have been (partially, fully) provided. (If not fully provided, date when records are expected to be fully provided: ________)

—Records Not Available

☐ Records cannot be found after diligent search

☐ The Department is not the custodian for records indicated

—Records Denied

I hereby certify that access to the records—or part of the records—circled above has been denied to the applicant for the reason(s) checked below:

☐ Specifically exempt by other statute

☐ Unwarranted invasion of personal privacy

☐ Would impair present or imminent contract awards or collective bargaining negotiations

☐ Are examination questions or answers

☐ Are inter-agency or intra-agency materials that are not:
  - statistical or factual tabulations or data
  - instructions to staff that affect the public
  - final agency policy or determinations; or
  - external audits, including but not limited to audits performed by the comptroller and the federal government

☐ Are trade secrets

☐ Would endanger the life or safety of any person

☐ Are compiled for law enforcement purposes and which, if disclosed would:
  - interfere with law enforcement investigations or judicial proceedings
  - deprive a person of the right to a fair trial or impartial adjudication
  - identify a confidential source or disclose confidential information relating to a criminal investigation, or
  - reveal criminal investigative techniques or procedures, except routine techniques and procedures

☐ Are computer access codes

Identification of records withheld (attach listing if additional space is required) and/or explanation if appropriate:

Records Custodian Signature Kathy Brennan Title Program Aide Date 1/12/00

NATURE'S WAY INC.
ENVIRONMENTAL REMEDIATION
11796 Genesee St.
Alden, N.Y. 14004
(716) 937-6527
(716) 937-6140

(1)

October 08, 1995

Mr. Robert Leary, P.E.
NYSDEC, Region 9
270 Michigan Ave.
Buffalo, New York 14203-2999

Rm /
FG

Re: RELOCATION/REUSE AS CLEAN FILL OF REMEDIATED (BIOTREATED) SOILS FROM SIEGEL PROPERTY, 2424 HAMBURG TURNPIKE (RT 5), LACKAWANNA, N.Y. TO PETRO USA PROPERTY, 19TH & WALNUT ST., NIAGARA FALLS, N.Y.

9407600

Dear Bob,

As per our conversation, this letter is to document the above described reuse of remediated soils as clean fill, as agreed in our telecon. These soils, as you are aware, have been fully tested according to NYSDEC Stars Memo #1 guidelines, and have been demonstrated to meet all applicable cleanliness standards, and all data has been submitted to and reviewed and approved by your Department. We appreciate your cooperation in helping us to efficiently reuse the subject soils. Please call if you should have any questions or comments.

04

Sincerely,

Russel J. Savage, Oper. Mgr.
NWEC&C Inc.

RECEIVED
OCT 10 1995
N.Y.S. DEPT. OF
ENVIRONMENTAL CONSERVATION
REGION 9

file

New York State Department of Environmental Conservation
270 Michigan Avenue, Buffalo, New York 14203-2999
(716) 851-7220

EARTH DAY 25 1995 ENVIRONMENTAL PARTNERS

Michael D. Zagata
Commissioner

September 29, 1995

Mr. Herbert Siegel, Esq.
Siegel, Kelleher and Kahn
426 Franklin
Buffalo, New York 14202

Dear Mr. Siegel:

Spill Number 9407600
2424 Hamburg Turnpike
Lackawanna, Erie County

We have reviewed the analytical results for the excavation. The results exceed our soil guidance values. However, since the results were low levels, we will not require any further work at this time. The site will have a status of "inactive".

Your cooperation is appreciated. If you have any questions, please contact me at (716)851-7220.

Sincerely,

Francine Gallego

Francine Gallego
Environmental Engineer I

FG:ma

cc: Mr. David Siegel, Esq.

9/7/94 2424 Hamburg TPKE
contamination under bldg.

S[illegible] Number ______________

Date ______________

SPILL CONTINUATION SHEET

2421 Hamburg Tpke

Date	Comments
9/7/94	FZ met R. Savage (Nature's Way) and Haak (representative of Herb Siegel - Owner) on site. Contamin. extends under bldg, onto back property and further towards street. All tanks to be removed today - 1 more gas and 1 diesel. Contaminated soil to be stockpiled. Test pits to be dug to determine extent of contam. Decisions on further remed. to be made after tanks removed.

Spill Number ____________

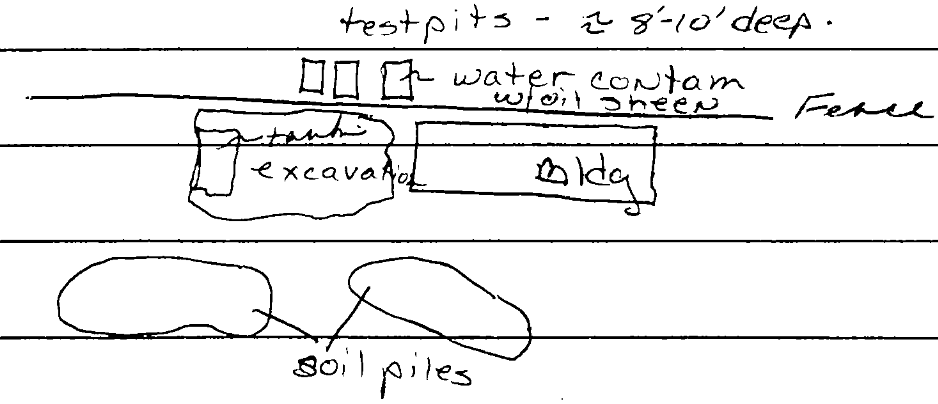
Date ____________

SPILL CONTINUATION SHEET

2424 Hamburg Tpke.

Date | Comments

9/7/94 FG MF site visit. One additional tank was removed and the other one was uncovered. Waters from the excavation were being stored in one tank. The waters are to be treated using carbon and then sampled prior to discharging. Test pits on the other side of the fence were dug. One test pit had an oily water in it. The other two had no water.



9/8/94 FG spoke to Russ Savage. Told him to sample water. He said owners deciding on remediation options for the property.

mber 9407600

2424 Hamburg Tpke

Date

9/7/94

9 7'94

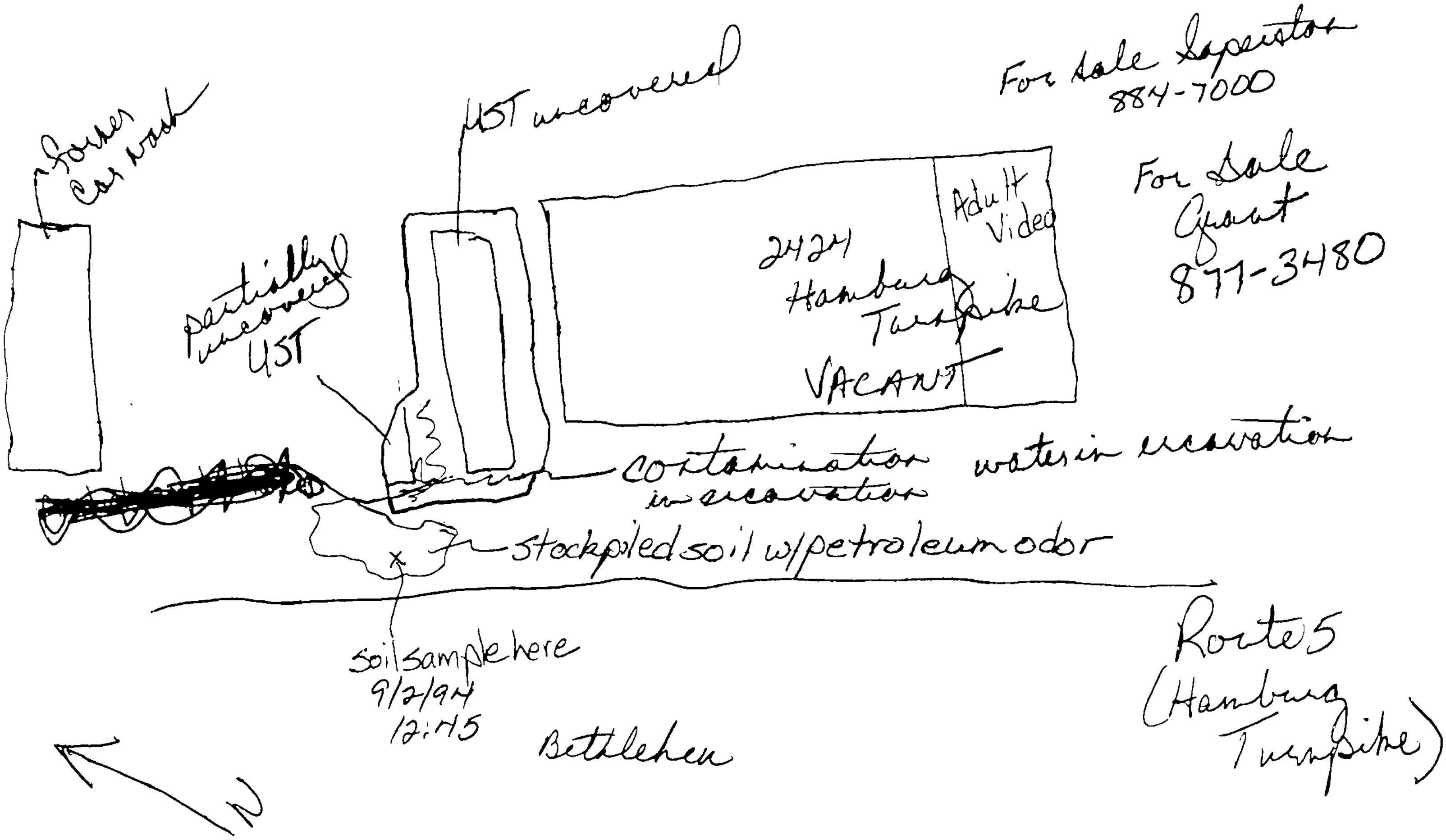
Spill Number ______________

2424 Hamburg Tpke

Date ______________

SPILL CONTINUATION SHEET

Date	Comments
9/2/94	FZ site visit. Contamination in soil which was removed from excavation. Product in excavation. Gas US tank uncovered. Other gas UST partially uncovered. Diesel to be removed also.
9/2/94	FZ called Herb Siegel 881-5800. Told him NYSDEC requirements. Told him NYSDEC to send ltr.
9/2/94	FZ spoke to Russ Savage. He is to sample collected gw's prior to discharge. Excavation not to occur before 9/6. Told him he must contact NYSDEC before samples taken in excav.


Former Car wash
UST uncovered
For Sale Saperston
884-7000
For Sale
Grant
877-3480
Adult Video
2424 Hamburg Turnpike
VACANT
partially uncovered UST
contamination in excavation
water in excavation
stockpiled soil w/petroleum odor
soil sample here
9/2/94
12:45
Bethlehem
Route 5
(Hamburg Turnpike)
N

9/2/94

NYSDEC INITIAL SPILL RESPONSE FORM

REGION 9 INCOMING LINE: 518 / 800

SPILL NAME ______

SPILL NUMBER: ______

CALLER'S NAME: ______

NOTIFIER'S NAME: Francine Gallego

CALLER'S AGENCY: ______

NOTIFIER'S AGENCY: NYSDEC

CALLER'S PHONE: ( ) ______

NOTIFIER'S PHONE: (716) 851-7220

SPILL DATE: 9/2/94 TIME: ~~12:00~~ 8:00 hrs.

ANS SVC DATE: __/__/__ TIME: ______ hrs.

CENT OFF DATE: __/__/__ TIME: ______ hrs.

FIRST CALL: A [✓ B] C ANS SVC OPER ______

REG OFF DATE: 9/2/94 TIME: 12:15 hrs.

SARA Title III/CERCLA Notification Y / N

PETROLEUM SPILLED

1 - Gasoline
2 - #2 Fuel
3 - #4 Fuel
4 - #6 Fuel
5 - Diesel
6 - Jet Fuel
7 - Waste Oil
8 - Non-PCB Oil
9 - PCB Oil
10 - Kerosene
[✓ 11 - Unknown]

MATERIAL CLASS

[✓ 1 - Petroleum]
2 - Non-Petro/Non-Haz
3 - Hazardous Material
4 - Raw Sewage
5 - Unknown

QUANTITY: ______ gals/lbs

Amount Recovered ______

Other Material Spilled ______

SPILL LOCATION

PLACE: 2424 Hamburg Turnpike

STREET: ______

T/C/V Lackawanna CO: Erie

CONTACT: ______

PHONE: ( ) ______

SPILLER (If Different)

NAME: ______

STREET: ______

CITY/ST/ZIP: ______

CONTACT: ______

PHONE: ( ) ______

OTHER INFO: ______

SPILL CAUSE

1 - Human Error
2 - Traffic Accident
3 - Equipment Failure
4 - Vandalism
5 - Tank Test Failure
6 - Housekeeping
7 - Deliberate
8 - Abandoned Drums
[✓ 9 - Tank Failure]
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SPILL SOURCE

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RESOURCE AFFECTED

[✓ 1 - On Land]
2 - In Sewer
[✓ 3 - Groundwater]
4 - Surface Water
5 - Air

Waterbody ______

Drainage Basin/Sub-Basin ______

DEC NOTIFIED BY:

1 - Responsible Party
2 - Affected Persons
3 - Police Department
4 - Fire Department
5 - Tank Tester
[✓ 6 - DEC]
7 - Citizen
8 - Health Dept.
9 - Local Agency
10 - Federal Gov't
11 - Other
a. Fuel Supplier
b. Tank Contractor
c. Clean-up Contractor
d. Envir. Consultant
e. ______

REMARKS: NYSDEC noted underground excavation while driving past site. Found contaminated soil stockpiled on site, and 2 UST's (large) partially excavated with contamination in the excavation. For sale sign on building - [illegible] - 884-7000. No people on site.

PIN #	T&A	Cost Center	
Status: Active / Closed	Env. Complete / /	ISR to Central Office / /	
Non-PIN Closed / /	Last Inspection / /	Penalty Y / N	Inspector

Tank Test Failure Y / N Tank Size ______ Gal. Test Method ______ System/Tank/Line

Leak Rate ______ GPH PBS # ______ Tank I.D.#'s ______ Manifold Y / N

Cleaner: 1 - State 2 - Spiller 3 - Local 4 - No Action		History __/__/__:
UST Trust Eligible Y / N	Site: A B C D E Resp. Party 1 2 3 4 5 6	

Regional Contact ______ Central Duty Ofcr ______ EDO: Y/N ______ DATA INPUT [ ]

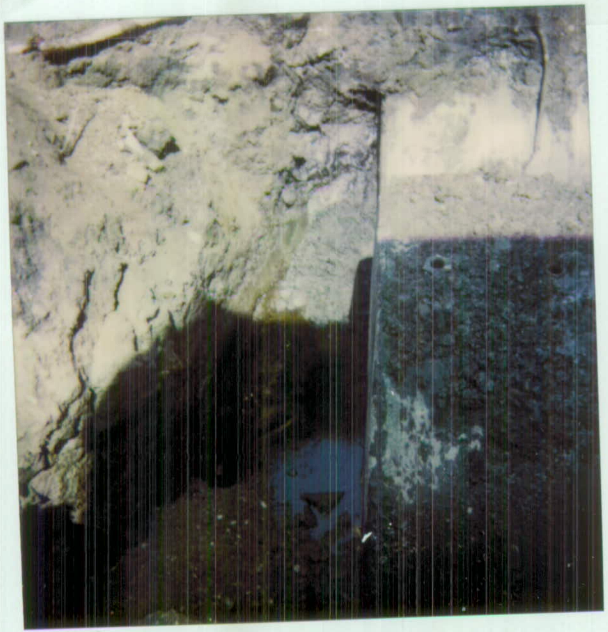
Revised 08/14/92

Spill Number

Date

NTINUA

Comme



9/2/94 Lackawanna
2424 Hamburg Turnpike

9/2/94 Lackawanna
2424 Hamburg Turnpike

9/2/94 Lackawanna
2424 Hamburg Turnpike

NATURE'S WAY INC.
ENVIRONMENTAL REMEDIATION
11796 Genesee St.
Alden, N.Y. 14004
(716) 937-6527
(716) 937-6140

(1)

August 08, 1995

RECEIVED
AUG 16 1995
NYSDEC-REG. 9
FOIL
—REL —UNREL

Ms. Francine Gallego
NYSDEC, Region 9
270 Michigan Ave.
Buffalo, New York 14203-2999

pm –
FG –
9407600

Re: ESTATE OF SIEGEL PROPERTY
2424 HAMBURG TURNPIKE (RT 5)
LACKAWANNA, N.Y.
Submission of Sampling/Testing Results for Excavated Soils Undergoing Biological Treatment;
Request for Site Closure;

This letter is to inform your department that Nature's Way Inc. has successfully completed bioremediation (decontamination) operations on the approx. 500 cubic yards of diesel contaminated soil at the above location. As you are aware, we have been biotreating the subject soil by Standard Biotreatment Operating Procedures over the past three months. We have submitted soil samples as required (STARS Memo #1 - grabs and/or composites derived from a total of 4 - 8 soil cores at random locations and depths each) as required for the following analyses:

METHOD 8021 DIRECT ON SAMPLES
METHOD 8270 PNA'S ONLY ON TCLP EXTRACT

The analyses were performed by Expresslabs, and results may be found in Attachment #1.

Since soil analyses show no evidence of contamination above allowable limits, we request a letter from the DEC (copy NWI) stating that the soil has been successfully decontaminated, that no further work will be required, and that the soil may be reused as clean fill On-Site. Also, based on this and previously submitted Site data and inspections, please state in the letter that the Site has been assigned a formal designation of "Inactive", and that no further work will be required with respect to this spill, at this time. As always, your attention to this matter is greatly appreciated. Please call if you should have any questions or comments.

Sincerely,

Russel J. Savage, Pres.
Nature's Way Inc.

NATURE'S WAY INC.
ENVIRONMENTAL REMEDIATION
11796 Genesee St.
Alden, N.Y. 14004
(716) 937-6527
(716) 937-6140

ATTACHMENT #1
ANALYTICAL RESULTS AT JOB COMPLETION

EXPRESSLAB *PO Box 40 5611 Water Street Middlesex NY 14507*

Tel: (716) 554-5347 *Tel: (800) THE LABS* *Tel: (800) 843-5227* *FAX: (716) 554-4114*

SPECIALIZING IN ENVIRONMENTAL SOIL TESTS
NEW YORK STATE LABORATORY #11369

LABORATORY REPORT - METHOD 8021

Cust **NATURE'S WAY, INC.**
Address: **11796 GENESEE STREET**
ALDEN , N.Y. 14004
Attn: **RUSS SAVAGE**

Phone 716-937-6527
FAX

PO Number:
Project Number:
Project Cust:
Project Site: **Turnpike Auto / Rt.5**
Date FAXED:
Lab Director

SAMPLE DEMOGRAPHICS AND TEST RESULTS

Results in bold type; Detection Limits in small print
Detection Limits* = Soil=ug/kg ppb
*See Individual Limit Water=ug/L ppb

Results shown are: **Volatile Organics**
Extraction Method: **EPA 5030 Purge & Trap**
Analysis Method: **EPA 8021 GC PID**

Sample ID (LAB)	6789	
Sample ID#1(CUST)	**Soil Under Treatment**	
Sample ID#2(CUST)	**Grab #1**	
Matrix	**Soil**	
Sampled By	**Brian O'Donnell**	
Date Sampled	07/25/95	01:50
Date Received	07/27/95	09:00
Date Analyzed	07/27/95	
Date Reported	07/28/95	

	Results	Det Limit*
MTBE	**< DL**	0.9
Benzene	**< DL**	0.9
Toluene	**< DL**	0.9
Ethylbenzene	**< DL**	0.9
m&p-Xylene	**< DL**	1.8
o-Xylene	**< DL**	0.9
Isopropylbenzene	**< DL**	0.9
n-Propylbenzene	**< DL**	0.9
1,3,5-Trimethylbenzene	**< DL**	0.9
1,2,4-Trimethylbenzene	**< DL**	0.9
sec-Butylbenzene&1,3-Dichlorobenzene	**< DL**	1.8
Isopropyltoluene	**< DL**	0.9
n-Butylbenzene	**< DL**	0.9
Naphthalene	**< DL**	0.9

* DL = Detection Limit

EXPRESSLAB *PO Box 40 5611 Water Street Middlesex NY 14507*

Tel: (716) 554-5347 *Tel: (800) THE LABS* *Tel: (800) 843-5227* *FAX: (716) 554-4114*

SPECIALIZING IN ENVIRONMENTAL SOIL TESTS
NEW YORK STATE LABORATORY #11369

LABORATORY REPORT - METHOD 8021

Cust **NATURE'S WAY, INC.**
Address: **11796 GENESEE STREET**
ALDEN , N.Y. 14004
Attn: **RUSS SAVAGE**

Phone 716-937-6527
FAX 716-937-6527

PO Number:
Project Number:
Project Cust:
Project Site: **Turnpike Auto / Rt. 5**
Date FAXED:
Lab Director

SAMPLE DEMOGRAPHICS AND TEST RESULTS

Results in bold type; Detection Limits in small print
Detection Limits* = Soil=ug/kg ppb
*See Individual Limit Water=ug/L ppb

Results shown are: **Volatile Organics**
Extraction Method: **EPA 5030 Purge & Trap**
Analysis Method: **EPA 8021 GC PID**

Sample ID (LAB)	6849	
Sample ID#1(CUST)	**Soil under treatment**	
Sample ID#2(CUST)	**Grab # 2**	
Matrix	Soil	
Sampled By	Brian J. O'Donnell	
Date Sampled	07/25/95	01:48
Date Received	07/26/95	03:15
Date Analyzed	08/02/95	
Date Reported	08/03/95	

	Results	Det Limit*
MTBE	**< DL**	1.0
Benzene	**1.0**	1.0
Toluene	**< DL**	1.0
Ethylbenzene	**< DL**	1.0
m&p-Xylene	**< DL**	2.0
o-Xylene	**< DL**	1.0
Isopropylbenzene	**< DL**	1.0
n-Propylbenzene	**< DL**	1.0
1,3,5-Trimethylbenzene	**< DL**	1.0
1,2,4-Trimethylbenzene	**< DL**	1.0
sec-Butylbenzene&1,3-Dichlorobenzene	**< DL**	2.0
Isopropyltoluene	**< DL**	1.0
n-Butylbenzene	**< DL**	1.0
Naphthalene	**< DL**	1.0

- DL = Detection Limit

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SPECIALIZING IN ENVIRONMENTAL SOIL TESTS
NEW YORK STATE LABORATORY #11369

LABORATORY REPORT - METHOD 8021

Cust **NATURE'S WAY, INC.**
Address: **11796 GENESEE STREET.**
ALDEN , N.Y. 14004
Attn: **RUSS SAVAGE**

Phone 716-937-6527
FAX 716-937-6527

PO Number:
Project Number:
Project Cust:
Project Site: **Turnpike Auto / Rt. 5**
Date FAXED:
Lab Director

SAMPLE DEMOGRAPHICS AND TEST RESULTS

Results in bold type; Detection Limits in small print
Detection Limits* = Soil=ug/kg ppb
*See Individual Limit Water=ug/L ppb

Results shown are: **Volatile Organics**
Extraction Method: **EPA 5030 Purge & Trap**
Analysis Method: **EPA 8021 GC PID**

Sample ID (LAB)	6850	
Sample ID#1(CUST)	**Soil under treatment**	
Sample ID#2(CUST)	**Grab # 3**	
Matrix	Soil	
Sampled By	Brian J. O'Donnell	
Date Sampled	07/25/95	01:45
Date Received	07/26/95	03:15
Date Analyzed	08/02/95	
Date Reported	08/03/95	
	Results	**Det Limit***
MTBE	**< DL**	1.0
Benzene	**< DL**	1.0
Toluene	**< DL**	1.0
Ethylbenzene	**< DL**	1.0
m&p-Xylene	**< DL**	2.0
o-Xylene	**< DL**	1.0
Isopropylbenzene	**< DL**	1.0
n-Propylbenzene	**< DL**	1.0
1,3,5-Trimethylbenzene	**< DL**	1.0
1,2,4-Trimethylbenzene	**< DL**	1.0
sec-Butylbenzene&1,3-Dichlorobenzene	**< DL**	2.0
Isopropyltoluene	**< DL**	1.0
n-Butylbenzene	**< DL**	1.0
Naphthalene	**< DL**	1.0

* DL = Detection Limit

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ALDEN , N.Y. 14004
Attn: **RUSS SAVAGE**

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SAMPLE DEMOGRAPHICS AND TEST RESULTS

Results in bold type; Detection Limits in small print
Detection Limits* = Soil=ug/kg ppb
*See Individual Limit Water=ug/L ppb

Results shown are: **Volatile Organics**
Extraction Method: **EPA 5030 Purge & Trap**
Analysis Method: **EPA 8021 GC PID**

Sample ID (LAB)	6851	
Sample ID#1(CUST)	**Soil under treatment**	
Sample ID#2(CUST)	**Grab # 4**	
Matrix	Soil	
Sampled By	**Brian J. O'Donnell**	
Date Sampled	07/25/95	01:43
Date Received	07/26/95	03:15
Date Analyzed	08/03/95	
Date Reported	08/03/95	

	Results	Det Limit*
MTBE	< DL	1.0
Benzene	**1.6**	1.0
Toluene	**1.0**	1.0
Ethylbenzene	< DL	1.0
m&p-Xylene	**2.2**	2.0
o-Xylene	**1.0**	1.0
Isopropylbenzene	< DL	1.0
n-Propylbenzene	**1.5**	1.0
1,3,5-Trimethylbenzene	< DL	1.0
1,2,4-Trimethylbenzene	< DL	1.0
sec-Butylbenzene&1,3-Dichlorobenzene	**2.0**	2.0
Isopropyltoluene	< DL	1.0
n-Butylbenzene	**1.1**	1.0
Naphthalene	< DL	1.0

* DL = Detection Limit

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Address: **11796 GENESEE STREET**
ALDEN , N.Y. 14004
Attn: **RUSS SAVAGE**

Phone 716-937-6527
FAX 716-937-6527

PO Number:
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SAMPLE DEMOGRAPHICS AND TEST RESULTS

Results in bold type; Detection Limits in small print
Detection Limits* = Soil=ug/kg ppb
*See Individual Limit Water=ug/L ppb

Results shown are: **Volatile Organics**
Extraction Method: **EPA 5030 Purge & Trap**
Analysis Method: **EPA 8021 GC PID**

Sample ID (LAB)	6852	
Sample ID#1(CUST)	**Soil under treatment**	
Sample ID#2(CUST)	**Grab # 5**	
Matrix	Soil	
Sampled By	Brian J. O'Donnell	
Date Sampled	07/25/95	01:42
Date Received	07/26/95	03:15
Date Analyzed	08/02/95	
Date Reported	08/03/95	
	Results	**Det Limit***
MTBE	< DL	1.0
Benzene	< DL	1.0
Toluene	< DL	1.0
Ethylbenzene	< DL	1.0
m&p-Xylene	< DL	2.0
o-Xylene	< DL	1.0
Isopropylbenzene	< DL	1.0
n-Propylbenzene	< DL	1.0
1,3,5-Trimethylbenzene	< DL	1.0
1,2,4-Trimethylbenzene	< DL	1.0
sec-Butylbenzene&1,3-Dichlorobenzene	< DL	2.0
Isopropyltoluene	< DL	1.0
n-Butylbenzene	< DL	1.0
Naphthalene	< DL	1.0

* DL = Detection Limit

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Address: **11796 GENESEE STREET**
ALDEN , N.Y. 14004
Attn: **RUSS SAVAGE**

Phone 716-937-6527
FAX

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Lab Director

SAMPLE DEMOGRAPHICS AND TEST RESULTS

Results in bold type; Detection Limits in small print
Detection Limits* = Soil=ug/kg ppb
*See Individual Limit Water=ug/L ppb

Results shown are: **Volatile Organics**
Extraction Method: **EPA 5030 Purge & Trap**
Analysis Method: **EPA 8021 GC PID**

Sample ID (LAB)	6790	
Sample ID#1(CUST)	**Soil Under Treatment**	
Sample ID#2(CUST)	**Composite #1**	
Matrix	Soil	
Sampled By	**Brian O'Donnell**	
Date Sampled	07/25/95	02:02
Date Received	07/27/95	09:00
Date Analyzed	07/27/95	
Date Reported	07/28/95	

	Results	Det Limit*
MTBE	**< DL**	1.0
Benzene	**< DL**	1.0
Toluene	**< DL**	1.0
Ethylbenzene	**< DL**	1.0
m&p-Xylene	**< DL**	2.0
o-Xylene	**< DL**	1.0
Isopropylbenzene	**< DL**	1.0
n-Propylbenzene	**< DL**	1.0
1,3,5-Trimethylbenzene	**< DL**	1.0
1,2,4-Trimethylbenzene	**< DL**	1.0
sec-Butylbenzene&1,3-Dichlorobenzene	**< DL**	2.0
Isopropyltoluene	**< DL**	1.0
n-Butylbenzene	**< DL**	1.0
Naphthalene	**< DL**	1.0

* DL = Detection Limit

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Address: 11796 GENESEE STREET
ALDEN , N.Y. 14004
Attn: RUSS SAVAGE

Phone 716-937-6527
FAX 716-937-6527

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SAMPLE DEMOGRAPHICS AND TEST RESULTS

Results in bold type; Detection Limits in small print
Detection Limits* = Soil=ug/kg ppb
*See Individual Limit Water=ug/L ppb

Results shown are: Volatile Organics
Extraction Method: EPA 5030 Purge & Trap
Analysis Method: EPA 8021 GC PID

Sample ID (LAB)	6853	
Sample ID#1(CUST)	Soil under treatment	
Sample ID#2(CUST)	Composite # 2	
Matrix	Soil	
Sampled By	Brian J. O'Donnell	
Date Sampled	07/25/95	01:55
Date Received	07/26/95	03:15
Date Analyzed	08/02/95	
Date Reported	08/03/95	

	Results	Det Limit*
MTBE	< DL	1.0
Benzene	< DL	1.0
Toluene	< DL	1.0
Ethylbenzene	< DL	1.0
m&p-Xylene	< DL	2.0
o-Xylene	< DL	1.0
Isopropylbenzene	< DL	1.0
n-Propylbenzene	< DL	1.0
1,3,5-Trimethylbenzene	< DL	1.0
1,2,4-Trimethylbenzene	< DL	1.0
sec-Butylbenzene&1,3-Dichlorobenzene	< DL	2.0
Isopropyltoluene	< DL	1.0
n-Butylbenzene	< DL	1.0
Naphthalene	< DL	1.0

* DL = Detection Limit

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SPECIALIZING IN ENVIRONMENTAL SOIL TESTS

NEW YORK STATE LABORATORY #11369

LABORATORY REPORT -TCLP- PAH

Cust **NATURE'S WAY, INC.**
Address: **11796 GENESEE STREET**
ALDEN , N.Y. 14004
Attn: **RUSS SAVAGE**

Phone **716-937-6527**
FAX

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Project Number:
Project Cust:
Project Site: **Turnpike Auto / Rt.5**
Date FAXED:
Lab Director

SAMPLE DEMOGRAPHICS AND TEST RESULTS

Detection Limits* = Soil=mg/kg= ppm*
*See Individual Limits

Results shown are: **PAH Compounds**
Extraction Method: **EPA 3510 Solvent Extraction**
Analysis Method: **EPA 8270 GC MS**

Sample ID (LAB)	6790	
Sample ID #1 (CUST)	**Soil Under Treatment**	
Sample ID #2 (CUST)	**Composite #1**	
Matrix	**Soil/Extract**	
Sampled By	**Brian O'Donnell**	
Date Sampled	07/25/95	02:02
Date Received	07/27/95	09:00
Date Analyzed	07/30/95	06:51
Date Reported	07/31/95	20:57

***<DL = Below Detection Limit**	**Results**	Det Limit
Naphthalene	<DL	0.011
Acenaphthylene	<DL	0.011
Acenapthene	<DL	0.011
Fluorene	<DL	0.011
Phenanthrene	<DL	0.011
Anthracene	<DL	0.011
Fluoranthene	<DL	0.011
Pyrene	<DL	0.011
Benzo(a)anthracene	<DL	0.011
Benzo(k)fluoranthene	<DL	0.011
Benzo(a)pyrene	<DL	0.011
Indeno(123-cd)pyrene	<DL	0.011
Dibenzo(a,h)anthracene	<DL	0.011
Benzo(ghi)perylene	<DL	0.011
Chrysene	<DL	0.011
Benzo(b)fluoranthene	<DL	0.011

10

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Cust NATURE'S WAY, INC.
Address: 11796 GENESEE STREET
ALDEN, N.Y. 14004
Attn: RUSS SAVAGE

Phone 716-937-6527
FAX 716-937-6527

PO Number:
Project Number:
Project Cust:
Project Site: Turnpike Auto / Rt. 5
Date FAXED:
Lab Director

SAMPLE DEMOGRAPHICS AND TEST RESULTS

Detection Limits* = Extract: mg/l= ppm*
*See Individual Limits

Results shown are: PAH Compounds
Extraction Method: EPA 3510 Solvent Extraction
Analysis Method: EPA 8270 GC MS

Sample ID (LAB)	6853	
Sample ID #1 (CUST)	Soil under treatment	
Sample ID #2 (CUST)	Composite # 2	
Matrix	Soil	
Sampled By	Brian J. O'Donnell	
Date Sampled	07/25/95	01:55
Date Received	07/26/95	03:15
Date Analyzed	08/06/95	01:51
Date Reported	08/07/95	11:28

*<DL = Below Detection Limit	Results	Det Limit
Naphthalene	< DL	0.010
Acenaphthylene	< DL	0.010
Acenapthene	< DL	0.010
Fluorene	< DL	0.010
Phenanthrene	< DL	0.010
Anthracene	< DL	0.010
Fluoranthene	< DL	0.010
Pyrene	< DL	0.010
Benzo(a)anthracene	< DL	0.010
Benzo(k)fluoranthene	< DL	0.010
Benzo(a)pyrene	< DL	0.010
Indeno(123-cd)pyrene	< DL	0.010
Dibenzo(a,h)anthracene	< DL	0.010
Benzo(ghi)perylene	< DL	0.010
Chrysene	< DL	0.010
Benzo(b)fluoranthene	< DL	0.010

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Cust NATURE'S WAY, INC.
Address: 11796 GENESEE STREET
ALDEN, N.Y. 14004
Attn: RUSS SAVAGE

Phone 716-937-6527
FAX 716-937-6527

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Project Number:
Project Cust:
Project Site: Turnpike Auto / Rt. 5
Date FAXED:
Lab Director

SAMPLE DEMOGRAPHICS AND TEST RESULTS

Detection Limits* = Extract: mg/l= ppm*
*See Individual Limits

Results shown are: PAH Compounds
Extraction Method: EPA 3510 Solvent Extraction
Analysis Method: EPA 8270 GC MS

Sample ID (LAB)	6854	
Sample ID #1 (CUST)	Soil under treatment	
Sample ID #2 (CUST)	Composite # 3	
Matrix	Soil/Extract	
Sampled By	Brian J. O'Donnell	
Date Sampled	07/25/95	02:15
Date Received	07/26/95	03:15
Date Analyzed	08/13/95	00:46
Date Reported	08/14/95	15:22

*<DL = Below Detection Limit	Results	Det Limit
Naphthalene	<DL	0.010
Acenaphthylene	<DL	0.010
Acenapthene	<DL	0.010
Fluorene	<DL	0.010
Phenanthrene	<DL	0.010
Anthracene	<DL	0.010
Fluoranthene	<DL	0.010
Pyrene	<DL	0.010
Benzo(a)anthracene	<DL	0.010
Benzo(k)fluoranthene	<DL	0.010
Benzo(a)pyrene	<DL	0.010
Indeno(123-cd)pyrene	<DL	0.010
Dibenzo(a,h)anthracene	<DL	0.010
Benzo(ghi)perylene	<DL	0.010
Chrysene	<DL	0.010
Benzo(b)fluoranthene	<DL	0.010

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Cust NATURE'S WAY, INC.
Address: 11796 GENESEE STREET
ALDEN, N.Y. 14004
Attn: RUSS SAVAGE

Phone 716-937-6527
FAX 716-937-6527

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SAMPLE DEMOGRAPHICS AND TEST RESULTS

Detection Limits* = Extract: mg/l = ppm*
*See Individual Limits

Results shown are:	PAH Compounds
Extraction Method:	EPA 3510 Solvent Extraction
Analysis Method:	EPA 8270 GC MS

Sample ID (LAB)	6855	
Sample ID #1 (CUST)	Soil under treatment	
Sample ID #2 (CUST)	Composite # 4	
Matrix	Soil/Extract	
Sampled By	Brian J. O'Donnell	
Date Sampled	07/25/95	02:20
Date Received	07/26/95	03:15
Date Analyzed	08/12/95	22:50
Date Reported	08/14/95	15:28

*<DL = Below Detection Limit	Results	Det Limit
Naphthalene	<DL	0.010
Acenaphthylene	<DL	0.010
Acenapthene	<DL	0.010
Fluorene	<DL	0.010
Phenanthrene	<DL	0.010
Anthracene	<DL	0.010
Fluoranthene	<DL	0.010
Pyrene	<DL	0.010
Benzo(a)anthracene	<DL	0.010
Benzo(k)fluoranthene	<DL	0.010
Benzo(a)pyrene	<DL	0.010
Indeno(123-cd)pyrene	<DL	0.010
Dibenzo(a,h)anthracene	<DL	0.010
Benzo(ghi)perylene	<DL	0.010
Chrysene	<DL	0.010
Benzo(b)fluoranthene	<DL	0.010

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Tel: (716) 554-3347 Tel: (800) THE LABS Tel: (800) 843-5227 FAX: (716) 554-4114

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Address: 11796 GENESEE STREET
ALDEN, N.Y. 14004
Attn: RUSS SAVAGE

Phone 716-937-6527
FAX 716-937-6527

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SAMPLE DEMOGRAPHICS AND TEST RESULTS

Detection Limits* = Extract: mg/l= ppm*
*See Individual Limits

Results shown are: PAH Compounds
Extraction Method: EPA 3510 Solvent Extraction
Analysis Method: EPA 8270 GC MS

Sample ID (LAB)	6856	
Sample ID #1 (CUST)	Soil under treatment	
Sample ID #2 (CUST)	Composite # 5	
Matrix	Soil/Extract	
Sampled By	Brian J. O'Donnell	
Date Sampled	07/25/95	02:27
Date Received	07/26/95	03:15
Date Analyzed	08/12/95	23:48
Date Reported	08/14/95	15:34

*<DL = Below Detection Limit	Results	Det Limit
Naphthalene	<DL	0.010
Acenaphthylene	<DL	0.010
Acenapthene	<DL	0.010
Fluorene	<DL	0.010
Phenanthrene	<DL	0.010
Anthracene	<DL	0.010
Fluoranthene	<DL	0.010
Pyrene	<DL	0.010
Benzo(a)anthracene	<DL	0.010
Benzo(k)fluoranthene	<DL	0.010
Benzo(a)pyrene	<DL	0.010
Indeno(123-cd)pyrene	<DL	0.010
Dibenzo(a,h)anthracene	<DL	0.010
Benzo(ghi)perylene	<DL	0.010
Chrysene	<DL	0.010
Benzo(b)fluoranthene	<DL	0.010

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Tel: (716) 554-5347 *Tel: (800) THE LABS* *Tel: (800) 843-5227* *FAX: (716) 554-4114*

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Cust **NATURE'S WAY, INC.**
Address: **11796 GENESEE STREET**
ALDEN , N.Y. 14004
Attn: **RUSS SAVAGE**

Phone **716-937-6527**
FAX

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Project Site: **Turnpike Auto / Rt.5**
Date FAXED:
Lab Director

SAMPLE DEMOGRAPHICS AND TEST RESULTS

Detection Limits* = Soil=mg/kg= ppm*
*See Individual Limits

Results shown are: **PAH Compounds**
Extraction Method: **EPA 3510 Solvent Extraction**
Analysis Method: **EPA 8270 GC MS**

Sample ID (LAB)	**6789**	
Sample ID #1 (CUST)	**Soil Under Treatment**	
Sample ID #2 (CUST)	**Grab #1**	
Matrix	**Soil/Extract**	
Sampled By	**Brian O'Donnell**	
Date Sampled	**07/25/95**	**01:50**
Date Received	**07/27/95**	**09:00**
Date Analyzed	**07/30/95**	**05:54**
Date Reported	**07/31/95**	**20:52**

***<DL = Below Detection Limit**	**Results**	Det Limit
Naphthalene	<DL	0.016
Acenaphthylene	<DL	0.016
Acenapthene	<DL	0.016
Fluorene	<DL	0.016
Phenanthrene	<DL	0.016
Anthracene	<DL	0.016
Fluoranthene	<DL	0.016
Pyrene	<DL	0.016
Benzo(a)anthracene	<DL	0.016
Benzo(k)fluoranthene	<DL	0.016
Benzo(a)pyrene	<DL	0.016
Indeno(123-cd)pyrene	<DL	0.016
Dibenzo(a,h)anthracene	<DL	0.016
Benzo(ghi)perylene	<DL	0.016
Chrysene	<DL	0.016
Benzo(b)fluoranthene	<DL	0.016

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ALDEN, N.Y. 14004
Attn: RUSS SAVAGE

Phone 716-937-6527
FAX 716-937-6527

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SAMPLE DEMOGRAPHICS AND TEST RESULTS

Detection Limits* = Soil=mg/kg= ppm*
*See Individual Limits

Results shown are: PAH Compounds
Extraction Method: EPA 3510 Solvent Extraction
Analysis Method: EPA 8270 GC MS

Sample ID (LAB)	6849	
Sample ID #1 (CUST)	Soil under treatment	
Sample ID #2 (CUST)	Grab # 2	
Matrix	Soil/Extract	
Sampled By	Brian J. O'Donnell	
Date Sampled	07/25/95	01:48
Date Received	07/26/95	03:15
Date Analyzed	08/03/95	02:51
Date Reported	08/03/95	12:21

*<DL = Below Detection Limit	Results	Det Limit
Naphthalene	<DL	0.010
Acenaphthylene	<DL	0.010
Acenapthene	<DL	0.010
Fluorene	<DL	0.010
Phenanthrene	<DL	0.010
Anthracene	<DL	0.010
Fluoranthene	<DL	0.010
Pyrene	<DL	0.010
Benzo(a)anthracene	<DL	0.010
Benzo(k)fluoranthene	<DL	0.010
Benzo(a)pyrene	<DL	0.010
Indeno(123-cd)pyrene	<DL	0.010
Dibenzo(a,h)anthracene	<DL	0.010
Benzo(ghi)perylene	<DL	0.010
Chrysene	<DL	0.010
Benzo(b)fluoranthene	<DL	0.010

10

EXPRESSLAB

PO Box 40 5611 Water Street Middlesex NY 14507

Tel: 1-716-554-5347 Tel: 1-800-THE LABS Tel: 1-800-843-5227 FAX 1-716-554-4114

WORKORDER NYS

SPECIALIZING IN ENVIRONMENTAL SOILS TESTS
NY STATE CERTIFIED LAB #11369

6789

CUSTOMER: NATURE'S WAY
ADDRESS: 11796 GENESEE ST.
CITY: ALDEN
STATE/ZIP: NY 14004
PHONE: (716) 937-6527
FAX: " "
CONTACT: RUSS SAVAGE / GREG WEBER

PO NUMBER:
PROJECT NO.:
PROJECT CUST.:
PROJECT SITE: TURNPIKE AUTO / RT. 5

SEND RESULTS: ☐ FAX ☐ EXPR MAIL
PHONE RESULTS: ☐ YES ☐ NO

SAMPLE DEMOGRAPHICS AND TESTS REQUIRED

8020 BTEX + MTDE
8021 + MTBE
503.1
TPH GASOLINE
TPH DIESEL
8240
8260 (Stars)
8260
8 RCRA METALS (DIRECT)

8270 (Stars)
625
PCB's
602
624
TOX
LEAD ONLY

FULL TCLP
TCLP LESS HERBS & PESTS
TCLP VOLATILES
TCLP SEMI-VOLATILES
8 RCRA METALS (TCLP)
HERBICIDES
PESTICIDES
REACTIVITY
COROSIVITY
FLASH POINT

(DIESEL)
(GAS OR OIL)
SUSPECT:

LIST ANALYSIS REQUIRED

SPECIAL INSTRUCTIONS:

DATE	TIME	SAMPLE DESCRIPTION / LOCATION / MATRIX	TCLP 8270 PNA's	8021 + MTBE direct				
7-25-95	1:50	SOIL UNDER TREATMENT GRAB #1	X	X				
7-25-95	1:48	SOIL UNDER TREATMENT GRAB #2	X	X				
7-25-95	1:45	SOIL UNDER TREATMENT GAB #3		X				
7-25-95	1:43	SOIL UNDER TREATMENT GRAB #4		X				
7-25-95	1:42	SOIL UNDER TREATMENT GRAB #5		X				

CHAIN OF CUSTODY RECORD

\# of SAMPLES 5 # of CONTAINERS 5
SAMPLED BY: BRIAN O'DONNELL
SIGNATURE: Brian J. O'Donnell
NAME:
DATED: / / TIME: :
HOW SENT: ☐ EXP MAIL ☐ HAND CARRY
SIGNATURE 2:
NAME 2:
DATED 2: / / TIME: :
HOW SENT 2: ☐ EXP MAIL ☐ HAND CARRY

SAMPLES RECEIVED BY: Rob Smith
SIGNATURE:
NAME:
DATE: 7/26/95 TIME: 2 15 pm
HOW REC'D.: ☐ EXP MAIL ☒ HAND CARRY
FREIGHT IN: $
LOGGED IN: 7/27/95 TIME: 9:00
SAMPLE COND.: SAMPLE TEMP.: 4°
LAB NOTES:

White-Lab, Yellow-Customer, Hard-Lab

RESULTS WHEN YOU WANT THEM

EXPRESSLAB *PO Box 40 5611 Water Street Middlesex NY 14507*

Tel: 1-716-554-5347 Tel: 1-800-THE LABS Tel: 1-800-843-5227 FAX 1-716-554-4114

WORKORDER NYS

SPECIALIZING IN ENVIRONMENTAL SOILS TESTS
NY STATE CERTIFIED LAB #11369

10370

CUSTOMER: NATURE'S WAY
ADDRESS: 1796 GENESEE ST.
CITY: ALDEN
STATE/ZIP: NY 14004
PHONE: (716) 937-6527
FAX: (716) 937-6537
CONTACT: RUSS SAVAGE / GREG WEBER

PO NUMBER:
PROJECT NO.:
PROJECT CUST.:
PROJECT SITE: TURNPIKE AUTO PARTS

SEND RESULTS: ☐ FAX ☐ EXPR MAIL
PHONE RESULTS: ☐ YES ☐ NO

SAMPLE DEMOGRAPHICS AND TESTS REQUIRED

8020 BTEX + MTDE
8021 + MTBE
503.1
TPH GASOLINE
TPH DIESEL
8240
8260 (Stars)
8260
8 RCRA METALS (DIRECT)

8270 (Stars)
625
PCB's
602
624
TOX
LEAD ONLY

FULL TCLP
TCLP LESS HERBS & PESTS
TCLP VOLATILES
TCLP SEMI-VOLATILES
8 RCRA METALS (TCLP)
HERBICIDES
PESTICIDES
REACTIVITY
COROSIVITY (DIESEL)
FLASH POINT (GAS OR OIL)
SUSPECT:

LIST ANALYSIS REQUIRED

SPECIAL INSTRUCTIONS: Please run Comp #1 + Grab #1 (adjoining Chain of Custody) and advise before proceeding

DATE	TIME	SAMPLE DESCRIPTION / LOCATION / MATRIX	TCLP 8270 PNA's	8021 + MTBE Direct				
7·25·95	2:07 pm	SOIL UNDER TREATMENT COMPOSITE #1	X	X				
7·25·95	1:55 pm	SOIL UNDER TREATMENT COMPOSITE #2	X	X				
7·25·95	2:15 pm	SOIL UNDER TREATMENT COMPOSITE #3	X					
7·25·95	2:20 pm	SOIL UNDER TREATMENT COMPOSITE #4	X					
7·25·95	2:27 pm	SOIL UNDER TREATMENT COMPOSITE #5	X					

CHAIN OF CUSTODY RECORD

of SAMPLES 5 # of CONTAINERS 5
SAMPLED BY: BRIAN O'DONNELL
SIGNATURE:
NAME:
DATED: / / TIME: :
HOW SENT: ☐ EXP MAIL ☐ HAND CARRY
SIGNATURE 2:
NAME 2:
DATED 2: / / TIME: :
HOW SENT 2: ☐ EXP MAIL ☐ HAND CARRY

SAMPLES RECEIVED BY:
SIGNATURE:
NAME:
DATE: 7/26/95 TIME: 3:[illegible]
HOW REC'D.: ☐ EXP MAIL ☒ HAND CARRY
FREIGHT IN: $
LOGGED IN: 7/27/95 TIME: 9:00
SAMPLE COND.: SAMPLE TEMP.: 4C
LAB NOTES:

White-Lab, Yellow-Customer, Hard-Lab

RESULTS WHEN YOU WANT THEM

New York State Department of Environmental Conservation
270 Michigan Avenue, Buffalo, New York 14203-2999
(716) 851-7220

Michael D. Zagata
Commissioner

July 27, 1995

Herbert Siegel, Esq.
Siegel, Kelleher and Kahn
426 Franklin Street
Buffalo, New York 14202

Dear Mr. Siegel:

SPILL NUMBER 9407600
2424 HAMBURG TURNPIKE
LACKAWANNA
ERIE COUNTY

Please provide an update on the status of the remediation at this site. Please include the schedule that the soil has been treated, tilled and sampled. Also, include all measures taken to date and to be taken to control runoff from the soil piles to Route 5.

Please provide the requested information by August 11, 1995. If you have any questions, please contact me at 716/851-7220.

Sincerely,

Francine Gallego

Francine Gallego
Environmental Engineer I

FG:lej

cc: David Siegel, Esq.
Mr. Russel Savage, Nature's Way

Spill Number 9407600

Date ______________

SPILL CONTINUATION SHEET

2424 Hamburg Tpke.

Date	Comments
7/26/95	FQ site visit. Met Nature's Way rep on site to check soils for petroleum odor. Checked 4 points to bottom of pile - found no contamin present. Nature's Way had collected samples on 7/25/95 for analysis.

Spill Number 94107600

Date

SPILL CONTINUATION SHEET

2424 Hmbg Tpke.

Date	Comments
5/3/95	Fg site visit. Soil being sprayed by Nature's Way with Nutrients.

NATURE'S WAY INC.
ENVIRONMENTAL REMEDIATION
11796 Genesee St.
Alden, N.Y. 14004
(716) 937-6527
(716) 937-6140

(1)

April 02, 1995

RECEIVED
APR 10 1995
NYSDEC-REG. 9
FOIL
___REL ___UNREL

Ms. Francine Gallego
NYSDEC, Region 9
270 Michigan Ave.
Buffalo, New York 14203-2999

Re: ESTATE OF SIEGEL PROPERTY
Spill No. 9407600
2424 HAMBURG TURNPIKE (RT 5)
LACKAWANNA, N.Y.
Submission of Schedule for Biotreatment of Soil (Work Activities)

Dear Francine,

In response to your March 16, 1995 letter, please find attached a revised copy of the biotreatment schedule, which was previously submitted within the Site Specific Biotreatment Work Plan, but which had to be modified slightly due to extended inclement (too cold) weather. As is shown by the attached schedule, we will be starting treatment work very soon. This should cover all work activities planned at the Subject Site:

1. Soil Treatment: 04/24/95 - 10/30/95
(or completion, whichever is first)
Bimonthly Treatment of Soil

2. Tilling: 05/15/95 - 10/30/95
(or completion, whichever is first)
Bimonthly as necessary

3. Interim Sampling for Contaminant Conc.:04/24/95 - 10/30/95
(or completion, whichever is first)
First Interim Soil Samples to be Taken approx. 06/24/94
Every two months if/as necessary thereafter.

Please note that we will try to notify you by telephone a day or two in advance of specific treatment applications, but that due to the nature of our work, the weather, and the need to schedule efficiently, we can't be more specific than the general intervals or timing shown above, at this time.

Sincerely,

Russel J. Savage, President
Nature's Way Inc.

cc:H. Siegel

file

New York State Department of Environmental Conservation
270 Michigan Avenue, Buffalo, New York 14203-2999
(716) 851-7220

March 16, 1995

Mr. Herbert Siegel
Siegel, Kelleher and Kahn
426 Franklin Street
Buffalo, New York 14202

Dear Mr. Siegel:

Spill Number 9407600
2424 Hamburg Turnpike
Hamburg
Erie County

Please provide your schedule of work activities at this site. As stated in your most recent correspondence, field work is to begin in April.

Please respond by March 31, 1995. If you have any questions, please call me at 851-7220.

Sincerely,

Francine Gallego

Francine Gallego
Environmental Engineer I

FG:vm

cc: David Siegel, Esquire - 300 Main Street, Buffalo
Mr. Russel J. Savage - Nature's Way, Inc.

NATURE'S WAY INC.
ENVIRONMENTAL REMEDIATION
11796 Genesee St.
Alden, N.Y. 14004
(716) 937-6527
(716) 937-6140

(1)

December 30, 1994

RECEIVED
JAN - 5 1995
NYSDEC-REG. 9
FOIL
__REL __UNREL

Ms. Francine Gallego
NYSDEC, Region 9
270 Michigan Ave.
Buffalo, New York 14203-2999

RML
FG

Re: ESTATE OF SIEGEL PROPERTY
Spill No. 9407600
2424 HAMBURG TURNPIKE (RT 5)
LACKAWANNA, N.Y.
Submission of Initial Sample Analysis for Soil To be Biotreated

Dear Francine,

Please find attached, copies of analytical test results for initial sample analysis for soil to be biotreated. The soil to be remediated was sampled on Dec. 12, 1994, upon completion of setup work.

Sincerely,

Russel J. Savage ~~President~~
Nature's Way Inc.

cc:H. Siegel

LOZIER LABORATORIES, INC.
909 CULVER ROAD
ROCHESTER, NEW YORK 14609
TEL. (716) 654-6350
FAX (716) 654-6354

NEW YORK STATE
APPROVED
ENVIRONMENTAL LABORATORY

CLIENT : NATURE'S WAY
11796 GENESEE STREET
ALDEN, N.Y. 14004

ATTN : RUSS SAVAGE

DATE REC'D. : 12/14/94
LABORATORY NO. : 94126589
REPORT DATE : 12/23/94

RE : 2424 HAMBURG TURNPIKE

SAMPLE INFORMATION

SAMPLE DATE : 12/12/94
SAMPLE TIME : 11:40 AM
NUMBER OF SAMPLES : 1

LOCATION :SOIL PILE
TYPE OF SAMPLE:SOIL COMPOSITE
SAMPLER :CLIENT

S.T.A.R.S. 8021

PARAMETER	SOIL UNDER TREATMENT COMP OF 16 GRABS	UNITS
METHYL t-BUTYL ETHER (MTBE)	15	ug/l
BENZENE	1.6	ug/l
ETHYLBENZENE	1.2	ug/l
TOLUENE	1.7	ug/l
m+p-XYLENES	4.9	ug/l
o-XYLENE	1.7	ug/l
ISOPROPYLBENZENE	<1.0	ug/l
n-PROPYLBENZENE	1.1	ug/l
p-ISOPROPYLTOLUENE	<1.0	ug/l
1,2,4-TRIMETHYLBENZENE	12	ug/l
1,3,5-TRIMETHYLBENZENE	3.4	ug/l
n-BUTYLBENZENE	3.8	ug/l
sec-BUTYLBENZENE	<1.0	ug/l
NAPHTHALENE	2.7	ug/l
a,a,a-TFT SURROGATE RECOVERIES:	122	%

Acceptable Range 60-132%

Performed by EPA Method 8021 Volatiles per NYSDEC S.T.A.R.S. Program Analyte List on a TCLP (Zero Headspace Extraction ZHE) 12/15/94.

NYSDOH LAB ID # 10390
acq

ALAN J. LAFFIN
LABORATORY DIRECTOR

LOZIER LABORATORIES, INC.
909 CULVER ROAD
ROCHESTER, NEW YORK 14609
TEL. (716) 654-6350
FAX (716) 654-6354

NEW YORK STATE
APPROVED
ENVIRONMENTAL LABORATORY

NATURE'S WAY / LAB #94126589

PAGE 2 OF 2

POLYNUCLEAR AROMATIC HYDROCARBONS

PARAMETER	SOIL UNDER TREATMENT	METHOD BLANK	UNITS
NAPHTHALENE	<1,700	<330	ug/kg
ACENAPHTHYLENE	<1,700	<330	ug/kg
ACENAPHTHENE	<1,700	<330	ug/kg
FLUORENE	<1,700	<330	ug/kg
PHENANTHRENE	<1,700	<330	ug/kg
ANTHRACENE	<1,700	<330	ug/kg
FLUORANTHENE	2,800	<330	ug/kg
PYRENE	2,100	<330	ug/kg
CHRYSENE	<1,700	<330	ug/kg
BENZO(b) FLUORANTHENE	<1,700	<330	ug/kg
BENZO(k) FLUORANTHENE	<1,700	<330	ug/kg
BENZO(a)PYRENE	<1,700	<330	ug/kg
DIBENZO(a,h) ANTHRACENE	<1,700	<330	ug/kg
INDENO(1,2,3-cd) PYRENE	<1,700	<330	ug/kg
BENZO(g,h,i) PERYLENE	<1,700	<330	ug/kg
BENZO(a) ANTHRACENE	<1,700	<330	ug/kg
SURROGATE RECOVERIES :			
NITROBENZENE-d5	52	48	%
2FLUOROBIPHENYL	102	49	%
TERPHENYL-d14	98	71	%

Analysis performed by EPA Method 8270 Base-Neutrals (PNA'S) per NYSDEC S.T.A.R.S. program memo #1 listing direct on sample on 12/16/94.

PARAMETER	SOIL UNDER TREATMENT	UNITS	METHOD NUMBER	DATE ANALYZED
IGNITABILITY	>140	°F	EPA SW 846 1010	12/14

ALAN J. LAFFIN
LABORATORY DIRECTOR

NYSDOH LAB ID # 10390
acq

LOZIER LABORATORIES

CHAIN OF CUSTODY RECORD

Client Name: Natures Way Inc
Mailing Address: 11796 Genesee St
Alden, NY 14004
Project Name: 2424 Hamburg TpK

LABORATORY NO: 6589

SAMPLE IDENTIFICATION	DATE	TIME	LOCATION	SAMPLE TYPE	ANALYSIS								NUMBER OF CONTAINERS		REMARK
					Ignitability	TCLP 8021	8270 PNA's								
Soil Under Treatment Composit of 16 Grabs	12/12/94	11:40 AM	Soil Pile	Soil Comp	X	X	X						3		

SAMPLED BY: SIGN William Kull

RELINQUISHED BY:
1 SIGN William Kull DATE 12/14/94 TIME
2 SIGN Brian Hendrich DATE 12/14/94 TIME 2:30pm
3 SIGN DATE TIME
4 SIGN DATE TIME

RECEIVED BY:
1 SIGN Brian Hendrich DATE 12/14/94 TIME 12:30pm
2 SIGN DATE TIME
3 SIGN DATE TIME
4 SIGN DATE TIME

METHOD OF SHIPMENT: Hand Delivered
SIGN Brian Hendrich

RECEIVED FOR LABORATORY BY:
SIGN DATE 12/14/94 TIME 230

Spill Number 9407600

Date

SPILL CONTINUATION SHEET

Date	Comments
12/15/94	Eq site visit. Met R. Savage on site. Berms had been set up adequately to control runoff. 4 drums sludge from UST's have to be disposed. Told Mr. Savage that a cover must be placed on the biocells to prevent ice c̄ snow runoff to the street. He agreed that he would place the plastic.

NATURE'S WAY INC.
ENVIRONMENTAL REMEDIATION

11796 Genesee St.
Alden, N.Y. 14004

(716) 937-6527
(716) 937-6140

FAX LEAD SHEET

DATE: 12/13/94

SENT TO: Ms. Francine Gallego NYS DEC

AT FAX NO.: 851-7252

NO. OF PAGES (INCLUDE LEAD SHEET) 25

FROM (SENT BY):

MESSAGE

NATURE'S WAY INC.
ENVIRONMENTAL REMEDIATION
11796 Genesee St.
Alden, N.Y. 14004
(716) 937-6527
(716) 937-6140

December 13, 1994

Ms. Francine Gallego
NYSDEC, Region 9
270 Michigan Ave.
Buffalo, New York 14203-2999

Re: ESTATE OF SIEGEL PROPERTY
Spill No. 9407600
2424 HAMBURG TURNPIKE (RT 5)
LACKAWANNA, N.Y.
Response to Your December 05, 1994 Letter

Dear Francine,

This letter is in response to your December 05, 1994 letter to Mr Herbert Siegel regarding ongoing remediation work at the subject Site. We would like to respond to the issues/items you raised in your letter as follows:

Item #1 - Analytical Test Results

As you are aware from your telcon with the Laboratory Coordinator/Supervisor of the NYSDOH ELAP accredited Environmental Testing Laboratory (Lozier Laboratories Inc.) who performed the subject testing on this project, all samples were submitted by NWI to the lab in a timely manner and initial analysis was performed by the lab within the applicable holding time allowance (14 days). Because the lab found that surrogate (QA/QC) recoveries (for sample #2 - tank pit bottom sides composite ONLY) were outside the normally acceptable range in the initial analysis, they reran the samples on 10/03/94, with QA/QC being acceptable and results being nearly identical to the first analysis, in this reanalysis. Please note that results obtained for the other two samples reported (Stained area west side, and test pit) were technically valid and acceptable on the first analysis date with regard to both QA/QC and holding time. The Laboratory, upon obtaining confirmation of the accuracy of their initial results for the one sample analysis in question, issued the report provided to you.

Please note that there was a typographical error on the original report issued by the Lab, stating the reanalysis date as 10/23/94 instead of 10/03/94. This has been corrected in the attached reissued report by the Lab. The laboratory has also provided a written explanation of the sequence of events as outlined above, reissued the corrected (typo) lab report, and stated that it is their Professional opinion that the analysis in question is accurate, reliable, and useable for its' intended purpose. Please also note that the technical issue here (holding time on the one sample) is over an exceedance of only 2 - 3 days beyond the normal technical holding time allowance, and relates to a secondary confirmatory analysis on the sample because of an effort to demonstrate QA/QC data within limits, and that results from that second analysis did not differ significantly from the original analysis. In addition, we did not request "clean closure" of this Site, nor contend that all areas are completely within DEC guidance values, as is shown by the results for the stained west side sample.

Based on this information and explanation, we feel that the data is accurate and that re-excavation or borings to obtain another sample would represent an unnecessary expense and hardship for all involved, and are respectfully requesting that the Department accept the analytical data and explanation submitted for this sample at this Site, and that no resampling be required.

Item #2 - Soil Removal from Test Pit

Soil was excavated to a depth of five to seven feet deep in this location.

Item #3 - Additional Test Pit Excavation

As per our November 14, 1994 letter to you, we planned and did notify you that we would reexcavate and sample <u>two</u> test pits in the locations you originally had requested, and which had been excavated and sampled previously during initial site work, but for which the samples were not turned in to the lab. We are assuming that this is what your item is referring to.

NATURE'S WAY INC.
ENVIRONMENTAL REMEDIATION
11796 Genesee St.
Alden, N.Y. 14004
(716) 937-6527
(716) 937-6140

December 13, 1994

Item #3 - Additional Test Pit Excavation (continued)

As is shown in that letter, we originally planned to perform this task on the 22nd of November, but were delayed to the 30th of November. Apparently, this is just a case of miscommunication or our data/letters crossing in the mail, since you did not mention anything to our office or to the NWI employees performing work on-site regarding your desire to be present during the excavation of these test pits when you made a site visit the week of the 21 - 25 of November. In any event, and as you are aware from our 12/08/94 submission, these test pits were re-excavated, as intended, on the 30th of Nov. and results showing no contamination present in these areas were submitted on 12/08/94.

Item #4 - Bioremediation Proposal

As your Department is aware, NWI has been performing bioremediation of petroleum contaminated soils for over six years at sites throughout Western and Central NY State. We have been using the same methodology that was originally approved by the Department six years ago on each of these more than 70 soil remediation Sites, all of them successsful. Never before has a more specific proposal than the one submitted to you on November 14 with regard to this Site, been requested by any DEC representative, on any Site, in any Region in which we have worked. In response to your request, please find attachment #2 Site Specific Bioremediation Proposal for this Site. Please inform us whether it is a new Department position that a site specific proposal be submitted for each Site, so that we can avoid the need for resubmissions in the future.

Item #5 - Bio Soil Pile Berming

Berming to prevent runoff apparently was not complete at the time of your visit and has since been completed.

Item #6 - Bio Pile Analysis

The soil to be remediated was sampled on Dec. 12, 1994, upon completion of setup work, for initial analysis as requested, and as planned (Nov. 14, 1994 letter), and results will be forwarded as soon as available.

NATURE'S WAY INC.
ENVIRONMENTAL REMEDIATION
11796 Genesee St.
Alden, N.Y. 14004
(716) 937-6527
(716) 937-6140

December 13, 1994

Item #6 - Bio Pile Analysis (continued)

With regard to interim (every two months) analysis during treatment, this has always been performed since required only during periods of active treatment (i.e. not during the winter Dec. - Apr., when treatment is suspended), and we assume that the requirements for this Site are the same as all others, and have planned to perform this interim sampling when active treatment begins in April. Please indicate whether this is acceptable.

Item #7 - Bacterial Product Information/MSDS's

This information is considered by us to be Company Confidential/Proprietary (trade secret), and so we request that you treat the information supplied (attachment #3) as such as Confidential, as required by Law.

Item #8 - Final Samples

We will notify NYSDEC when we are ready for final sampling.

Item #9 - Soil Conditioning Agents/pH Adjustments

No adjustments have been made as yet, since active treatment wont begin until April. If any adjustments are deemed necessary based on field testing of the soil by NWI for pH and moisture content and retention, they will consist of agricultural lime and/or Basic-H (MSDS for Basic-H also enclosed in attachment #3). Please note that this information is also considered by us to be confidential.

Item #10 - Tank Scrap Disposal Reciept

We do many tank removals (> 100 per year). We have never before been asked to provide a scap disposal reciept for the cleaned former U.S.T.'s at any Site. Therefore, we do not routinely keep them on record. Please note that these tanks were cleaned so thoroughly before disposal that we were able to use them to hold water that had been carbon filtered prior to release and which water tested clean enough to meet groundwater standards prior to release. We have asked our normal scrap recycling facility to check their records for us, but that will take some time. We will submit any reciepts, if

NATURE'S WAY INC.
ENVIRONMENTAL REMEDIATION
11796 Genesee St.
Alden, N.Y. 14004
(716) 937-6527
(716) 937-6140

December 13, 1994

Item #10 - Tank Scrap Disposal Reciept (continued)

> We will submit any reciepts, if found, as soon as we find them. Please inform us as to whether the described accounting for of the tanks for the Site is acceptable if reciepts cant be found.

In closing, please review the above responses to your 12/05/94 letter, and provide written response to our submissions. Please copy NWI (as per Mr. Siegel's request) on all correspondence to expedite the handling of any issues that may arise in the future with regard to this Site. Also, please call if you should have any questions or comments.

Sincerely,

Russel J. Savage, President
Nature's Way Inc.

NATURE'S WAY INC.
ENVIRONMENTAL REMEDIATION

11796 Genesee St.
Alden, N.Y. 14004

(716) 937-6527
(716) 937-6140

ATTACHMENT #1
LETTER FROM LOZIER LABORATORIES INC. RE ANALYTICAL TEST RESULTS

809 CULVER ROAD
ROCHESTER, NEW YORK 14609
TEL. (716) 654-6350
FAX (716) 654-6354

NEW YORK STATE
APPROVED
ENVIRONMENTAL LABORATORY

December 13, 1994

Russell Savage
Nature's Way Inc.
11796 Genesee Street
Alden, NY 14004

Re: 2424 Hamburg Turnpike
Losier Laboratory report: 94094867

Dear Mr. Savage:

Please find enclosed a revised laboratory report concerning three (3) soil samples submitted to Losier Laboratories September 22, 1994 for NYSDEC S.T.A.R.S. program 8021 Volatiles-Direct, and TCLP-EPA 8270 Base Neutrals (PAH's) for the 2424 Hamburg Turnpike site.

Ms. Francine Gallego of the NYS Department of Environmental Conservation, Region 9, called to inform me that Losier Laboratories was non-compliant with regard to the analysis performed on your sample identified "T. Pit Bottom/Sides" because EPA 8021 volatiles-direct analysis was performed outside of the proper 14-day holding time.

In my conversation with Ms. Gallego, I mentioned that this same sample was, in fact, analysed on September 23, 1994 (well within the proper 14-day holding time)but that the surrogate % recovery value for this sample was 24%.

An attempt was made to re-analyze this sample on September 27, 1994 but due to a GC-system contamination problem the data and chromatogram were un-usable. A third attempt was made to analyze the sample on October 3, 1994 (3 days outside of holding time). This time the surrogate % recovery was acceptable (45%). It was the data from this analysis run that was reported in your first laboratory report.

The only analyte of concern with this same sample was isopropylbenzene. The first analysis (9/23/94) had a positive hit of 3.8 ug/kg. The value reported outside of holding time was 2.9 ug/kg.

LOZIER LABORATORIES, INC.
909 CULVER ROAD
ROCHESTER, NEW YORK 14609
TEL. (716) 654-8350
FAX (716) 654-8354

NEW YORK STATE
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Our GC Analyst has summarized the two (2) analysis runs concerning QA/QC ie. blanks, external QC check runs, etc. for each of the two analysis dates (9/23 & 10/03/94).

Even though the analysis for "T. Pit Bottom/Sides" could be considered non-compliant it is my opinion that the data should be regarded usuable.

Compensating for surrogate recoveries on this sample would account for the following theoretical conclusion:

3.8 ug/kg / 0.24 = 15.8 ug/kg
2.9 ug/kg / 0.45 = 6.4 ug/kg
Avg. 11.1 ug/kg

At the very most this sample would possibly have had a value of 11.1 ug/kg; well below the TCLP alternative guidance value of 100 ug/kg listed for isopropylbenzene in the NYSDEC STARS memo #1 document.

Please call if you have any questions or require additional information.

Sincerely,

Dennis Ciehomski
Laboratory Coordinator

DC/js
attachment

LOZIER LABORATORIES, INC.
808 CULVER ROAD
ROCHESTER, NEW YORK 14609
TEL. (716) 654-8360
FAX (716) 654-8364

NEW YORK STATE
APPROVED
ENVIRONMENTAL LABORATORY

12/13/94

Re: Laboratory Report 94094867 Soils

9/23/94

1. Surrogate Recoveries for laboratory 94094867-1 = 56% (acceptance range for soils = 37-120%) 94094867-3 = 52%

2. D.I. H^2O Instrument Blk: 102%

3. 8021 Cal Check: Within +/- 20% of established curve for all 8021 cpds.

4. 8021 QC: Between 82 to 117% Recovery for all 8021 cpds.

5. Isopropylbenzene QC: 84% Rec. (reference check sample).

6. 8021 MS/MSD (Ext QC) within established parameters for all 8021 cpds.

10/03/94

1. Surrogate recovery for 4867-2 = 45% (acceptance range for soils = 37-120%)

2. D.I. H_2O Instrument Blk: 102.

3. 8021 Cal Check: Within +/- 20% of established curve for all 8021 cpds.

4. 8021 QC: Between 70-118% for all 8021 cpds except Napthalene (46%).

5. Isopropylbenzene QC: 95% Recovery.

6. MS/MSD (EXT QC) done on a soil (#4989) within established parameters for all 8021 cpds. (Isopropbenzene = 100%, 67%)

William T. Stork
William Stork
GC Analyst

WS/js

LOZIER LABORATORIES, INC.
909 CULVER ROAD
ROCHESTER, NEW YORK 14603
TEL. (716) 654-8360
FAX (716) 654-6354

NEW YORK STATE
APPROVED
ENVIRONMENTAL LABORATORY

CLIENT : NATURE'S WAY
11796 GENESEE STREET
ALDEN, N.Y. 14004

ATTN : RUSS SAVAGE

DATE REC'D. : 09/22/94
LABORATORY NO. : 94094867
REPORT DATE : 10/06/94

RE : 2424 HAMBURG TURNPIKE

SAMPLE INFORMATION

SAMPLE DATE : 09/16-09/20
SAMPLE TIME : 3:15-4:00 PM
NUMBER OF SAMPLES : 3

LOCATION :SEE REFERENCE
TYPE OF SAMPLE:SOILS
SAMPLER :CLIENT

S.T.A.R.S. 8021 VOLATILES - DIRECT

PARAMETER	STAINED AREA W. SIDE (1)	T. PIT BOTTOM /SIDES (2)	TEST PIT (1)	UNITS
BENZENE	17	<1.0	<1.0	ug/kg
ETHYLBENZENE	51	<1.0	<1.0	ug/kg
TOLUENE	21	<1.0	<1.0	ug/kg
m+p-XYLENES	180	<2.0	<2.0	ug/kg
o-XYLENE	8.0	<1.0	<1.0	ug/kg
ISOPROPYLBENZENE	6.2	3.8	<1.0	ug/kg
n-PROPYLBENZENE	10	<1.0	<1.0	ug/kg
p-ISOPROPYL TOLUENE	<1.0	<1.0	<1.0	ug/kg
1,2,4-TRIMETHYL BENZENE	160	<1.0	27	ug/kg
1,3,5-TRIMETHYL BENZENE	64	<1.0	<1.0	ug/kg
n-BUTYLBENZENE	55	<1.0	4.3	ug/kg
sec-BUTYLBENZENE	4.2	<1.0	<1.0	ug/kg
NAPHTHALENE	56	<1.0	20	ug/kg
METHYL t-BUTYL ETHER (MTBE)	<5.0	<5.0	<5.0	ug/kg
SURROGATE RECOVERIES:				
a,a,a-TFT	56	24	52	%

Soils Acceptance Criteria : 37-120%

(1) Analysis performed by EPA Method 8021 Volatiles per NYSDEC S.T.A.R.S. Program Analyte List Direct on samples on 09/23/94.
(2) Analysis performed on 09/23/94. Low surrogate recovery due to matrix interference.

NYSDOH LAB ID # 10390
acq

ALAN J. LAFFIN
LABORATORY DIRECTOR

LOZIER LABORATORIES, INC.
909 CULVER ROAD
ROCHESTER, NEW YORK 14609
TEL. (716) 654-6350
FAX (716) 654-6354

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NATURE'S WAY / LAB #940948667

PAGE 2 OF 3

POLYNUCLEAR AROMATIC HYDROCARBONS

PARAMETER	STAINED AREA W. SIDE	T. PIT BOTTOM /SIDES	TEST PIT	METHOD BLANK
NAPHTHALENE	<10	<10	<10	<10
ACENAPHTHYLENE	<10	<10	<10	<10
ACENAPHTHENE	<10	<10	<10	<10
FLUORENE	<10	<10	<10	<10
PHENANTHRENE	<10	<10	<10	<10
ANTHRACENE	<10	<10	<10	<10
FLUORANTHENE	<10	<10	<10	<10
PYRENE	<10	<10	<10	<10
CHRYSENE	<10	<10	<10	<10
BENZO(b) FLUORANTHENE	<10	<10	<10	<10
BENZO(k) FLUORANTHENE	<10	<10	<10	<10
BENZO(a)PYRENE	<10	<10	<10	<10
DIBENZO(a,h) ANTHRACENE	<10	<10	<10	<10
INDENO(1,2,3-cd) PYRENE	<10	<10	<10	<10
BENZO(g,h,i) PERYLENE	<10	<10	<10	<10
BENZO(a) ANTHRACENE	<10	<10	<10	<10
SURROGATE RECOVERIES :				
NITROBENZENE-d5	61	51	61	74
2FLUOROBIPHENYL	56	46	51	53
TERPHENYL	75	54	69	68

Analysis performed by EPA Method 8270 Base-Neutrals (PNA'S) per NYSDEC S.T.A.R.S. program memo #1 listing on TCLP Extractions on 09/28/94.

Results expressed in ug/l.

NYSDOH LAB ID # 10390
acq

Alan J. Laffin
ALAN J. LAFFIN
LABORATORY DIRECTOR

LOZIER LABORATORIES, INC.
909 CULVER ROAD
ROCHESTER, NEW YORK 14609
TEL. (716) 654-8350
FAX (716) 654-6354

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NATURE'S WAY / LAB #940948667
PAGE 3 OF 3

S.T.A.R.S. 8021 VOLATILES - DIRECT

PARAMETER	T. PIT BOTTOM /SIDES	UNITS
BENZENE	<1.0	ug/kg
ETHYLBENZENE	<1.0	ug/kg
TOLUENE	<1.0	ug/kg
m+p-XYLENES	<2.0	ug/kg
o-XYLENE	<1.0	ug/kg
ISOPROPYLBENZENE	2.9	ug/kg
n-PROPYLBENZENE	<1.0	ug/kg
p-ISOPROPYL TOLUENE	<1.0	ug/kg
1,2,4-TRIMETHYL BENZENE	<1.0	ug/kg
1,3,5-TRIMETHYL BENZENE	<1.0	ug/kg
n-BUTYLBENZENE	<1.0	ug/kg
sec-BUTYLBENZENE	<1.0	ug/kg
NAPHTHALENE	<1.0	ug/kg
METHYL t-BUTYL ETHER (MTBE)	<5.0	ug/kg
SURROGATE RECOVERIES:		
a,a,a-TFT	45	%
Soils Acceptance Criteria : 37-120%		

Analysis performed on 10/03/94, outside of holding time.

NYSDOH LAB ID # 10390
acq

ALAN J. LAPPIN
LABORATORY DIRECTOR

CHAIN OF CUSTODY RECORD

Name: Nature's Way Inc

Mailing Address: 11796 Genesee St

Alden, NY 14004

Project Name: 2429 HAMBURG TPK

LABORATORY NO: 4867

SAMPLE IDENTIFICATION :	DATE	TIME	LOCATION	SAMPLE TYPE	8021 + TA TYPE	TCLP 8270 PHASE	ANALYSIS						NUMBER OF CONTAINERS		REMARK
Stained Area Under Bldg	9/16/94	3:15 pm	West side	grab	X	X							1 .5l		
T.Pit Bottom/Sides Comp.	9/16/94	3:45 pm	5 Random grabs	Comp	X	X							1 .5l		
Test pit @ Foundation	9/20/94	4:00 pm	5-7' BGS Composite	comp	X	X							1 .5l		

SAMPLED BY: Pres.

SIGN

	1	2	3	4
RELINQUISHED BY:	SIGN Pres DATE 9/22/94 TIME 2:55 pm	SIGN DATE 9-22-94 TIME 3:10	SIGN DATE TIME	SIGN DATE TIME
RECEIVED BY:	SIGN DATE 9-22-94 TIME 255	SIGN DATE TIME	SIGN DATE TIME	SIGN DATE TIME

METHOD OF SHIPMENT:

SIGN

RECEIVED FOR LABORATORY BY:

SIGN DATE 9/22/94 TIME 310

NATURE'S WAY INC.
ENVIRONMENTAL REMEDIATION

11796 Genesee St.
Alden, N.Y. 14004

(716) 937-6527
(716) 937-6140

ATTACHMENT #2
BIOREMEDIATION - SITE SPECIFIC PROPOSAL W/SITE MAP

NATURE'S WAY INC.
ENVIRONMENTAL REMEDIATION

11796 Genesee St.
Alden, N.Y. 14004

(716) 937-6527
(716) 937-6140

SITE SPECIFIC BIOREMEDIATION PLAN AND SCHEDULE FOR:

2424 HAMBURG TURNPIKE SITE
LACKAWANNA, N.Y.

General Overview Of Bioremediation Process Used By NWI

Bioremediation can be considered for practical purposes to be greatly enhanced natural biodegradation. Biodegradation is the metabolic breakdown of hydrocarbons by numerous types of organisms resulting in end products such as carbon dioxide, water, and organic matter (cell protoplasm,etc.). These metabolic processes are often referred to as mineralization. The bioremediation processes employed by NWI use commercial formulations of specially selected and adapted naturally occurring bacteria, and create an environment which is favorable for growth, reproduction, and hydrocarbon utilization. This is accomplished through supplementation and management of various factors including bacterial population, moisture content, oxygen availability, nutrient loading, and pH. A bacterial suspension is applied to supplement indigenous soil bacteria. Soil to be remediated must be aerated (oxygenated) by one of several means to support degradation. Essential nutrients, in the form of commercial agricultural type fertilizers, must be supplied in the correct ratios to support degradation. Soil conditioning agents such as biodegradable surfactants are also applied as needed to maintain contaminant substrate availability and to act as a cosubstrate and volatilization inhibitor.

NATURE'S WAY INC.
ENVIRONMENTAL REMEDIATION

11796 Genesee St.
Alden, N.Y. 14004

(716) 937-6527
(716) 937-6140

Description Of Above Ground Bioremediation Methodology

The following is a summary and schedule of events and actions to take place during the decontamination procedure.

I. Soil Preparation For Treatment: 11/14 - 12/01/94

The contaminated soil will be placed on a plastic liner having it's perimeter supported by hay bales or clean soil to form a burm, to prevent runoff. The contaminated soil is generally spread over a large enough area to provide a maximum depth of 2 feet.

II. Soil Treatment: 03/15/95 - 09/30/95
(or completion, whichever is first)

Bimonthly Treatment of Soil:

Soil conditioning agents and nutrient supplements, in the form of dilute commercial agricultural type fertilizers (Peters 20-20-20 w/soluble trace elements), necessary pH adjustments (agricultural lime), and biodegradable surfactants (Basic-H), will be applied when active soil treatment is begun in March or April 1995, and as a part of bi-monthly bacterial suspension applications.

Large quantities (approx. 9000 gal/application) of an ubiquitous hydrocarbon utilizing bacteria, Bacillus subtilus, will be produced and applied in a liquid suspension on a Bimonthly basis to the soil on site, within the manufacturer's recommended guidelines. The bacteria used are a proven, safe, commercial formulation similar to that used in wastewater treatment for over 20 years. Product information and MSDS sheets on these bacterial formulations is attached and is considered confidential. The bacteria will be applied to the soil using a high volume, medium pressure pumping system.

NATURE'S WAY INC.
ENVIRONMENTAL REMEDIATION
11796 Genesee St.
Alden, N.Y. 14004
(716) 937-6527
(716) 937-6140

Description Of Above Ground Bioremediation Methodology (cont.)

III. Tilling: 03/15/95 - 09/30/95
(or completion, whichever is first)

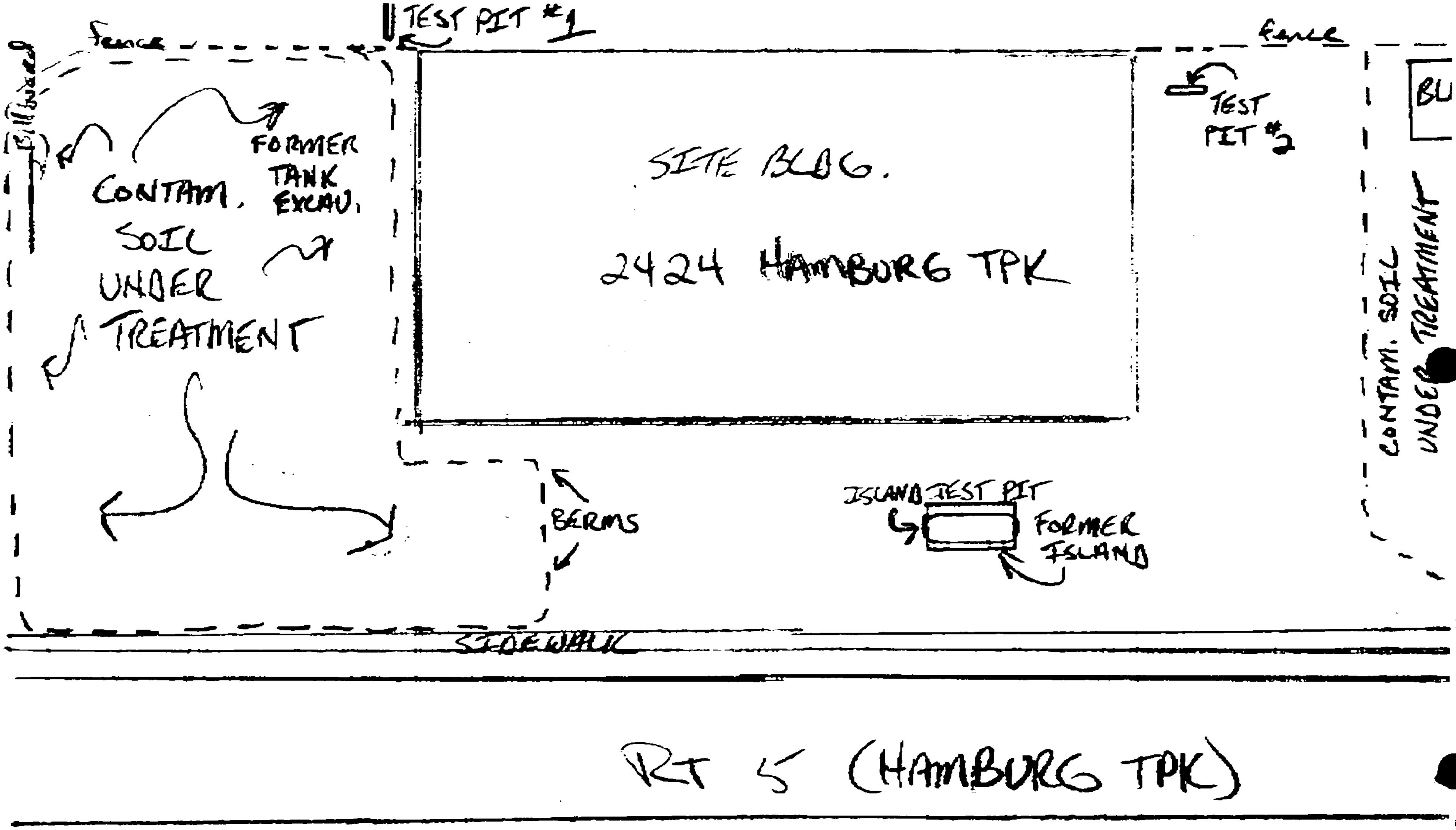
Oxygenation (tilling) of the soil under treatment to support degradation will be performed bimonthly with construction equipment (backhoe).

IV. Interim Sampling for Contaminant Concentration:
03/15/95 - 09/30/95
(or completion, whichever is first)

In addition, we will monitor contamination levels through soil sample analysis every two months during periods of active treatment throughout the treatment period to monitor performance. All data will be made available to the NYSDEC as it becomes available.

V. Final Sampling: Est. 06/01/95 - 09/30/95

When NWI has determined by field observsations/instrumentation that cleanliness criteria probably have been achieved, we will notify NYSDEC that we are ready to perform final sampling/analysis, and will submit required analytical results to confirm completion of decontamination. Upon confirmation of attainment of cleanup criteria, we will consider site operations complete and provide a written report, analytical data, and request for closure of the project to the NYSDEC within 30 days of completion.



SITE MAP - 2424 HAMBURG T
NOT TO SCALE: INFORMATIONA
PURPOSES ONLY

NATURE'S WAY INC.
ENVIRONMENTAL REMEDIATION

11796 Genesee St.
Alden, N.Y. 14004

(716) 937-6527
(716) 937-6140

ATTACHMENT #3
TREATMENT AGENT INFO & MSDS'S

NATURE'S WAY INC.
ENVIRONMENTAL REMEDIATION
11796 Genesee St.
Alden, N.Y. 14004
(716) 937-6527
(716) 937-6140

December 7, 1994

RECEIVED
DEC 13 1994
N.Y.S. DEPT. OF
ENVIRONMENTAL CONSERVATION
REGION 9

RM J
FG

Ms. Francine Gallego
NYSDEC, Region 9
270 Michigan Ave.
Buffalo, New York 14203-2999

Re: ESTATE OF SIEGEL PROPERTY
2424 HAMBURG TURNPIKE (RT 5)
LACKAWANNA, N.Y.
Submission of Test Pit Groundwater Analytical Testing Results;

9407600

Dear Francine,

As you know, we recently (November 30, 1994) excavated two test pits as follows:

> Test Pit #1 - just beyond the fence at the rear (south side) of the tank excavation area; and
>
> Test Pit #2 - at the far (southwest corner) end of the Site building;

to demonstrate that the residual contamination known to be present beneath the Site building did not extend in other directions beyond the building, and was not of significant impact to soils/groundwater outside the building footprint. We obtained a water sample (shallow groundwater-probable trapped surficial drainage water was encountered in both test pits at approx.7.0' - 8.0' BGS) from each test pit to confirm whether contamination above DEC guidelines existed in these areas.

Field observations (appearance, odor, sheen) gave no indication of the presence of contamination. Analytical results (Attachment #1) for the groundwater samples obtained from these two test pits confirm that no petroleum contamination is detectable in these test pit areas, and also confirming that any residual contamination at the Site appears isxolated to the inaccessible area beneath the building.

December 7, 1994

As stated in our previous letter/report (Nov. 14, 1994), while contaminant levels slightly above NYSDEC guidlines were found to remain in an area of soils beneath the Site Building, it is our opinion based on the available data that it is unlikely that the contaminated soils present in that area are impacting soils/groundwater areas outside the building footprint, and constitute no significant present or potential impact to the Environment.

Also as previously reported, it was determined that no utilities or likely sensitive receptors are present in/around the residually affected area (beneath building) of the Site, and that groundwater is not being used as a source of potable water in the area in general. This would make the presence of residual soils contamination in this area unlikely to pose a significant threat of impact to any sensitive receptors, or the Environment in general.

Based on these findings, and since analytical results from the two test pits confirm that these areas meet DEC guidelines, it is our opinion and conclusion that:

> The small area of isolated low level residual soils contamination present beneath the Site building poses no significant threat of adverse impact to the overall quality of the environment or potential receptors.

Based on the above data and conclusions, and upon submission of the above-referenced confirmatory test pit analyses, please respond with a letter (address above - copy NWI) assigning a formal designation of "Inactive" to this spill Site, and stating that no further work (other than completion of soil decontamination) will be required at this time. Please call if you should have any questions or comments.

Sincerely,

Russel J. Savage, President
Nature's Way Inc.

NATURE'S WAY INC.
ENVIRONMENTAL REMEDIATION
11796 Genesee St.
Alden, N.Y. 14004
(716) 937-6527
(716) 937-6140

ATTACHMENT #1
TEST PIT ANALYTICAL RESULTS

EXPRESSLAB PO Box 40 5611 Water Street Middlesex NY 14507

Tel: (716) 554-5347 Tel: (800) THE LABS Tel: (800) 843-5227 FAX: (716) 554-4114

SPECIALIZING IN ENVIRONMENTAL SOIL TESTS
NEW YORK STATE LABORATORY #11369

LABORATORY REPORT - METHOD 8021

Cust	**Nature's Way Inc.**
Address:	**11796 Genesee Street** **Alden, NY 14004**
Attn:	**Russ Savage**
Phone	716-937-6527
FAX	716-937-6527

PO Number:	**2424 Hamburg Tpk.**
Project Number:	
Project Cust:	
Project Site:	**Turnpike Auto**
Date FAXED:	
Lab Director	

SAMPLE DEMOGRAPHICS AND TEST RESULTS

Results in bold type; Detection Limits in small print

Detection Limits* = Soil=ug/kg ppb

*See Individual Limit Water=ug/L ppb

Results shown are: **Volatile Organics**

Extraction Method: **EPA 5030 Purge & Trap**

Analysis Method: **EPA 8021 GC PID**

Sample ID (LAB)	5476	
Sample ID#1(CUST)	**Test pit #1**	
Sample ID#2CUST)	**rear of building**	
Matrix	**Water**	
Sampled By	**Charlie Say**	
Date Sampled	**11/30/94**	11:30
Date Received	**12/03/94**	10:00
Date Analyzed	**12/07/94**	
Date Reported	**12/07/94**	

	Results	Det Limit*
MTBE	**< DL**	1.0
Benzene	**< DL**	1.0
Toluene	**< DL**	1.0
Ethylbenzene	**< DL**	1.0
m&p-Xylene	**< DL**	2.0
o-Xylene	**< DL**	1.0
Isopropylbenzene	**< DL**	1.0
n-Propylbenzene	**< DL**	1.0
1,3,5-Trimethylbenzene	**< DL**	1.0
1,2,4-Trimethylbenzene	**< DL**	1.0
sec-Butylbenzene	**< DL**	1.0
Isopropyltoluene	**< DL**	1.0
n-Butylbenzene	**< DL**	1.0
Naphthalene	**< DL**	1.0

* DL = Detection Limit

EXPRESSLAB
PO Box 40 5611 Water Street Middlesex NY 14507
Tel: (716) 554-5347 *Tel: (800) THE LABS* *Tel: (800) 843-5227* *FAX: (716) 554-4114*
SPECIALIZING IN ENVIRONMENTAL SOIL TESTS
NEW YORK STATE LABORATORY #11369

LABORATORY REPORT - 8270 Water

Cust Nature's Way Inc.
Address: 11796 Genesee Street
Alden, NY 14004
Attn: Russ Savage

Phone 716-937-6527
FAX 716-937-6527

PO Number: 2424 Hamburg Tpk.
Project Number:
Project Cust:
Project Site: Turnpike Auto
Date FAXED:
Lab Director

SAMPLE DEMOGRAPHICS AND TEST RESULTS

Detection Limits* = Water=ug/L= ppb*
*See Individual Limits

Results shown are: EPA 8270 Water
Extraction Method: EPA 3550 Solvent Extraction
Analysis Method: EPA 8270 GC MS Ion Trap

Sample ID (LAB)	5476	
Sample ID #1 (CUST)	Test pit #1	
Sample ID #2 (CUST)	rear of building	
Matrix	Water	
Sampled By	Charlie Say	
Date Sampled	11/30/94	11:30
Date Received	12/03/94	10:00
Date Analyzed	12/06/94	09:42
Date Reported	12/06/94	17:53

* ND = Below Detection Limit	Results	Det Limit
Naphthalene	<DL	5.0
Acenaphthylene	<DL	5.0
Acenapthene	<DL	5.0
Fluorene	<DL	5.0
Phenanthrene	<DL	5.0
Anthracene	<DL	5.0
Fluoranthene	<DL	5.0
Pyrene	<DL	5.0
Benzo(a)anthracene	<DL	5.0
Benzo(k)fluoranthene	<DL	6.0
Benzo(a)pyrene	<DL	5.0
Indeno(123-cd)pyrene	<DL	5.0
Dibenzo(a,h)anthracene	<DL	5.0
Benzo(ghi)perylene	<DL	5.0
Benzo(b)fluoranthene	<DL	6.0
Chrysene	<DL	5.0

EXPRESSLAB *PO Box 40 5611 Water Street Middlesex NY 14507*

Tel: (716) 554-5347 *Tel: (800) THE LABS* *Tel: (800) 843-5227* *FAX: (716) 554-4114*

SPECIALIZING IN ENVIRONMENTAL SOIL TESTS
NEW YORK STATE LABORATORY #11369

LABORATORY REPORT - METHOD 8021

Cust **Nature's Way Inc.**
Address: **11796 Genesee Street**
Alden, NY 14004
Attn: **Russ Savage**

Phone 716-937-6527
FAX 716-937-6527

PO Number: **2424 Hamburg Tpk.**
Project Number:
Project Cust:
Project Site: **Turnpike Auto**
Date FAXED:
Lab Director

SAMPLE DEMOGRAPHICS AND TEST RESULTS

Results in bold type; Detection Limits in small print
Detection Limits* = Soil=ug/kg ppb
*See Individual Limit Water=ug/L ppb

Results shown are: **Volatile Organics**
Extraction Method: **EPA 5030 Purge & Trap**
Analysis Method: **EPA 8021 GC PID**

Sample ID (LAB)	**5477**	
Sample ID#1(CUST)	**Test pit #2**	
Sample ID#2CUST)	**West end of building**	
Matrix	Water	
Sampled By	**Charlie Say**	
Date Sampled	**11/30/94**	01:10
Date Received	**12/03/94**	10:00
Date Analyzed	**12/07/94**	
Date Reported	**12/07/94**	

	Results	Det Limit*
MTBE	**< DL**	1.0
Benzene	**< DL**	1.0
Toluene	**< DL**	1.0
Ethylbenzene	**< DL**	1.0
m&p-Xylene	**< DL**	2.0
o-Xylene	**< DL**	1.0
Isopropylbenzene	**< DL**	1.0
n-Propylbenzene	**< DL**	1.0
1,3,5-Trimethylbenzene	**< DL**	1.0
1,2,4-Trimethylbenzene	**< DL**	1.0
sec-Butylbenzene	**< DL**	1.0
Isopropyltoluene	**< DL**	1.0
n-Butylbenzene	**< DL**	1.0
Naphthalene	**< DL**	1.0

* DL = Detection Limit

EXPRESSLAB
PO Box 40 5611 Water Street Middlesex NY 14507
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SPECIALIZING IN ENVIRONMENTAL SOIL TESTS
NEW YORK STATE LABORATORY #11369

LABORATORY REPORT - 8270 Water

Cust	Nature's Way Inc.
Address:	11796 Genesee Street Alden, NY 14004
Attn:	Russ Savage
Phone	716-937-6527
FAX	716-937-6527

PO Number:	2424 Hamburg Tpk.
Project Number:	
Project Cust:	
Project Site:	Turnpike Auto
Date FAXED:	
Lab Director	

SAMPLE DEMOGRAPHICS AND TEST RESULTS

Detection Limits* = Water=ug/L=ppb*
*See Individual Limits

Results shown are: EPA 8270 Water
Extraction Method: EPA 3550 Solvent Extraction
Analysis Method: EPA 8270 GC MS Ion Trap

Sample ID (LAB)	5477	
Sample ID #1 (CUST)	Test pit #2	
Sample ID #2 (CUST)	West end of building	
Matrix	Water	
Sampled By	Charlie Say	
Date Sampled	11/30/94	01:10
Date Received	12/03/94	10:00
Date Analyzed	12/06/94	10:37
Date Reported	12/06/94	18:11

* ND = Below Detection Limit	Results	Det Limit
Naphthalene	<DL	5.0
Acenaphthylene	<DL	5.0
Acenapthene	<DL	5.0
Fluorene	<DL	5.0
Phenanthrene	<DL	5.0
Anthracene	<DL	5.0
Fluoranthene	<DL	5.0
Pyrene	<DL	5.0
Benzo(a)anthracene	<DL	5.0
Benzo(k)fluoranthene	<DL	5.0
Benzo(a)pyrene	<DL	5.0
Indeno(123-cd)pyrene	<DL	5.0
Dibenzo(a,h)anthracene	<DL	5.0
Benzo(ghi)perylene	<DL	5.0
Benzo(b)fluoranthene	<DL	5.0
Chrysene	<DL	5.0

5476

5477 MANILLA COPY

40 5611 Water Stree Middlesex NY 14507

Tel: 1-800-843-5227 FAX 1-716-554-4114

WORKORDER NYS

SPECIALIZING IN ENVIRONMENTAL SOILS TESTS
NY STATE CERTIFIED LAB #11369

12-7-94

CUSTOMER: Natures Way Inc
ADDRESS: 11796 Genesee St.
CITY: Alden, NY 14004
STATE/ZIP: NY, 14004
PHONE: (716) 937-6527
FAX: same
CONTACT: R. Savage

PO NUMBER: 2424 Hamburg Tpk
PROJECT NO.:
PROJECT CUST.:
PROJECT SITE: Turnpike Auto
SEND RESULTS: ☒ FAX ☐ EXPR MAIL
PHONE RESULTS: ☐ YES ☐ NO

SAMPLE DEMOGRAPHICS AND TESTS REQUIRED

8020 BTEX + MTDE
8021 + MTBE
503.1
TPH GASOLINE
TPH DIESEL
8240
8260 (Stars)
8260
8 RCRA METALS (DIRECT)

8270 (Stars)
625
PCB's
602
624
TOX
LEAD ONLY

FULL TCLP
TCLP LESS HERBS & PESTS
TCLP VOLATILES
TCLP SEMI-VOLATILES
8 RCRA METALS (TCLP)
HERBICIDES
PESTICIDES
REACTIVITY
COROSIVITY
FLASH POINT

(DIESEL)
(GAS OR OIL)
SUSPECT:

SPECIAL INSTRUCTIONS: 7/Day T/A

LIST ANALYSIS REQUIRED

DATE	TIME	SAMPLE DESCRIPTION / LOCATION / MATRIX	8021 + MTBE	8270 PNA's Only				
11/30/94	11:30	Test Pit #1, Rear of Bldg. (Water)	X	X				
11/30/94	1:10	Test Pit #2, West End of Bldg (Water)	X	X				

CHAIN OF CUSTODY RECORD

\# of SAMPLES 2 # of CONTAINERS 6 [illegible] -40 mls/Water
SAMPLED BY: Charlie Say
SIGNATURE: Charlie Say Jr
NAME: Charlie Say
DATED: 12/2/94 TIME: 12:15 PM
HOW SENT: ☒ EXP MAIL ☐ HAND CARRY
SIGNATURE 2: Charlie Say Jr
NAME 2:
DATED 2: / / TIME: :
HOW SENT 2: ☐ EXP MAIL ☐ HAND CARRY

SAMPLES RECEIVED BY: E. [illegible] Lab
SIGNATURE: [illegible]
NAME:
DATE: 12/3/94 TIME: 10:00
HOW REC'D.: ☒ EXP MAIL ☐ HAND CARRY
FREIGHT IN: $
LOGGED IN: 12/5/94 TIME: 9:55
SAMPLE COND.: SAMPLE TEMP.: 50.9
LAB NOTES:

White-Lab, Yellow-Customer, Hard-Lab

RESULTS WHEN YOU WANT THEM

file

New York State Department of Environmental Conservation
270 Michigan Avenue, Buffalo, New York 14203-2999
(716) 851-7220

Langdon Marsh
Commissioner

December 8, 1994

Mr. Herbert M. Siegel
Siegel, Kelleher and Kahn
426 Franklin Street
Buffalo, New York 14202

Dear Mr. Siegel:

Spill Number 9407600
2424 Hamburg Turnpike
Lackawanna
Erie County

I am in receipt of a letter dated December 7, 1994 submitted by Mr. Russel Savage of Nature's Way, Inc., regarding the above-noted site. Mr. Savage states that I was aware of the excavation of two test pits on November 30, 1994 on site. I was not notified that work was to occur on the site. I specifically requested that I be made aware of the date and time of this activity. Please provide a site map with locations of the test pits on it.

You must cover the soil to prevent rain and snow build up in the contaminated soil pile. This will limit contaminated water runoff from the soil pile. In addition, you must design a collection and treatment system for the runoff water.

As I stated in my recent letter, NYSDEC cannot change the status of a site until all remediation has been completed. Please respond to this letter by December 21, 1994. If you have any questions, please call me at 851-7220.

Sincerely,

Francine Gallego

Francine Gallego
Environmental Engineer I

FG:vm

cc: David A. Siegel, Esquire

Spill Number 9407600

Date

SPILL CONTINUATION SHEET

Date	Comments
12/7/94	John Balcarczyk with the City of Lackawanna called to complain about 2424 Hamburg Tpke site. He said contractor never got required permits for UST Removal from City. He said citizens have been complaining about storage of soils at site. He wants NYSDEC to require removal of soils. ☎ 827-6425.

FAX

New York State
Department of Environmental Conservation
Spill Response Unit
Region 9

DATE: 12/6/94

NUMBER OF PAGES BEING SENT ~~7~~ 3 (INCLUDING THIS ONE)

SENT TO: JOHN BALCARCZYK
CITY OF LACKAWANNA

FAX NUMBER: 827 ~~6425~~ 6665

FROM: MARK SORGI NYS-DEC

MESSAGE: LAST LETTER RE: 2424 HAMBURG TURNPIKE.

CONFIDENTIALITY NOTICE

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
270 MICHIGAN AVENUE,BUFFALO, NEW YORK 14203-2999
(716)851-7220, TELECOPY(716)851-7252

JOHN B.
827-6425


BANTAM
BANTAM


Ashland
Pest Control
COUNTER ATTACK.
GAS

New York State Department of Environmental Conservation
270 Michigan Avenue, Buffalo, New York 14203-2999
(716) 851-7220

Langdon Marsh
Commissioner

Post-It™ brand fax transmittal memo 7671 | # of pages ▸ 2

To JOHN BALCARCZYK	From MARK SORGI
Co. CITY OF LACK.	Co. NYS-DEC
Dept.	Phone # 851-7220
Fax # 827-6665	Fax #

Mr. Herbert M. Siegel
Siegel, Kelleher and Kahn
426 Franklin Street
Buffalo, New York 14202

Dear Mr. Siegel:

Spill Number 9407600
2424 Hamburg Turnpike
Lackawanna
Erie County

On November 25, 1994, I received your bioremediation proposal for the contaminated soils from the above-referenced site from Mr. Russel Savage of Nature's Way, Inc. The following lists items which must be addressed before NYSDEC can approve this system:

1. Analytical - The holding times for EPA Method 8021 analysis on the stained west side, tank pit bottom and sides and test pit have been exceeded. You must collect another sample in these areas and have them analyzed for EPA Method 8021. Please contact me prior to collection so that I can be present.

2. A test pit was dug five to seven feet deep at the former island on site. Was soil excavated to this depth? If not, further remediation may be necessary.

3. Another test pit will be dug behind the property. Please provide the date this will occur so that NYSDEC can be present. Please provide a site map to show buildings where excavations occurred and where soil is to be treated.

4. The bioremediation proposal submitted is not specific to this site. There is also no schedule for work completion, i.e. when will bioremediation begin for nutrient/bacteria addition, tilling and sampling schedule. Please provide a site-specific proposal along with a schedule.

5. The bioremediation soil pile on site has no berming to prevent runoff. An adequate berm must be placed as currently, there is runoff being generated from the contaminated soils discharging to the street and adjacent properties.

6. Per my September 6, 1994 letter, you must analyze the soil every two months for EPA Methods 8021 and 8270. You must also analyze the soil for TCLP benzene, ignitability, 8021 and 8270 before treatment begins. All analytical data must be submitted to this office.

7. Please submit product information and MSDS on these bacterial formulations.

8. Please notify NYSDEC when you plan on collecting final samples so that we can be present.

9. What soil conditioning agents and pH adjustments were added to this soil and how was this determined?

10. You must submit a scrap disposal receipt for the underground storage tanks removed from the site.

NYSDEC is unable to submit a letter changing the status of this site as the remediation has not been completed. Please submit the above-requested information by December 19, 1994. If you should have any questions, please call me at 851-7220.

Sincerely,

Francine Gallego

Francine Gallego
Environmental Engineer I

FG:vm

cc: David Siegel, Esquire
300 Main St.
Bflo, NY 14202

FAX

New York State
Department of Environmental Conservation
Spill Response Unit
Region 9

DATE: 12/2/94

NUMBER OF PAGES BEING SENT 4 (INCLUDING THIS ONE)

SENT TO: Margaret Prevost
ELAP Approval Program

FAX NUMBER: (318) 485-3565

FROM: Francine Gallego - NYSDEC

MESSAGE: Attached is a laboratory report which exceeds the holding time for EPA Method 8021. Please call me with any questions

CONFIDENTIALITY NOTICE

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
270 MICHIGAN AVENUE,BUFFALO, NEW YORK 14203-2999
(716)851-7220, TELECOPY(716)851-7252

Spill Number 9407600

Date

SPILL CONTINUATION SHEET

Date	Comments
11/22/94	F/U site visit. Part of the contaminated soil placed in bio beds. Majority of soil not set up. Soil blowing off site. No berming to prevent runoff.

9407600 11/22/94

Contamin soil

9407600 11/22/94

Biopile

9407600 11/22/94

Biopile

9407600 11/22/94

Biopile

Spill Number 94072600

Date

SPILL CONTINUATION SHEET

Date	Comments
11/21/94	FG reviewed submitted package for 24241 Hamburg Turnpike. The dates of analysis were not written on the data report. According to Dennis Cichowski, with Lozier, the holding times may have been exceeded. He is to check on this specifically and get back to me. A test pit was dug 5'-7' at the former pump island - It is not clear if the excavation was that deep. -Will be excavating another test pit for sampling behind property on 11/22/94. -Generic Biorem proposal submitted, not specific, no schedule for site work

Siegel, Kelleher & Kahn

Attorneys and Counselors at Law

426 Franklin Street · Buffalo, New York 14202
(716) 881-5800 · FAX: (716) 885-3369
Toll Free: 1-(800)-888-5288

HERBERT M. SIEGEL
J. MICHAEL KELLEHER
MARK G. HIRSCHORN
DENNIS ALAN KAHN
BRIAN R. WELSH
STEVEN G. WISEMAN
TIMOTHY G. O'CONNELL
KENNETH I. FEINMAN
ROSS T. RUNFOLA
ROBERT D. STEINHAUS
STEPHEN R. SILVERSTEIN
ANGELO J. MORINELLO
JOAN WARREN
KENNETH A. OLENA
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JEFFREY S. KRAJEWSKI
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ELISSA M. BANAS

J. KEVIN LAUMER
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JAMES D. BELL
DAVID PAUL LOSI
WILLIAM N. NAPLES
• LEROI C. JOHNSON
EMIL J. CAPPELLI
R. THOMAS BURGASSER, P.C.
RICHARD F. DALY
•• NEIL W. SIEGEL
ROBERT RIORDAN
STEPHEN GASSMAN
BARRY FISHER
••• FLORENCE M. FASS
OF COUNSEL

• ALSO ADMITTED IN PA.
•• ADMITTED IN OHIO
••• ALSO ADMITTED IN VT.

November 17, 1994

RECEIVED

NOV 2 1 1994

N.Y.S. DEPT. OF
ENVIRONMENTAL CONSERVATION
REGION 9

RM

PB

Russel J. Savage
President
NATURE'S WAY INC.
11796 Genesee Street
Alden, NY 14004

Re: Spill Number 9407600
2424 Hamburg Turnpike

Dear Russ:

After speaking to you this morning in regard to your removal of the soil, I had a telephone call from Ms. Francine Gallego of the NYS Department of Environmental Conservation wherein she informed me she had not received the analytical data from the site, the bioremedial proposal or the workplan and schedule.

She informed me she had spoken to you two days ago and that the soil was going to be removed that day. That has not occurred.

I would appreciate your immediate cooperation with Ms. Gallego in this matter. We want an expedient resolution to this situation.

Very truly yours,

SIEGEL, KELLEHER & KAHN

Herbert M. Siegel

HMS/jag

cc: Francine Gallego, NYS DEC
David A. Siegel, Esq.

New York State Department of Environmental Conservation
270 Michigan Avenue, Buffalo, New York 14203-2999
(716) 851-7220

Langdon Marsh
Commissioner

November 17, 1994

Mr. Herbert Siegel
426 Franklin Street
Buffalo, New York 14202

Dear Mr. Siegel:

Spill Number 9407600
2424 Hamburg Turnpike
Lackawanna
Erie County

You have exceeded the 60-day limit for on-site storage of petroleum-contaminated soils at this site. Soils were generated on September 2, 1994. Therefore, you must dispose of the soils.

Please arrange for disposal as soon as possible. You must submit all analytical data generated to date as further remediation may be necessary. Please submit your disposal receipt for the soil by December 2, 1994.

If you have any questions, please contact me at 851-7220.

Sincerely,

Francine Gallego

Francine Gallego
Environmental Engineer I

FG:vm

NATURE'S WAY INC.
ENVIRONMENTAL REMEDIATION
11796 Genesee St.
Alden, N.Y. 14004

(716) 937-6527
(716) 937-6140

(1)

RM ✓

FG ✓

9407600

RECEIVED
NOV 25 1994
NYSDEC-REG. 9
FOIL
___REL ___UNREL

November 14, 1994

Ms. Francine Gallego
NYSDEC, Region 9
270 Michigan Ave.
Buffalo, New York 14203-2999

Re: ESTATE OF SIEGEL PROPERTY
2424 HAMBURG TURNPIKE (RT 5)
LACKAWANNA, N.Y.
Submission of Excavation and Contaminated Soil Analytical Testing Results;
Submission of Associated Site Risk Assessment;
Request for Inactive Site Designation;

Dear Francine,

As you know, we recently (September 6 - 22, 1994) removed three 10K U.S.T.'s and associated piping, island, and contaminated soils at the above Site. Enclosed please find analytical test results for the bottom/sides of the tank excavation at the above Site after the removal of all accessible contaminated soils. As is shown by the attached analytical data, and based on all presently available data and observations, the Site meets current NYSDEC cleanliness guidelines with some minor exceptions as detailed below. The following is a description of Work Performed, Site characteristics, Conclusions, and Risk Assessment, based on these conclusions for the subject Site:

As is shown by the attached analytical (Attachment #1), with the exception of a stained area of soil beneath the building located On-Site, contaminant levels in the tank excavation are below present NYSDEC guidelines, indicating that all accessible soils in the tank excavation area of concern were removed (approx. 475 cubic yards total).

Also, as you are aware, and as per your request, we removed the former dispensing island at the Site, and excavated a test pit directly beneath this area, and obtained a soil sample to confirm whether contamination above DEC guidelines existed in this potential area of concern. Although field observations (dark soil/slag appearance and very slight odor) indicated that this area might be contaminated, analytical results (Attachment #1) show that contaminant levels in these soils were below DEC guideline values.

NATURE'S WAY INC.
ENVIRONMENTAL REMEDIATION
11796 Genesee St.
Alden, N.Y. 14004
(716) 937-6527
(716) 937-6140

November 14, 1994

In addition, as per your request since not all contaminated soils were accessible for removal (a stained area remained beneath the Site building), we excavated two other test pits:

one just beyond the fence at the rear (south side) of the tank excavation area; and

one at the far (southwest corner) end of the Site building;

to demonstrate that the residual contamination known to be present beneath the Site building did not extend in other directions beyond the building, and was not of significant impact to soils/groundwater outside the building footprint. We obtained a water sample (shallow groundwater-probable trapped surficial drainage water was encountered in both test pits at approx. 8.0' BGS) from each test pit to confirm whether contamination above DEC guidelines existed in these areas. Field observations (appearance, odor, sheen) gave no indication of the presence of contamination. Unfortunately, it was only recently discovered that analytical results for these two samples were not available, due to miscommunication regarding sample identification, resulting in the holding times (1 week) for these samples to be exceeded. In order to complete analytical confirmation of Site conditions at these two locations, we will re-excavate and resample these two test pits on Nov. 22, 1994, and we will forward results of analysis as soon as they become available (1 week - Expresslabs).

Nature's Way Inc. has been contracted to bioremediate the contaminated soil, and setup for treatment will begin the week of Nov. 14 - 18, 1994. The soil will undergo active above-ground biological treatment as per standard operating procedure for bioremedaition of petroleum contaminated soils (copy of SOP attached - Attachment #2), weather permitting, until such time that NYSDEC criteria for permanent retention/reuse of the soil as fill on-site are met, with interim sampling during treatment if/as required.

November 14, 1994

We will sample the soil under treatment as per standard operating procedures for TCLP Benzene, ignitability, 8021, and 8270, and results will be forwarded as soon as they are available.

Also enclosed for your records are analytical results for post-carbon filtration/aeration treated contaminated water previously contained in the tank excavation and placed in above ground holding tanks until treatment and analysis for discharge was completed (Attachment #3 - please note that these results were submitted previously prior to surface discharge of the subject treated water - copy of letter attached). These results show that NYSDEC groundwater limits were met prior to surface discharge of the treated water.

While contaminant levels slightly above NYSDEC guidlines were found to remain in an area of soils beneath the Site Building, it is our opinion that it is unlikely that the contaminated soils present in that area are impacting soils/groundwater areas outside the building footprint, and constitute no significant present or potential impact to the Environment.

It was determined that no utilities or likely sensitive receptors are present in/around the residually affected area (beneath building) of the Site, and that groundwater is not being used as a source of potable water in the area in general. This would make the presence of residual soils contamination in this area unlikely to pose a significant threat of impact to any sensitive receptors, or the Environment in general.

Based on these findings, and assuming that analytical results from the two test pits confirm that these areas meet DEC guidelines, it is our opinion and conclusion that:

> The small area of isolated low level residual soils contamination present beneath the Site building poses no significant threat of adverse impact to the overall quality of the environment or potential receptors.

NATURE'S WAY INC.
ENVIRONMENTAL REMEDIATION
11796 Genesee St.
Alden, N.Y. 14004
(716) 937-6527
(716) 937-6140

November 14, 1994

Based on the above data and conclusions, and upon submission of the above-referenced confirmatory test pit analyses, please respond with a letter (address above - copy NWI) assigning a formal designation of "Inactive" to this spill Site, and stating that no further work (other than completion of soil decontamination) will be required at this time. Please call if you should have any questions or comments.

Sincerely,

Russel J. Savage, President
Nature's Way Inc.

NATURE'S WAY INC.
ENVIRONMENTAL REMEDIATION
11796 Genesee St.
Alden, N.Y. 14004
(716) 937-6527
(716) 937-6140

ATTACHMENT #1
EXCAVATION AND DISPENSING ISLAND TEST PIT ANALYTICAL RESULTS

LOZIER LABORATORIES, INC.
909 CULVER ROAD
ROCHESTER, NEW YORK 14609
TEL. (716) 654-6350
FAX (716) 654-6354

NEW YORK STATE
APPROVED
ENVIRONMENTAL LABORATORY

CLIENT : NATURE'S WAY
11796 GENESEE STREET
ALDEN, N.Y. 14004

ATTN : RUSS SAVAGE

DATE REC'D. : 09/22/94
LABORATORY NO. : 94094867
REPORT DATE : 10/06/94

RE : 2424 HAMBURG TURNPIKE

SAMPLE INFORMATION

SAMPLE DATE : 09/16-09/20
SAMPLE TIME : 3:15-4:00 PM
NUMBER OF SAMPLES : 3
LOCATION :SEE REFERENCE
TYPE OF SAMPLE:SOILS
SAMPLER :CLIENT

S.T.A.R.S. 8021 - DIRECT

PARAMETER	STAINED AREA W. SIDE	T. PIT BOTTOM /SIDES	TEST PIT	UNITS
BENZENE	17	<1.0	<1.0	ug/kg
ETHYLBENZENE	51	<1.0	<1.0	ug/kg
TOLUENE	21	<1.0	<1.0	ug/kg
m+p-XYLENES	180	<2.0	<2.0	ug/kg
o-XYLENE	8.0	<1.0	<1.0	ug/kg
ISOPROPYLBENZENE	6.2	2.9	<1.0	ug/kg
n-PROPYLBENZENE	10	<1.0	<1.0	ug/kg
p-ISOPROPYL TOLUENE	<1.0	<1.0	<1.0	ug/kg
1,2,4-TRIMETHYL BENZENE	160	<1.0	27	ug/kg
1,3,5-TRIMETHYL BENZENE	64	<1.0	<1.0	ug/kg
n-BUTYLBENZENE	55	<1.0	4.3	ug/kg
sec-BUTYLBENZENE	4.2	<1.0	<1.0	ug/kg
NAPHTHALENE	56	<1.0	20	ug/kg
METHYL t-BUTYL ETHER (MTBE)	<5.0	<5.0	<5.0	ug/kg

Performed by EPA Method 8021 Volatiles per NYSDEC S.T.A.R.S. Program Analyte List Direct on samples on 09/23 and 10/23/94.

ALAN J. LAFFIN
LABORATORY DIRECTOR

NYSDOH LAB ID # 10390
acq

LOZIER LABORATORIES, INC.
909 CULVER ROAD
ROCHESTER, NEW YORK 14609
TEL. (716) 654-6350
FAX (716) 654-6354

NEW YORK STATE
APPROVED
ENVIRONMENTAL LABORATORY

NATURE'S WAY / LAB #940948667

PAGE 2 OF 2

POLYNUCLEAR AROMATIC HYDROCARBONS

PARAMETER	STAINED AREA W. SIDE	T. PIT BOTTOM /SIDES	TEST PIT	METHOD BLANK
NAPHTHALENE	<10	<10	<10	<10
ACENAPHTHYLENE	<10	<10	<10	<10
ACENAPHTHENE	<10	<10	<10	<10
FLUORENE	<10	<10	<10	<10
PHENANTHRENE	<10	<10	<10	<10
ANTHRACENE	<10	<10	<10	<10
FLUORANTHENE	<10	<10	<10	<10
PYRENE	<10	<10	<10	<10
CHRYSENE	<10	<10	<10	<10
BENZO(b) FLUORANTHENE	<10	<10	<10	<10
BENZO(k) FLUORANTHENE	<10	<10	<10	<10
BENZO(a)PYRENE	<10	<10	<10	<10
DIBENZO(a,h) ANTHRACENE	<10	<10	<10	<10
INDENO(1,2,3-cd) PYRENE	<10	<10	<10	<10
BENZO(g,h,i) PERYLENE	<10	<10	<10	<10
BENZO(a) ANTHRACENE	<10	<10	<10	<10
SURROGATE RECOVERIES :				
NITROBENZENE-d5	61	51	61	74
2FLUOROBIPHENYL	56	46	51	63
TERPHENYL	75	54	69	68

Analysis performed by EPA Method 8270 Base-Neutrals (PNA'S) per NYSDEC S.T.A.R.S. program memo #1 listing on TCLP Extractions on 09/28/94.

Results expressed in ug/l.

NYSDOH LAB ID # 10390
acq

ALAN J. LAFFIN
LABORATORY DIRECTOR

CHAIN OF CUSTODY RECORD

Name: Natures Way Inc.

Mailing Address: 11796 Genesee St
Alden, NY 14004

Project Name: 2424 HAMBURG TPK

LABORATORY NO: 4867

STARS

SAMPLE IDENTIFICATION	DATE	TIME	LOCATION	SAMPLE TYPE	8021 + MTBE	TCLP 8270 PNAS	ANALYSIS						NUMBER OF CONTAINERS		REMARK
Stained Area Under Bldg	9/16/94	3:15 pm	West side	grab	X	X							1 .5l		
T.Pit Bottom/Sides Comp.	9/16/94	3:15 pm	5 Random grabs	Comp	X	X							1 .5l		
Test pit @ Former Ts.	9/20/94	4:00 pm	5-7' BGS Composite	comp	X	X							1 .5l		

SAMPLED BY: Pres.
SIGN

RELINQUISHED BY:

1 Pres.
SIGN
DATE 9/22/94 TIME 2:55 pm

2 SIGN
DATE 9-22-94 TIME 3:10

3 SIGN
DATE TIME

4 SIGN
DATE TIME

RECEIVED BY:

1 SIGN
DATE 9-22-94 TIME 2:55

2 SIGN
DATE TIME

3 SIGN
DATE TIME

4 SIGN
DATE TIME

METHOD OF SHIPMENT:

SIGN

RECEIVED FOR LABORATORY BY:

SIGN
DATE 9/22/94 TIME 310

NATURE'S WAY INC.
ENVIRONMENTAL REMEDIATION
11796 Genesee St.
Alden, N.Y. 14004
(716) 937-6527
(716) 937-6140

ATTACHMENT #2
BIOREMEDIATION - DESCRIPTION
STANDARD OPERATING PROCEDURE

NATURE'S WAY INC.
ENVIRONMENTAL REMEDIATION
11796 Genesee St.
Alden, N.Y. 14004
(716) 937-6527
(716) 937-6140

General Overview Of Bioremediation Process Used By NWI

Bioremediation can be considered for practical purposes to be greatly enhanced natural biodegradation. Biodegradation is the metabolic breakdown of hydrocarbons by numerous types of organisms resulting in end products such as carbon dioxide, water, and organic matter (cell protoplasm,etc.). These metabolic processes are often referred to as mineralization. The bioremediation processes employed by NWI use commercial formulations of specially selected and adapted naturally occurring bacteria, and create an environment which is favorable for growth, reproduction, and hydrocarbon utilization. This is accomplished through supplementation and management of various factors including bacterial population, moisture content, oxygen availability, nutrient loading, and pH. A bacterial suspension is applied to supplement indigenous soil bacteria. Soil to be remediated must be aerated (oxygenated) by one of several means to support degradation. Essential nutrients, in the form of commercial agricultural type fertilizers, must be supplied in the correct ratios to support degradation. Soil conditioning agents such as biodegradable surfactants are also applied as needed to maintain contaminant substrate availability and to act as a cosubstrate and volatilization inhibitor.

NATURE'S WAY INC.
ENVIRONMENTAL REMEDIATION
11796 Genesee St.
Alden, N.Y. 14004
(716) 937-6527
(716) 937-6140

General Description Of Above Ground Bioremediation Methodology

The following is a brief summary of events and actions to take place during the decontamination procedure.

Soil Preparation For Treatment

The contaminated soil is placed on a plastic liner having it's perimeter supported by hay bales or clean soil to form a burm, to prevent runoff. The contaminated soil is generally spread over a large enough area to provide a maximum depth of 2 feet. Soil conditioning agents and nutrient supplements, in the form of commercial agricultural type fertilizers, necessary pH adjustments, and biodegradable surfactants, will be applied as the soil is placed in the treatment area, or shortly thereafter.

Soil Treatment

Large quantities of an ubiquitous hydrocarbon utilizing bacteria, Bacillus subtilus, will be produced and applied in a liquid suspension to the conditioned soil on site, within the manufacturer's recommended guidelines. The bacteria used are a proven, safe, commercial formulation similar to that used in wastewater treatment for over 20 years. Product information and MSDS sheets on these bacterial formulations is available upon request and confidentiality agreement completion. The bacteria will be applied to the soil using a high volume, high pressure pumping system. Bacterial/nutrient application frequency will initially be at least weekly and then as dictated by the results of soil analysis by NWI. Proper and necessary oxygenation of the contaminated soil to support degradation will be performed as required, usually one to two times per month with standard agricultural type tilling equipment or construction equipment. In addition, we will monitor soil conditions, bacterial populations and contamination levels through soil sample analysis throughout the treatment period to monitor performance. All data will be made available to the NYSDEC for a particular site upon request.

When NWI has determined by field observsations/instrumentation that cleanliness criteria probably have been achieved, we will perform final sampling/analysis, and notify the appropriate NYSDEC representative of results, and will submit required analytical results to confirm completion of decontamination. Upon confirmation of attainment of cleanup criteria, we will consider site operations complete and provide a written report, analytical data, and request for closure of the project to the NYSDEC within 30 days of completion. If necessary, provisions can be made for a written interim report(s) to be issued.

NATURE'S WAY INC.
ENVIRONMENTAL REMEDIATION
11796 Genesee St.
Alden, N.Y. 14004
(716) 937-6527
(716) 937-6140

ATTACHMENT #3
TREATED WATER PRE-DISCHARGE ANALYTICAL

NATURE'S WAY INC.
ENVIRONMENTAL REMEDIATION
11796 Genesee St.
Alden, N.Y. 14004
(716) 937-6527
(716) 937-6140

September 21, 1994

Ms. Francine Gallego/Mr. Sal Calandra
NYSDEC Region 9
270 Michigan Ave.
Buffalo, New York 14203-2999

Re: Herb Siegel Property
2424 Hamburg Tpk.
Lackawanna, N.Y.
Carbon Filtered H2O in 6000 gal Holding Tank - Request for Permission to Release/Discharge

Dear Francine/Sal,

I am forwarding analyses of carbon filtered water contained in the 6000 gal. cap. Holding Tank at the above site, which show the water to be clean/free of petroleum components. We would like to discharge this filtered water to surface immediately, so that we can continue with Site work, so I am faxing this information, and will call to confirm your agreement with the proposed discharge.

Sincerely,

Russel J. Savage, President
Nature's Way Inc.

LOZIER LABORATORIES, INC.
909 CULVER ROAD
ROCHESTER, NEW YORK 14609
TEL. (716) 654-6350
FAX (716) 654-6354

NEW YORK STATE
APPROVED
ENVIRONMENTAL LABORATORY

CLIENT : NATURE'S WAY, INC
11796 GENESEE STREET
ALDEN, N.Y. 14004

ATTN : RUSS SAVAGE

DATE REC'D. : 09/16/94
LABORATORY NO. : 94094705
REPORT DATE : 09/20/94

RE : 2424 HAMBURG TPK

SAMPLE INFORMATION

SAMPLE DATE : 09/14/94
SAMPLE TIME : 4:15 PM
NUMBER OF SAMPLES : 1

LOCATION :HOLDING TANK
TYPE OF SAMPLE:WASTEWATER
SAMPLER :CLIENT

PURGEABLE AROMATICS

PARAMETER	FILTERED WATER IN TANK	UNITS
BENZENE	<1.0	ug/l
TOLUENE	<1.0	ug/l
CHLOROBENZENE	<1.0	ug/l
ETHYLBENZENE	<1.0	ug/l
m+p-XYLENES	<2.0	ug/l
o-XYLENE	<1.0	ug/l
o-DICHLOROBENZENE	<1.0	ug/l
m-DICHLOROBENZENE	<1.0	ug/l
p-DICHLOROBENZENE	<1.0	ug/l
METHYL t-BUTYL ETHER (MTBE)	<5.0	ug/l
a,a,a-TRIFLUOROTOLUENE: INTERNAL STANDARD % RECOVERY	100	%

Performed by EPA Method 602 Purgeable Aromatics on 09/16/94.

NYSDOH LAB ID # 10390
acq

ALAN J. LAFFIN
LABORATORY DIRECTOR

LOZIER LABORATORIES, INC.
909 CULVER ROAD
ROCHESTER, NEW YORK 14609
TEL. (716) 654-6350
FAX (716) 654-6354

NEW YORK STATE
APPROVED
ENVIRONMENTAL LABORATORY

NATURE'S WAY / LAB #94094705

PAGE 2 OF 2

POLYNUCLEAR AROMATIC HYDROCARBONS

PARAMETER	FILTERED WATER IN TANK	UNITS
NAPHTHALENE	<10	ug/l
ACENAPHTHYLENE	<10	ug/l
ACENAPHTHENE	<10	ug/l
FLUORENE	<10	ug/l
PHENANTHRENE	<10	ug/l
ANTHRACENE	<10	ug/l
FLUORANTHENE	<10	ug/l
PYRENE	<10	ug/l
CHRYSENE	<10	ug/l
BENZO(b) FLUORANTHENE	<10	ug/l
BENZO(k) FLUORANTHENE	<10	ug/l
BENZO(a)PYRENE	<10	ug/l
DIBENZO(a,h) ANTHRACENE	<10	ug/l
INDENO(1,2,3-cd) PYRENE	<10	ug/l
BENZO(g,h,i) PERYLENE	<10	ug/l
BENZO(a) ANTHRACENE	<10	ug/l
SURROGATE RECOVERIES :		
NITROBENZENE-d5	72	%
2FLUOROBIPHENYL	62	%
TERPHENYL	58	%

Analysis performed by EPA Method 8270 Base-Neutrals (PNA'S) on 09/16/94.

NYSDOH LAB ID # 10390
acq

ALAN J. LAFFIN
LABORATORY DIRECTOR

LOZIER LABORATORIES

CHAIN OF CUSTODY RECORD

Client Name: Nature's Way Inc.

Mailing Address: 11796 Genesee St
Alden, NY 14004

Project Name: 2424 Hamburg TpK

LABORATORY NO: 4705

SAMPLE IDENTIFICATION	DATE	TIME	LOCATION	SAMPLE TYPE	602+MTBE	8270			ANALYSIS				NUMBER OF CONTAINERS		REMARK
Filtered H_2O in Holding Tank	9/14/94	4:15 PM	Holding Tank	Grab									2-VOA 1-1.0 liter		24 HR RUSH [illegible]/A

RUSH

SAMPLED BY: Charlie Sanz
SIGN

	1	2	3	4
RELINQUISHED BY:	SIGN DATE 9/16/94 TIME 914am	SIGN DATE TIME	SIGN DATE TIME	SIGN DATE TIME
RECEIVED BY:	SIGN DATE TIME	SIGN DATE TIME	SIGN DATE TIME	SIGN DATE TIME

METHOD OF SHIPMENT:

SIGN

RECEIVED FOR LABORATORY BY:

SIGN DATE 9/16/94 TIME 914am

LOZIER LABORATORIES, INC.
909 CULVER ROAD
ROCHESTER, NEW YORK 14609
TEL. (716) 654-6350
FAX (716) 654-6354

NEW YORK STATE
APPROVED
ENVIRONMENTAL LABORATORY

CLIENT : NATURE'S WAY, INC
11796 GENESEE STREET
ALDEN, N.Y. 14004

ATTN : RUSS SAVAGE

DATE REC'D. : 09/12/94
LABORATORY NO. : 94094607
REPORT DATE : 09/15/94

RE : 2424 HAMBURG TPK

SAMPLE INFORMATION

SAMPLE DATE : 09/09/94
SAMPLE TIME : 3:00 PM
NUMBER OF SAMPLES : 1

LOCATION :10K HOLDING TANK
TYPE OF SAMPLE:WASTEWATER
SAMPLER :CLIENT

PURGEABLE AROMATICS

PARAMETER	FILTERED WATER IN TANK	UNITS
BENZENE	<1.0	ug/l
TOLUENE	<1.0	ug/l
CHLOROBENZENE	<1.0	ug/l
ETHYLBENZENE	<1.0	ug/l
m+p-XYLENES	<2.0	ug/l
o-XYLENE	<1.0	ug/l
o-DICHLOROBENZENE	<1.0	ug/l
m-DICHLOROBENZENE	<1.0	ug/l
p-DICHLOROBENZENE	<1.0	ug/l
METHYL t-BUTYL ETHER (MTBE)	<5.0	ug/l
a,a,a-TRIFLUOROTOLUENE: INTERNAL STANDARD % RECOVERY	90	%

Performed by EPA Method 602 Purgeable Aromatics on 09/13/94.

NYSDOH LAB ID # 10390
acq

ALAN J. LAFFIN
LABORATORY DIRECTOR

NATURE'S WAY / LAB #94094607

PAGE 2 OF 2

POLYNUCLEAR AROMATIC HYDROCARBONS

PARAMETER	FILTERED WATER IN TANK	METHOD BLANK
NAPHTHALENE	<10	<10
ACENAPHTHYLENE	<10	<10
ACENAPHTHENE	<10	<10
FLUORENE	<10	<10
PHENANTHRENE	<10	<10
ANTHRACENE	<10	<10
FLUORANTHENE	<10	<10
PYRENE	<10	<10
CHRYSENE	<10	<10
BENZO(b) FLUORANTHENE	<10	<10
BENZO(k) FLUORANTHENE	<10	<10
BENZO(a)PYRENE	<10	<10
DIBENZO(a,h) ANTHRACENE	<10	<10
INDENO(1,2,3-cd) PYRENE	<10	<10
BENZO(g,h,i) PERYLENE	<10	<10
BENZO(a) ANTHRACENE	<10	<10
SURROGATE RECOVERIES :		
NITROBENZENE-d5	46 %	57 %
2FLUOROBIPHENYL	46 %	57 %
TERPHENYL	47 %	70 %

Analysis performed by EPA Method 8270 Base-Neutrals (PNA'S) on 09/13/94.

Results expressed in ug/l unless otherwise indicated.

NYSDOH LAB ID # 10390
acq

ALAN J. LAFFIN
LABORATORY DIRECTOR

LOZIER LABORATORIES

CHAIN OF CUSTODY RECORD

Client Name: NATURE'S WAY

Mailing Address:

LABORATORY NO: 4607

Project Name: 2424 HAMBURG TPK

SAMPLE IDENTIFICATION	DATE	TIME	LOCATION	SAMPLE TYPE	602+MTBE	8270-PNA'S	ANALYSIS						NUMBER OF CONTAINERS		REMARK
Filtered H_2O in 10K Holding TANK	9/9/94	3:00pm	10K Holding TANK	grab	X	X							2 VOA 1 1.0l		RUSH 24 HR T/A

SAMPLED BY:

SIGN

RELINQUISHED BY:

1 SIGN

DATE 9/12/94 TIME 2:00pm

2 SIGN

DATE TIME

3 SIGN

DATE TIME

4 SIGN

DATE TIME

RECEIVED BY:

1 SIGN

DATE TIME

2 SIGN

DATE TIME

3 SIGN

DATE TIME

4 SIGN

DATE TIME

METHOD OF SHIPMENT:

SIGN

RECEIVED FOR LABORATORY BY:

SIGN DATE 9/12/94 TIME 2:00 pm

New York State Department of Environmental Conservation
270 Michigan Avenue, Buffalo, New York 14203-2999
(716) 851-7220

Langdon Marsh
Commissioner

October 3, 1994

Mr. Herbert M. Siegel
Siegel, Kelleher & Kahn
426 Franklin Street
Buffalo, New York 14202

Dear Mr. Siegel:

Spill #9407600
2424 Hamburg Turnpike
Lackawanna
Erie County

Per our recent telephone conversation, you have been considering bioremediating the contaminated soils from the 2424 Hamburg Turnpike Lackawanna site. Please review my September 6, 1994 letter to you requesting sampling, a contract and a workplan if bioremediation is chosen. In addition, you must provide a copy of your lease agreement with the adjacent property owner regarding treatment of contaminated soils to this Office.

Per 6NYCRR Part 360-1.7(b)(4), on-site storage of excavated petroleum contaminated soils is limited to 60 days. The work plan submitted must include the items noted on the attached corrective action plan checklist. If the workplan is not submitted and treatment does not begin within 60 days, then you must dispose of the soil.

Please respond to this letter by October 14, 1994 with your workplan and schedule. If you have any questions, please contact me at 716/851-7220.

Sincerely,

Francine Gallego

Francine Gallego
Environmental Engineer I

FG:vam

NATURE'S WAY INC.
ENVIRONMENTAL REMEDIATION
11796 Genesee St.
Alden, N.Y. 14004
(716) 937-6527
(716) 937-6140

FAX LEAD SHEET

DATE: 9/21/94

SENT TO: Francine Gallego / Sal Calandra

AT FAX NO.: 851-7252

NO. OF PAGES (INCLUDE LEAD SHEET) 6

FROM (SENT BY): Greg Weber

MESSAGE

NATURE'S WAY INC.
ENVIRONMENTAL REMEDIATION
11796 Genesee St.
Alden, N.Y. 14004
(716) 937-6527
(716) 937-6140

September 21, 1994

Ms. Francine Gallego/Mr. Sal Calandra
NYSDEC Region 9
270 Michigan Ave.
Buffalo, New York 14203-2999

Re: Herb Siegel Property
2424 Hamburg Tpk.
Lackawanna, N.Y.
Carbon Filtered H20 in 6000 gal Holding Tank - Request for Permission to Release/Discharge

Dear Francine/Sal,

I am forwarding analyses of carbon filtered water contained in the 6000 gal. cap. Holding Tank at the above site, which show the water to be clean/free of petroleum components. We would like to discharge this filtered water to surface immediately, so that we can continue with site work, so I am faxing this information, and will call to confirm your agreement with the proposed discharge.

Sincerely,

Russel J. Savage, President
Nature's Way Inc.

LOZIER LABORATORIES, INC.
309 CULVER ROAD
ROCHESTER, NEW YORK 14609
TEL. (716) 654-8360
FAX (716) 654-6364

NEW YORK STATE
APPROVED
ENVIRONMENTAL LABORATOR

CLIENT : NATURE'S WAY
11796 GENESEE STREET
ALDEN, N.Y. 14004

ATTN : RUSS SAVAGE

DATE REC'D. : 9/16/94
LABORATORY NO. : 9409 4705
REPORT DATE : 9/20/94

RE : 2424 Hamburg TPK

SAMPLE INFORMATION

SAMPLE DATE : 9/14/94
SAMPLE TIME : 4:15 pm
NUMBER OF SAMPLES : 1

LOCATION : Holding Tank
TYPE OF SAMPLE : W.W.
SAMPLER : client

LABORATORY REPORT

602 NTDA

8270 INA

See att
9/19/94

STRICTLY ORGANICS

OHA

NYSDOH LAB ID # 10390
acq

ALAN J. LAFFIN
LABORATORY DIRECTOR

602

CLIENT:

Nature's Way, Inc.
11796 Genesee St.
Alden, New York 14004

Laboratory No.: 94094705
Date Received: 9/16/94
Report Date: 9-20-94

Sample Information

Sample Date: 9/14/94
Sample Time: 415 pm
No. of Samples: 1
Location: Holding Tank 2424 [illegible] TPK
Type of Sample: ww
Sampler: Client
Date Analyzed: 9/16, 9/19
Analyst: [illegible]

Parameter	Units	Filtered water in Holding Tank				
Benzene	ug/l	<1.0				
Toluene						
Chlorobenzene						
Ethylbenzene		↓				
m- o- p- Total Xylenes	m+p o	<2.0 <1.0				
o-Dichlorobenzene						
m-Dichlorobenzene						
p-Dichlorobenzene		↓				
MTBE	↓	<5.0				
a,a,a-Trifluorotoluene Internal Standard % Recovery	%	100				

ANALYSIS PERFORMED BY EPA METHOD 602 PURGEABLE AROMATICS

STARS T[illegible]-8270-PNA

CLIENT: Nature's Way

Re: 2424 Hamburg TPK

Sample Identification	matrix	Date Extracted	Date Analyzed
Filtered water in H.T.	W.W.	9/16	9/16

Laboratory No. 94094705

Date Received: 9/14/94

Report Date 9-20-94

Date Sampled: 9/14/94

Time Sampled: 9 am

Sampler: Client

Concentration ug/l.

CAS NO.	COMPOUND	DL	A	B	C	D	E
91-20-3	Naphthalene	*10*	<10				
208-96-8	Acenaphthylene	*10*	<10				
83-32-9	Acenaphthene	*10*	<10				
86-73-7	Fluorene	*10*	<10				
85-01-8	Phenanthrene	*10*	<10				
120-12-7	Anthracene	*10*	<10				
206-44-0	Fluoranthene	*10*	<10				
129-00-0	Pyrene	*10*	<10				
218-01-09	Chrysene	*10*	<10				
205-99-2	Benzo(b)fluoranthene	*10*	<10				
207-08-09	Benzo(k)fluoranthene	*10*	<10				
50-32-8	Benzo(a)pyrene	*10*	<10				
53-70-3	Dibenzo(a,h)anthracene	*10*	<10				
193-39-5	Indeno(1,2,3-cd)pyrene	*10*	<10				
191-24-2	Benzo(g,h,i)perylene	*10*	<10				
56-55-3	Benzo(a) anthracene	*10*	<10				
	Volume Extracted (L):		1 L				
	Final Volume (mls)		1 ml				
	Dilution Factor:						
SURR. RECOV.		QC					
	Nitrobenzene-d5	(38-114)	73				
	2Fluorobiphenyl	(43-116)	62				
	Terphenyl	(33-141)	58				

Analysis PERFORMED BY EPA 8270 BASE NEUTRALS (PNA's)

LOZIER LABORATORIES

CHAIN OF CUSTODY RECORD

Client Name: Nature's Way En
Mailing Address: 11756 Genesee S
Alden, NY 1400

LABORATORY NO: 4705

Project Name: 2424 Hamburg Tp

SAMPLE IDENTIFICATION	DATE	TIME	LOCATION	SAMPLE TYPE	602+MTBE	8270	ANALYSIS						NUMBER OF CONTAINERS		REMARK
Filtered H_2O in	9/14/94	4:15 AM	Holding Tank	Grab									2-VOA		24 H
Holding Tank													1- Liter		RUSH T/

RUSH

SAMPLED BY:
SIGN

RELINQUISHED BY:	1 SIGN DATE 9/16/94 TIME 914a	2 SIGN DATE TIME	3 SIGN DATE TIME	4 SIGN DATE TIME
RECEIVED BY:	1 SIGN DATE TIME	2 SIGN DATE TIME	3 SIGN DATE TIME	4 SIGN DATE TIME

METHOD OF SHIPMENT:
SIGN

RECEIVED FOR LABORATORY BY:
SIGN DATE 9/16/94 TIME 914am

NATURE'S WAY INC.
ENVIRONMENTAL REMEDIATION
11796 Genesee St.
Alden, N.Y. 14004
(716) 937-6527
(716) 937-6140

FAX LEAD SHEET # 9407600

DATE: 9/15/94 F6

SENT TO: SAL CALANDRA / Anyone left in Spills!

AT FAX NO.: 851-7252

NO. OF PAGES (INCLUDE LEAD SHEET) ~~4~~ 6

FROM (SENT BY): Russ Savage

MESSAGE Please call to confirm O/K AS SOON AS POSSIBLE Thanks, Russ

NATURE'S WAY INC.
ENVIRONMENTAL REMEDIATION

11796 Genesee St.
Alden, N.Y. 14004

(716) 937-6527
(716) 937-6140

September 15, 1994

Ms. Francine Gallego/Mr. Sal Calandra
NYSDEC Region 9
270 Michigan Ave.
Buffalo, New York 14203-2999

Re: Herb Siegel Property
2424 Hamburg Tpk.
Lackawanna, N.Y.
Carbon Filtered H2O in 10000 gal UST - Request for Permission to Release/Discharge

Dear Francine/Sal,

I am forwarding analyses of carbon filtered water contained in the 10000 gal. cap. UST at the above site, which show the water to be clean/free of petroleum components. We would like to discharge this filtered water to surface immediately, so that we can continue with site work, so I am faxing this information, and will call to confirm your agreement with the proposed discharge.

Sincerely,

Russel J. Savage, President
Nature's Way Inc.

LOZIER LABORATORIES, INC.
300 CULVER ROAD
ROCHESTER, NEW YORK 14609
TEL. (716) 654-8350
FAX (716) 654-8354

NEW YORK STATE
APPROVED
ENVIRONMENTAL LABORA

CLIENT : NATURE'S WAY
11796 GENESEE STREET
ALDEN, N.Y. 14004

ATTN : RUSS SAVAGE

DATE REC'D : 9/12/94
LABORATORY NO. : 9409 4007
REPORT DATE :
RE. : 2424 Hamburg TPK

SAMPLE INFORMATION

SAMPLE DATE : 9/4/94
SAMPLE TIME : 3 pm
NUMBER OF SAMPLES : 1
LOCATION : 10 K Holding Tank ~~2424 Hamburg TPK~~
TYPE OF SAMPLE : w.w.
SAMPLER : client

LABORATORY REPORT

#1 - 001 MTBE *

8270 - PNA's

9/13/94

RUSH - 24 HR

Due 9/13/94

*to lab

STRICTLY ORGANICS

NYSDOH LAB ID # 10390
aoq

ALAN J. LAFFIN
LABORATORY DIRECTOR

Nature's Way, Inc.
11796 Genesee St.
Alden, New York 14004

Laboratory #: [illegible]
Date Received: 9/12/94
Report Date: 9/13/94

Sample Information

Sample Date: 9/9/94
Sample Time: 3 oo pm
No. of Samples: 1
Location: 10 K Holding Tank 2929 Hamburg
Type of Sample: Water
Sampler: Client
Date Analyzed: 9/13/94
Analyst:

Parameter	Units	Filtered water in Tank				
Benzene	[illegible]g/l	<1.0				
Toluene						
Chlorobenzene						
Ethylbenzene		↓				
m- o- p- } Total Xylenes	m+p o	<2.0 <1.0				
o-Dichlorobenzene						
m-Dichlorobenzene						
p-Dichlorobenzene		↓				
MTBE	↓	<5.0				
	RU	SH-	24 HR	TAT		
		Due	9/13/94			
α,α,α-Trifluorotoluene Internal Standard % Recovery		90				
Acceptance Range: 60→132						

CLIENT: Natures way Inc.

NYCDEC STARS

Laboratory No. 94094687
Date Received: 9-12-94
Report Date 9-15-94
Date Sampled: 9-9-94
Time Sampled: 3,pm
Sampler: Client

Sample Identification	matrix	Date Extracted	Date Analyzed
Filtered water is Faucet	water	9/13/94	9/13/94

CAS NO.	COMPOUND	DL	A	B	C	D	E	F
			Concentration ug/L					
91-20-3	Naphthalene	*10*	<10.	<10				
208-96-8	Acenaphthylene	*10*						
83-32-9	Acenaphthene	*10*						
86-73-7	Fluorene	*10*						
85-01-8	Phenanthrene	*10*						
120-12-7	Anthracene	*10*						
206-44-0	Fluoranthene	*10*						
129-00-0	Pyrene	*10*						
218-01-09	Chrysene	*10*						
205-99-2	Benzo(b)fluoranthene	*10*						
207-08-09	Benzo(k)fluoranthene	*10*						
50-32-8	Benzo(a)pyrene	*10*						
53-70-3	Dibenzo(a,h)anthracene	*10*						
193-39-5	Indeno(1,2,3-cd)pyrene	*10*						
191-24-2	Benzo(g,h,i)perylene	*10*						
56-55-3	Benzo(a) anthracene	*10*						
	Volume Extracted (L):		1000	1000				
	Final Volume (mls)		1	1				
	Dilution Factor:		1	1				
SURR. RECOV.		QC						
	Nitrobenzene-d5	(38-114)	46	57				
	2fluorobiphenyl	(43-116)	46	57				
	Terphenyl	(33-141)	47	70				

Analysis Performed By EPA Method 8270 Base Neutrals - PNA's

LOZIER LABORATORIES

CHAIN OF CUSTODY RECORD

Client Name: NATURE'S WAY

Mailing Address:

LABORATORY NO: 4607

Project Name: 2424 HAMBURG TPK

SAMPLE IDENTIFICATION	DATE	TIME	LOCATION	SAMPLE TYPE	ANALYSES Lead + Leachable	8270 PPL's							NUMBER OF CONTAINERS		REMARK
Filtered H2O in 10K Holding TANK	[illegible]	3:00 pm	10K Holding TANK	grab	X	X							2 VOA 1 1.0l		RUSH 24 HR T/A

SAMPLED BY:
SIGN

RELINQUISHED BY:
1 SIGN DATE 9/12/94 TIME 9:30 pm
2 SIGN DATE TIME
3 SIGN DATE TIME
4 SIGN DATE TIME

RECEIVED BY:
1 SIGN DATE TIME
2 SIGN DATE TIME
3 SIGN DATE TIME
4 SIGN DATE TIME

METHOD OF SHIPMENT:
SIGN

RECEIVED FOR LABORATORY BY:
SIGN DATE 9/12/94 TIME 2:00 pm

CO·STEEL RECYCLING

We Recycle

Advance Divison

Office & Yard: 776 Ohio St., Buffalo, NY 14203
Mailing Address: P.O. Box 1131, Buffalo, NY 14240-1131
Office (716) 847-6200 ● Scale (716) 847-6204 ● Fax (716) 847-6210

28382
INBOUND

NAME CASH PURCHASE

ADDRESS

DATE SHIPPED	YOUR ORDER NO.	REFERENCE NO.	CARRIER
09/28/94			NATURES WAY

MATERIAL OVERSIZE

CODE 180800006

GROSS	35840	LB
TARE	31500	LB
NET	4340	LB

PA

TIME IN 11:16

OUT 11:29 09/28/94

MAN ON OFF

PRICE 45 GT [✓ NT] AMOUNT 97.65 ACCOUNT

SCALE OPERATOR

DRIVER

Recycling Today for a Better Tomorrow

◆ A Division of Co-Steel Inc.

We Recycle

CO·STEEL ◆ RECYCLING

Advance Divison

Office & Yard: 776 Ohio St., Buffalo, NY 14203
Mailing Address: P.O. Box 1131, Buffalo, NY 14240-1131
Office (716) 847-6200 ● Scale (716) 847-6204 ● Fax (716) 847-6210

27301
INBOUND

NAME CASH PURCHASE Natures Way

ADDRESS

DATE SHIPPED	YOUR ORDER NO.	REFERENCE NO.	CARRIER
09/08/94			

MATERIAL OVERSIZE

188800006

GROSS	40720	LB
TARE	31420	LB
NET	9300	LB

TIME IN 14:51
OUT 14:58 09/08/94

MAN ON OFF

PAID
SEP 09 1994

PRICE 45 GT [✓ NT] AMOUNT 209.25 ACCOUNT

SCALE OPERATOR

DRIVER

Recycling Today for a Better Tomorrow

◆ A Division of Co-Steel Inc.

CO·STEEL RECYCLING

We Recycle

Advance Divison

Office & Yard: 776 Ohio St., Buffalo, NY 14203
Mailing Address: P.O. Box 1131, Buffalo, NY 14240-1131
Office (716) 847-6200 • Scale (716) 847-6204 • Fax (716) 847-6210

27681
INBOUND

NAME CASH PURCHASE

ADDRESS

DATE SHIPPED	YOUR ORDER NO.	REFERENCE NO.	CARRIER
09/15/94			NAT WAY

MATERIAL OVERSIZE

CODE 180800006

GROSS	39740	LB
TARE	31500	LB
NET	8240	LB

TIME IN 14:14

OUT 14:28 09/15/94

PAID

MAN ON OFF

PRICE	AMOUNT	ACCOUNT
45^{00} GT [✓ NT]	$185.40	

SCALE OPERATOR

DRIVER

Recycling Today for a Better Tomorrow

◆ A Division of Co-Steel Inc.

Siegel, Kelleher & Kahn
Attorneys and Counselors at Law

426 Franklin Street • Buffalo, New York 14202
(716) 881-5800 • FAX: (716) 885-3369

Herbert M. Siegel
J. Michael Kelleher
Mark G. Hirschorn
Dennis Alan Kahn
Brian R. Welsh
Steven G. Wiseman
Timothy G. O'Connell
Kenneth I. Feinman
Ross T. Runfola
Robert D. Steinhaus
Stephen R. Silverstein
Angelo J. Morinello
Joan Warren
Kenneth A. Olena
Boyd L. Earl
Jeffrey S. Krajewski
Michelle G. Chaas

J. Kevin Laumer
Thomas Calandra
James D. Bell
David Paul Losi
William N. Naples
* Leroi C. Johnson
Emil J. Cappelli
R. Thomas Burgasser, P.C.
Richard F. Daly
** Neil W. Siegel
Robert Riordan
Stephen Gassman
Barry Fisher
*** Florence M. Fass
of counsel
* also admitted in PA & D.C.
** also admitted in Ohio
*** also admitted in VT.

RECEIVED
SEP 14 1994
NYSDEC-REG. 9
FOIL
__REL __UNREL

September 8, 1994

9407600 RM ✓
JTS
→ FG ✓

Mr. James Stack
Environmental Chemist I
New York State Department of
Environmental Conservation
270 Michigan Avenue
Buffalo, NY 14203-2999

Re: 2424 Hamburg **Turnpike**
Petroleum Bulk Storage **Number** 9-386383

Dear Mr. Stack:

Please be advised that we have begun the removal of the tanks at the above mentioned site, and the work commenced on September 1, 1994.

The job is being done by:

Russ Savage
Nature's Way, Inc.
Environmental Remediation
11796 Genesee Street
Alden, New York 14004

If there is any additional information which you desire, please do not hesitate to contact me.

Thank you for your kind courtesies and cooperation.

Very truly yours,

HERBERT M. SIEGEL

HMS/dvs

cc: David A. Siegel, Esq.

Offices in: Buffalo • Brockport • Cheektowaga • Dunkirk/Fredonia • Hamburg • Jamestown • Lancaster • Lockport • Niagara Falls
North Tonawanda • Olean • Orchard Park • Tona-Amherst • West Seneca • Williamsville • Youngstown
• Garden City •

New York State Department of Environmental Conservation
270 Michigan Avenue, Buffalo, New York 14203-2999
(716) 851-7220

Langdon Marsh
Commissioner

file

September 6, 1994

Mr. Herbert Siegel
426 Franklin
Buffalo, New York 14202

Dear Mr. Siegel:

9407600

Spill Number - Not Assigned Yet
2424 Hamburg Turnpike
Lackawanna
Erie County

On September 2, 1994, I discussed remediation requirements and options with you for the above-mentioned spill site. This site involves removal of three underground storage tanks (UST's) and associated soil and water contamination. We require the following for all remediation options:

1. All contaminated material must be removed and stored on site on plastic and covered with plastic.

2. The contaminated material must be sampled for ignitability, TCLP Benzene, and TCLP Lead. The sample results will determine if the material is a non-hazardous waste or a hazardous waste. If the material is non-hazardous, you may proceed with your selected option. If the material is hazardous, please contact us for further information.

3. You must notify us to arrange an inspection of the spill area before backfilling any excavation.

4. You must properly clean the UST's before removing them from the site.

5. You must properly characterize and dispose of all product and bottoms from the tanks.

6. You must properly store and characterize waters from the excavations prior to disposal.

7. You must sample and analyze the excavations. One sample must be collected beneath and on the sides of each UST for EPA Methods 8021 and 8270. If the results are above NYSDEC STARS guidance, further remediation may be necessary.

The following remediation option(s) require additional work as noted:

OPTION 1 - Disposal of Contaminated Material at a Landfill.

1. Your selected sanitary landfill may require additional testing before disposal. You must contact them before moving the waste material.
2. You must use a licensed hauler to transport the contaminated material to your selected landfill.
3. Copies of the landfill disposal receipt and the sample results are to be sent to this Department.

OPTION 2 - Bioremediation of Contaminated Material.

1. Before treatment starts and every two months until treatment is completed, the material must be sampled for EPA Methods 8021 and 8270. The results of this sampling will determine if further treatment is necessary.
2. The treated material must remain on site.
3. A copy of your signed contract with your bioremediation contractor and the workplan must be submitted to this office by September 27, 1994.
4. Bioremediation must start when weather permits. This Department must be notified when you plan to start work.

Your treatment option selection and a work schedule are requested by September 21, 1994. If you have any questions, please contact me at 851-7220.

Sincerely,

Francine Gallego

Francine Gallego
Environmental Engineer I

FG:sz

90 B John Muir Drive
Amherst, New York 14228
(716) 565-0624 • Fax (716) 565-0625

August 10, 2013

Nicole Savage
President
Nature's Way Environmental
3553 Crittenden Road
Alden, NY 14004

Transmitted via email to: Nicole Savage [NSavage@natureswayenv.com]

Subject: Geophysical Survey Results, 2424 Hamburg Turnpike, Lackawanna, NY

Dear Ms. Savage:

1.0 INTRODUCTION

This letter report presents the results of the geophysical investigation performed for Nature's Way Environmental, Inc. in support of their environmental investigation a property located at 2424 Hamburg Turnpike in Lackawanna, NY (the Site).

The geophysical investigation was designed to geophysically characterize the subsurface and focus a follow-up intrusive investigation, if warranted. The information provided herein is intended to assist Nature's Way Environmental with their assessment of potential environmental concerns at the Site. The objective for the geophysical survey was to explore for subsurface anomalies that may relate to a source or pathway of petroleum constituents that were reportedly observed during the installation of a Fiber Optic line adjacent to the Site. AMEC Environment and Infrastructure, Inc. (Amec) performed data acquisition on July 23, 2013 using time domain electromagnetic techniques.

The Site is currently vacant however we understand it previously operated as a retail automotive fuel facility. The survey was limited to the paved portion of the site in the area between Hamburg Turnpike and the Site building.

2.0 METHODOLOGY

A reference grid was installed at the site to facilitate data acquisition along lines spaced three feet apart. The grid was marked with orange and white spray paint with select coordinates labeled to allow subsequent work if necessary. Grid coordinate 100N,100E was established at the south west corner of the Site building. Grid north was taken as the direction parallel the west wall of the building.

The Site was geophysically surveyed using the Geonics EM61. The EM61 unit is a high sensitivity, high resolution time domain electromagnetic (TDEM) metal detector that can detect both ferrous and nonferrous metallic objects. It has an approximate investigation depth of 10 feet. The processing console is contained in a backpack worn by the operator which is interfaced to a digital data logger. The transmitter and two receiver coils are located on a two-wheeled cart that is pulled by the operator.

The device’s transmitter coil generates a pulsed primary EM field at a rate of 150 pulses per second, inducing eddy currents into the subsurface. The decay rates of these eddy currents are measured by two, 3.28 foot by 1.64 foot (1 meter by ½ meter) rectangular receiver coils. By taking the measurements at a relatively long time frame after termination of the primary pulse, the response is practically independent of the survey area's terrain conductivity. Specifically, the decay rates of the eddy currents are much longer for metals than for normal soils allowing the discrimination of the two.

EM61 in use (photo not from this site)

Data are collected from the EM61’s two receiver coils. One of the receiver coils is located coincident to the transmitter coil. The other receiver coil is located 1.31 feet (0.4 meters) above the transmitter coil. Data from the top receiver coil are stored on Channel 1 of a digital data logger. Data from the bottom receiver coil are stored on Channel 2 of the data logger. Channel 1 and Channel 2 data are simultaneously recorded at each station location. The instrument responses are recorded in units of milliVolts (mV). Data were recorded digitally by a data logger at a rate of approximately 2 measurements per foot along the survey lines which were spaced 3 feet apart.

3.0 RESULTS

The EM61 data for the site is shown in Figure 1. The color bar to the right of the map indicates the colors associated with the respective measured values. Areas suspected to be free of buried metals are shown as color shades of light blue. All areas exhibiting a response greater than background (0 to 35 mVolts) likely contain buried metals. These areas are depicted in shades of dark blue through yellow on the figure.

Four anomalies are identified that may be related to the reported observation of petroleum impact in the fiber optic manhole (designated as “Verizon manhole on Figure 1). These anomalies are labeled **A** through **D** on the figure. Visual observations during the survey suggested the locations of three former pump islands. Anomalies A through D may be related to remnants of the pump islands (subsurface reinforced concrete pads) or they may be related to UST’s, associated appurtenances and/or miscellaneous buried metals. It is possible that any of the additional unlabelled anomalies may be of environmental significance.

Numerous linear anomalies are observed in the geophysical data and are denoted with dashed red lines on Figure 1. These linear anomalies likely are related to buried utility lines. The geophysical survey was conducted over the entire length of the property (approx 460 ft). Additional metal anomalies are observed in the data, many related to observed surface features (ie., fence posts cut at grade, entrance drives, foundations, etc.).

4.0 LIMITATIONS

The geophysical methods used during this survey are established, indirect techniques for non-destructive subsurface reconnaissance exploration. As these instruments utilize indirect methods, they are subject to inherent limitations and ambiguities. Metallic surface features (electrical wires, scrap metal, etc.) preclude reliable non-invasive data/results beneath, and in the immediate vicinity of, the surface features. Targets such as buried drums, buried tanks, conduits, etc. are detectable only if they produce recognizable anomalies or patterns against the background geophysical data collected. As with any remote sensing technique, the anomalies identified during a geophysical survey should be further investigated by other techniques such as historical aerial photography, test pit excavation and/or test boring, if warranted.

Please do not hesitate to contact us if you have any questions or require additional information.

Sincerely yours,
AMEC Environment and Infrastructure, Inc.

John Luttinger

John Luttinger
Senior Geophysicist

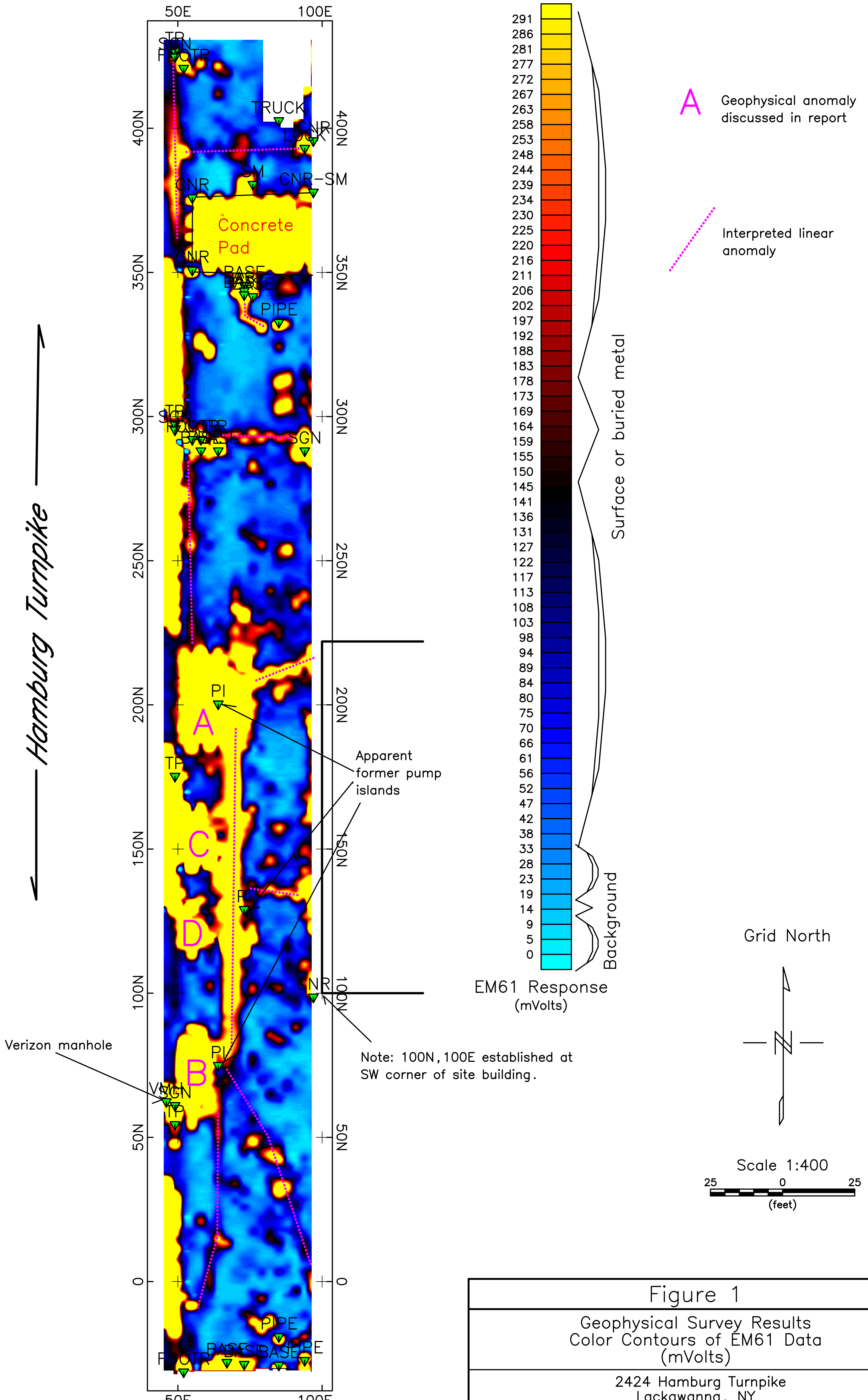


Figure 1

Geophysical Survey Results
Color Contours of EM61 Data
(mVolts)

2424 Hamburg Turnpike
Lackawanna, NY
Natures Way Environmental

Amec (716) 998 6973

ATTACHMENT 2

BORING LOGS AND WELL COMPLETION DETAILS

Project No: 0298-014-001

Borehole Number: SB-01

Project: Phase II Environmental Investigation

A.K.A.:

Client: Franklin Asset Management

Logged By: PWW

Site Location: 2424 Hamburg Turnpike

Checked By: BCH

TurnKey Environmental Restoration, LLC
2558 Hamburg Turnpike, Suite 300
Buffalo, NY 14218
(716) 856-0635

SUBSURFACE PROFILE			SAMPLE						
Depth (fbgs)	Elev. /Depth	Description (ASTM D2488: Visual-Manual Procedure)	Sample No.	SPT N-Value	Recovery (ft)	Symbol	PID VOCs ppm 0 12.5 25	Lab Sample	Well Completion Details or Remarks
	0.0 0.0	Ground Surface							
0.0	0.0	**Gravel Road Base**	S-1	NA	1.3		0.0 0.0		
	-2.0 2.0	**Slag** Brown, moist, mostly fine to coarse slag, brick pieces, trace fine sand, loose when disturbed, massive					0.0		
5.0	-4.0 4.0	As above, moist to wet (6')	S-2	NA	1.2		0.0 0.0		
	-8.0 8.0	**Lean Clay** Brown, moist, mostly medium plasticity fines, few fine sand, firm	S-3	NA	3.1		0.0		
	-9.0 9.0	**Organic Soil (Peat)** Brown, moist, mostly organic soil with wood debris, little medium plasticity fines, firm							
10.0	-10.0 10.0	**Poorly Graded Sand** Grey, wet, mostly fine sand, medium dense					0.0		
15.0	-12.0 12.0	**Organic Soil (Peat)** Same as (9-10') interval	S-4	NA	1.1		0.0 0.0		
	-16.0 16.0	End of Borehole							

Drilled By: DDS Companies
Drill Rig Type: Geoprobe 66DT Track Mounted Rig
Drill Method: Direct Push w/ 4' macro-core
Comments:
Drill Date(s): 1-14-14

Hole Size: 2"
Stick-up: NA
Datum: Mean Sea Level

Sheet: 1 of 1

Project No: 0298-014-001

Borehole Number: SB-02

Project: Phase II Environmental Investigation

A.K.A.:

Client: Franklin Asset Management

Logged By: PWW

Site Location: 2424 Hamburg Turnpike

Checked By: BCH

TurnKey Environmental Restoration, LLC
2558 Hamburg Turnpike, Suite 300
Buffalo, NY 14218
(716) 856-0635

SUBSURFACE PROFILE			SAMPLE						
Depth (fbgs)	Elev. /Depth	Description (ASTM D2488: Visual-Manual Procedure)	Sample No.	SPT N-Value	Recovery (ft)	Symbol	PID VOCs ppm 0 12.5 25	Lab Sample	Well Completion Details or Remarks
	0.0	Ground Surface							
0.0	0.0	***Slag*** Brown, moist, mostly fine to coarse slag, brick pieces, trace fine sand, loose when disturbed, massive	S-1	NA	1.6		0.0 0.0 0.0		
5.0	-4.0 4.0	As above, moist to wet (7')	S-2	NA	2.9		0.0 0.0		
	-8.0 8.0	***Lean Clay*** Brown, moist, mostly medium plasticity fines, few fine sand, firm	S-3	NA	2.2		0.0		
10.0	-10.0 10.0	***Organic Soil (Peat)*** Brown, moist, mostly organic soil with wood debris, little medium plasticity fines, firm					0.0		
15.0	-12.0 12.0	***Poorly Graded Sand*** Grey, wet, mostly fine sand, medium dense	S-4	NA	3.0		0.0 0.0		
	-16.0 16.0	End of Borehole							

Drilled By: DDS Companies
Drill Rig Type: Geoprobe 66DT Track Mounted Rig
Drill Method: Direct Push w/ 4' macro-core
Comments:
Drill Date(s): 1-14-14

Hole Size: 2"
Stick-up: NA
Datum: Mean Sea Level

Sheet: 1 of 1

Project No: 0298-014-001

Borehole Number: SB-03

Project: Phase II Environmental Investigation

A.K.A.:

Client: Franklin Asset Management

Logged By: PWW

Site Location: 2424 Hamburg Turnpike

Checked By: BCH

TurnKey Environmental Restoration, LLC
2558 Hamburg Turnpike, Suite 300
Buffalo, NY 14218
(716) 856-0635

SUBSURFACE PROFILE			SAMPLE						
Depth (fbgs)	Elev. /Depth	Description (ASTM D2488: Visual-Manual Procedure)	Sample No.	SPT N-Value	Recovery (ft)	Symbol	PID VOCs ppm 0 12.5 25	Lab Sample	Well Completion Details or Remarks
0.0	0.0	Ground Surface							
	0.0	***Slag*** Brown, moist, mostly fine to coarse slag, brick pieces, trace fine sand, loose when disturbed, massive	S-1	NA	2.4		0.0 0.0 0.0		
5.0	-4.0 4.0	As above, moist to wet (6')	S-2	NA	2.1		0.0 0.0		
	-8.0 8.0	***Organic Soil (Peat)*** Brown, moist, mostly organic soil with wood debris, little medium plasticity fines, firm	S-3	NA	4.0		0.0		
10.0	-9.0 9.0	***Lean Clay*** Brown, moist, mostly medium plasticity fines, few fine sand, firm					0.0		
15.0	-11.0 11.0	***Poorly Graded Sand*** Grey, wet, mostly fine sand, medium dense	S-4	NA	4.0		0.0 0.0		
	-16.0 16.0	End of Borehole							

Drilled By: DDS Companies
Drill Rig Type: Geoprobe 66DT Track Mounted Rig
Drill Method: Direct Push w/ 4' macro-core
Comments:
Drill Date(s): 1-14-14

Hole Size: 2"
Stick-up: NA
Datum: Mean Sea Level

Sheet: 1 of 1

Project No: 0298-014-001

Borehole Number: SB-04/TMW-01

Project: Phase II Environmental Investigation

A.K.A.:

Client: Franklin Asset Management

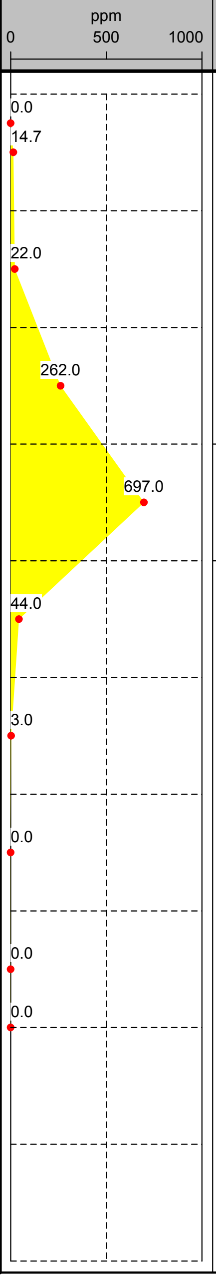
Logged By: PWW

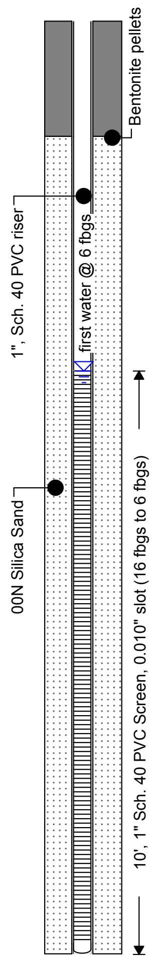
Site Location: 2424 Hamburg Turnpike

Checked By: BCH

TurnKey Environmental Restoration, LLC
2558 Hamburg Turnpike, Suite 300
Buffalo, NY 14218
(716) 856-0635

SUBSURFACE PROFILE			SAMPLE						
Depth (fbgs)	Elev. /Depth	Description (ASTM D2488: Visual-Manual Procedure)	Sample No.	SPT N-Value	Recovery (ft)	Symbol	PID VOCs ppm	Lab Sample	Well Completion Details or Remarks
	0.0 0.0	Ground Surface							
0.0	0.0	**Slag** Brown, moist, mostly fine to coarse slag, brick pieces, trace fine sand, loose when disturbed, massive, slight petro odor @ 1 fbgs	S-1	NA	2.6		0.0 14.7 22.0		
5.0	-4.0 4.0	As above, moist to wet (6'), strong petroleum-like odor	S-2	NA	2.5		262.0 697.0	Sampled (6-8')	
	-8.0 8.0	**Organic Soil (Peat)** Brown, moist, mostly organic soil with wood debris, little medium plasticity fines, firm, slight petroleum-like odor	S-3	NA	3.2		44.0		
10.0	-9.0 9.0	**Lean Clay** Brown, moist, mostly medium plasticity fines, few fine sand, firm					3.0		
15.0	-11.0 11.0	**Poorly Graded Sand** Grey, wet, mostly fine sand, medium dense	S-4	NA	3.1		0.0 0.0 0.0		
20.0	-16.0 16.0	End of Borehole							





Drilled By: DDS Companies
Drill Rig Type: Geoprobe 66DT Track Mounted Rig
Drill Method: Direct Push w/ 4' macro-core
Comments:
Drill Date(s): 1-14-14

Hole Size: 2"
Stick-up: NA
Datum: Mean Sea Level

Sheet: 1 of 1

Project No: 0298-014-001

Borehole Number: SB-05/TMW-02

Project: Phase II Environmental Investigation

A.K.A.:

Client: Franklin Asset Management

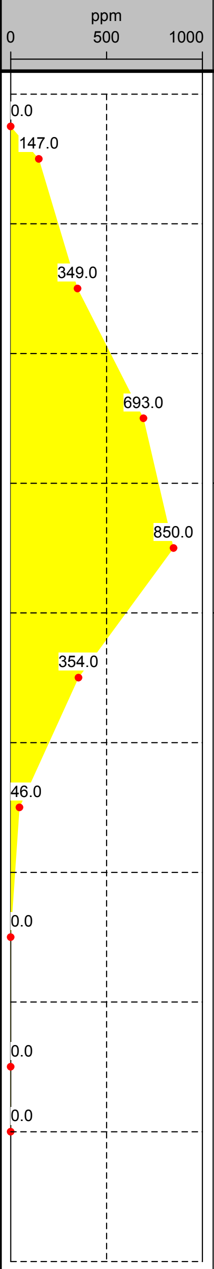
Logged By: PWW

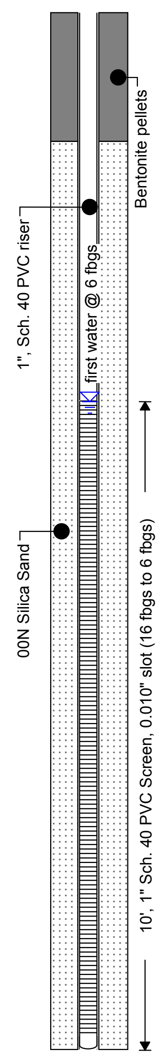
Site Location: 2424 Hamburg Turnpike

Checked By: BCH

TurnKey Environmental Restoration, LLC
2558 Hamburg Turnpike, Suite 300
Buffalo, NY 14218
(716) 856-0635

SUBSURFACE PROFILE			SAMPLE				Lab Sample
Depth (fbgs)	Elev. /Depth	Description (ASTM D2488: Visual-Manual Procedure)	Sample No.	SPT N-Value	Recovery (ft)	Symbol	
	0.0	Ground Surface					
0.0	0.0	***Slag*** Brown, moist, mostly fine to coarse slag, brick pieces, trace fine sand, loose when disturbed, massive, petroleum-like odor @ 1 fbgs	S-1	NA	2.7		
5.0	-4.0 4.0	As above, moist to wet (6'), strong petroleum-like odor	S-2	NA	3.0		Sampled (6-8')
	-8.0 8.0	***Organic Soil (Peat)*** Brown, moist, mostly organic soil with wood debris, little medium plasticity fines, firm, slight petroleum-like odor	S-3	NA	4.0		
10.0	-9.0 9.0	***Lean Clay*** Brown, moist, mostly medium plasticity fines, few fine sand, firm, slight petroleum-like odor					
15.0	-11.0 11.0	***Poorly Graded Sand*** Grey, wet, mostly fine sand, medium dense	S-4	NA	4.0		
	-16.0 16.0	End of Borehole					





Drilled By: DDS Companies
Drill Rig Type: Geoprobe 66DT Track Mounted Rig
Drill Method: Direct Push w/ 4' macro-core
Comments:
Drill Date(s): 1-14-14

Hole Size: 2"
Stick-up: NA
Datum: Mean Sea Level

Sheet: 1 of 1

Project No: 0298-014-001

Borehole Number: SB-06

Project: Phase II Environmental Investigation

A.K.A.:

Client: Franklin Asset Management

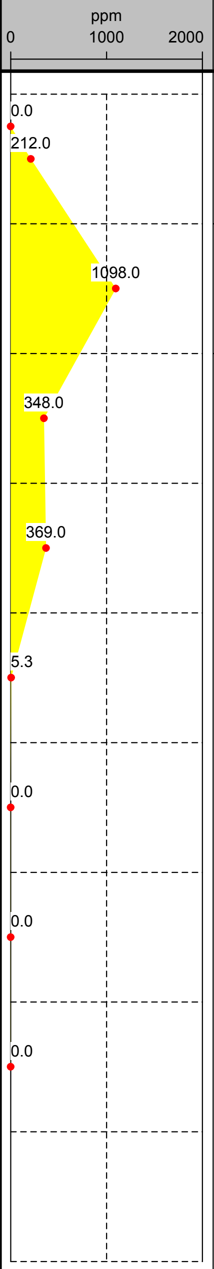
Logged By: PWW

Site Location: 2424 Hamburg Turnpike

Checked By: BCH

TurnKey Environmental Restoration, LLC
2558 Hamburg Turnpike, Suite 300
Buffalo, NY 14218
(716) 856-0635

SUBSURFACE PROFILE			SAMPLE				PID VOCs	Lab Sample	Well Completion Details or Remarks
Depth (fbgs)	Elev. /Depth	Description (ASTM D2488: Visual-Manual Procedure)	Sample No.	SPT N-Value	Recovery (ft)	Symbol	ppm		
0.0	0.0	Ground Surface							
	0.0 0.0	***Gravel Road-Base***							
	-1.0 1.0	***Slag*** Brown, moist, mostly fine to coarse slag, brick pieces, trace fine sand, loose when disturbed, massive, petroleum-like odors starting @ 2 fbgs	S-1	NA	2.1			Sampled (2-4')	
5.0	-4.0 4.0	As above, moist to wet (6')	S-2	NA	2.4				
	-8.0 8.0	***Organic Soil (Peat)*** Brown, moist, mostly organic soil with wood debris, little medium plasticity fines, firm	S-3	NA	4.0				
10.0	-9.0 9.0	***Lean Clay*** Brown, moist, mostly medium plasticity fines, few fine sand, firm							
15.0	-11.0 11.0	***Poorly Graded Sand*** Grey, wet, mostly fine sand, medium dense	S-4	NA	3.6				
	-16.0 16.0	End of Borehole							



Drilled By: DDS Companies
Drill Rig Type: Geoprobe 66DT Track Mounted Rig
Drill Method: Direct Push w/ 4' macro-core
Comments:
Drill Date(s): 1-14-14

Hole Size: 2"
Stick-up: NA
Datum: Mean Sea Level

Sheet: 1 of 1

Project No: 0298-014-001

Borehole Number: SB-07/TMW-03

Project: Phase II Environmental Investigation

A.K.A.:

Client: Franklin Asset Management

Logged By: PWW

Site Location: 2424 Hamburg Turnpike

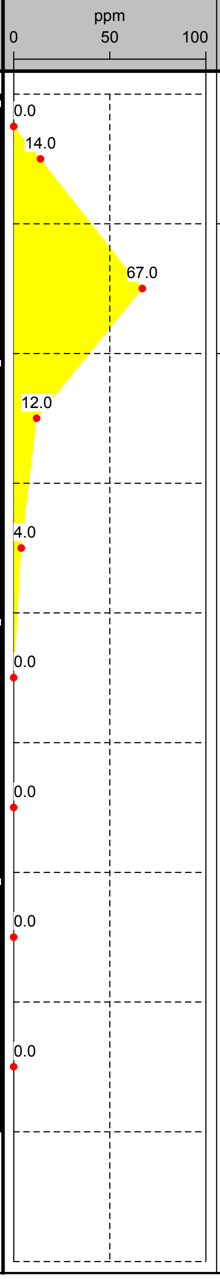
Checked By: BCH

TurnKey Environmental Restoration, LLC
2558 Hamburg Turnpike, Suite 300
Buffalo, NY 14218
(716) 856-0635

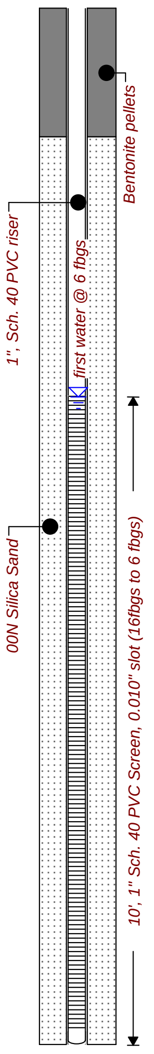
SUBSURFACE PROFILE / SAMPLE

Depth (ftbgs)	Elev. /Depth	Description (ASTM D2488: Visual-Manual Procedure)	Sample No.	SPT N-Value	Recovery (ft)	Lab Sample
0.0	0.0	Ground Surface				
	0.0 0.0	**Gravel Road-Base**				
	-1.0 1.0	**Slag** Brown, moist, mostly fine to coarse slag, brick pieces, trace fine sand, loose when disturbed, massive, slight petroleum-like odors starting @ 2 fbgs	S-1	NA	2.1	Sampled (2-4')
5.0	-4.0 4.0	As above, moist to wet (6')	S-2	NA	2.4	
	-8.0 8.0	**Organic Soil (Peat)** Brown, moist, mostly organic soil with wood debris, little medium plasticity fines, firm	S-3	NA	4.0	
10.0	-9.0 9.0	**Lean Clay** Brown, moist, mostly medium plasticity fines, few fine sand, firm				
15.0	-11.0 11.0	**Poorly Graded Sand** Grey, wet, mostly fine sand, medium dense	S-4	NA	3.6	
	-16.0 16.0	End of Borehole				

PID VOCs



Well Completion Details or Remarks



Drilled By: DDS Companies
Drill Rig Type: Geoprobe 66DT Track Mounted Rig
Drill Method: Direct Push w/ 4' macro-core
Comments:
Drill Date(s): 1-14-14

Hole Size: 2"
Stick-up: NA
Datum: Mean Sea Level

Sheet: 1 of 1

Project No: 0298-014-001

Borehole Number: SB-08

Project: Phase II Environmental Investigation

A.K.A.:

Client: Franklin Asset Management

Logged By: PWW

Site Location: 2424 Hamburg Turnpike

Checked By: BCH

TurnKey Environmental Restoration, LLC
2558 Hamburg Turnpike, Suite 300
Buffalo, NY 14218
(716) 856-0635

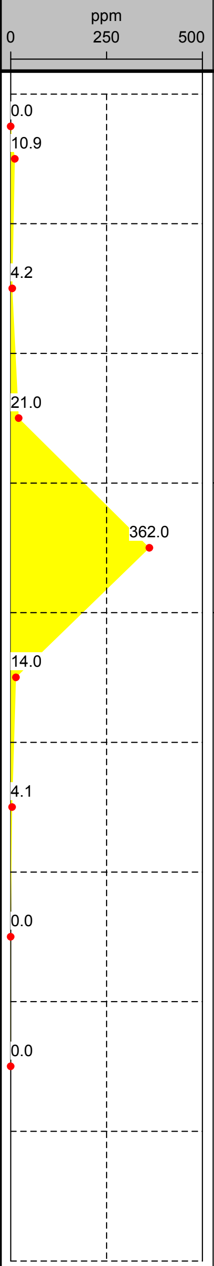
SUBSURFACE PROFILE

Depth (fbgs)	Elev. /Depth	Description (ASTM D2488: Visual-Manual Procedure)
0.0	0.0	Ground Surface
	0.0 -0.8	**Concrete**
	0.8 -4.0	**Slag** Brown, moist, mostly fine to coarse slag, brick pieces, trace fine sand, loose when disturbed, massive, slight petroleum-like odors starting @ 2 fbgs
5.0	4.0 -8.0	As above, moist to wet (6'), petroleum-like odors
	8.0 -9.0	**Organic Soil (Peat)** Brown, moist, mostly organic soil with wood debris, little medium plasticity fines, firm, petroleum-like odors
10.0	9.0 -11.0	**Lean Clay** Brown, moist, mostly medium plasticity fines, few fine sand, firm
15.0	11.0 -16.0	**Poorly Graded Sand** Grey, wet, mostly fine sand, medium dense
	16.0	End of Borehole

SAMPLE

Sample No.	SPT N-Value	Recovery (ft)	Lab Sample	Well Completion Details or Remarks
S-1	NA	1.7		
S-2	NA	2.4	Sampled (6-8')	
S-3	NA	3.4		
S-4	NA	3.0		

PID VOCs



Drilled By: DDS Companies
Drill Rig Type: Geoprobe 66DT Track Mounted Rig
Drill Method: Direct Push w/ 4' macro-core
Comments:
Drill Date(s): 1-14-14

Hole Size: 2"
Stick-up: NA
Datum: Mean Sea Level

Sheet: 1 of 1

Project No: 0298-014-001

Borehole Number: SB-09

Project: Phase II Environmental Investigation

A.K.A.:

Client: Franklin Asset Management

Logged By: PWW

Site Location: 2424 Hamburg Turnpike

Checked By: BCH

TurnKey Environmental Restoration, LLC
2558 Hamburg Turnpike, Suite 300
Buffalo, NY 14218
(716) 856-0635

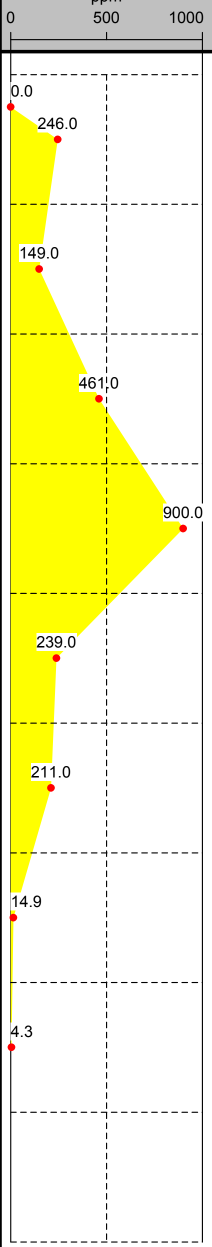
SUBSURFACE PROFILE

Depth (fbgs)	Elev. /Depth	Description (ASTM D2488: Visual-Manual Procedure)
0.0	0.0	Ground Surface
	0.0	***Concrete***
	-0.8 0.8	***Slag*** Brown, moist, mostly fine to coarse slag, brick pieces, trace fine sand, loose when disturbed, massive, slight petroleum-like odors starting @ 2 fbgs
5.0	-4.0 4.0	As above, moist to wet (6'), petroleum-like odors
	-8.0 8.0	***Organic Soil (Peat)*** Brown, moist, mostly organic soil with wood debris, little medium plasticity fines, firm, petroleum-like odors
10.0	-9.0 9.0	***Lean Clay*** Brown, moist, mostly medium plasticity fines, few fine sand, firm, petroleum-like odors
15.0	-11.0 11.0	***Poorly Graded Sand*** Grey, wet, mostly fine sand, medium dense, slight petroleum-like odors
	-16.0 16.0	End of Borehole

SAMPLE

Sample No.	SPT N-Value	Recovery (ft)	Lab Sample	Well Completion Details or Remarks
S-1	NA	2.0		
S-2	NA	2.6	Sampled (6-8')	
S-3	NA	3.0		
S-4	NA	3.6		

PID VOCs



Drilled By: DDS Companies
Drill Rig Type: Geoprobe 66DT Track Mounted Rig
Drill Method: Direct Push w/ 4' macro-core
Comments:
Drill Date(s): 1-14-14

Hole Size: 2"
Stick-up: NA
Datum: Mean Sea Level

Sheet: 1 of 1

Project No: 0298-014-001

Borehole Number: SB-10

Project: Phase II Environmental Investigation

A.K.A.:

Client: Franklin Asset Management

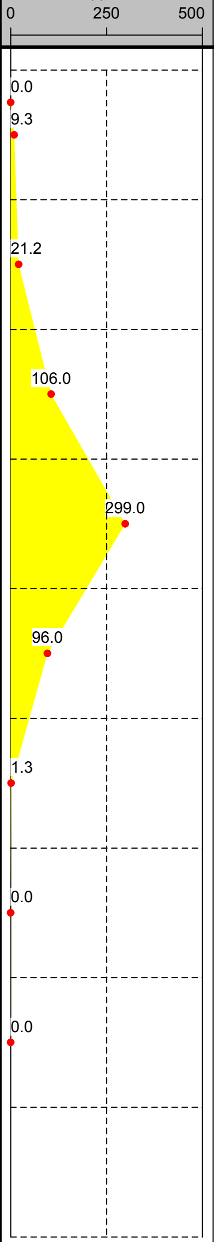
Logged By: PWW

Site Location: 2424 Hamburg Turnpike

Checked By: BCH

TurnKey Environmental Restoration, LLC
2558 Hamburg Turnpike, Suite 300
Buffalo, NY 14218
(716) 856-0635

SUBSURFACE PROFILE			SAMPLE						
Depth (fbgs)	Elev. /Depth	Description (ASTM D2488: Visual-Manual Procedure)	Sample No.	SPT N-Value	Recovery (ft)	Symbol	PID VOCs ppm	Lab Sample	Well Completion Details or Remarks
	0.0	Ground Surface							
0.0	0.0	**Concrete**							
	-0.8 0.8	**Slag** Brown, moist, mostly fine to coarse slag, brick pieces, trace fine sand, loose when disturbed, massive, slight petroleum-like odors starting @ 2 fbgs	S-1	NA	1.2				
5.0	-4.0 4.0	As above, moist to wet (6'), petroleum-like odors	S-2	NA	2.6				
	-8.0 8.0	**Organic Soil (Peat)** Brown, moist, mostly organic soil with wood debris, little medium plasticity fines, firm, petroleum-like odors	S-3	NA	3.1				
10.0	-9.0 9.0	**Lean Clay** Brown, moist, mostly medium plasticity fines, few fine sand, firm							
15.0	-11.0 11.0	**Poorly Graded Sand** Grey, wet, mostly fine sand, medium dense	S-4	NA	4.0				
	-16.0 16.0	End of Borehole							



Drilled By: DDS Companies
Drill Rig Type: Geoprobe 66DT Track Mounted Rig
Drill Method: Direct Push w/ 4' macro-core
Comments:
Drill Date(s): 1-14-14

Hole Size: 2"
Stick-up: NA
Datum: Mean Sea Level

Sheet: 1 of 1

ATTACHMENT 3

LABORATORY ANALYTICAL DATA SUMMARY PACKAGE

ANALYTICAL REPORT

Lab Number:	L1401509
Client:	Benchmark & Turnkey Companies 2558 Hamburg Turnpike Suite 300 Buffalo, NY 14218
ATTN:	Mike Lesakowski
Phone:	(716) 856-0599
Project Name:	2424 HAMBURG TURNPIKE
Project Number:	0298-014-001
Report Date:	01/22/14

Certifications & Approvals: MA (M-MA086), NY (11148), CT (PH-0574), NH (2003), NJ NELAP (MA935), RI (LAO00065), ME (MA00086), PA (68-03671), USDA (Permit #P-330-11-00240), NC (666), TX (T104704476), DOD (L2217), US Army Corps of Engineers.

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com

Project Name: 2424 HAMBURG TURNPIKE
Project Number: 0298-014-001

Lab Number: L1401509
Report Date: 01/22/14

Alpha Sample ID	Client ID	Sample Location	Collection Date/Time
L1401509-01	SB-4 (6-8)	2424 HAMBURG TURNPIKE	01/14/14 11:45
L1401509-02	SB-5 (6-8)	2424 HAMBURG TURNPIKE	01/14/14 12:30
L1401509-03	SB-6 (2-4)	2424 HAMBURG TURNPIKE	01/14/14 14:15
L1401509-04	SB-7 (2-4)	2424 HAMBURG TURNPIKE	01/14/14 13:45
L1401509-05	SB-8 (6-8)	2424 HAMBURG TURNPIKE	01/14/14 16:00
L1401509-06	SB-9 (6-8)	2424 HAMBURG TURNPIKE	01/14/14 16:30

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet all of the requirements of NELAC, for all NELAC accredited parameters. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. Performance criteria for CAM and RCP methods allow for some LCS compound failures to occur and still be within method compliance. In these instances, the specific failures are not narrated but are noted in the associated QC table. This information is also incorporated in the Data Usability format for our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY
For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Volatile Organics

Any reported concentrations that are below 200 ug/kg may be biased low due to the sample not being collected according to 5035-L/5035A-L low-level specifications.

L1401509-04 has elevated detection limits due to the dilution required by the elevated concentrations of non-target compounds in the sample.

Semivolatile Organics

The surrogate recoveries for L1401509-02 and -03 are below the acceptance criteria for nitrobenzene-d5, 2-fluorobiphenyl and 4-terphenyl-d14 (all 0%) due to the dilutions required to quantitate the samples. Re-extraction was not required; therefore, the results of the original analyses are reported.

L1401509-03 has elevated detection limits due to the dilution required by the sample matrix.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Kelly Stenstrom Kelly Stenstrom

Title: Technical Director/Representative Date: 01/22/14

ORGANICS

VOLATILES

SAMPLE RESULTS

Lab ID:	L1401509-01 D		Date Collected:	01/14/14 11:45
Client ID:	SB-4 (6-8)		Date Received:	01/15/14
Sample Location:	2424 HAMBURG TURNPIKE		Field Prep:	Not Specified
Matrix:	Soil			
Analytical Method:	1,8260C			
Analytical Date:	01/19/14 16:15			
Analyst:	BN			
Percent Solids:	76%			

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methylene chloride	ND		ug/kg	16000	3300	1250
1,1-Dichloroethane	ND		ug/kg	2500	290	1250
Chloroform	ND		ug/kg	2500	610	1250
Carbon tetrachloride	ND		ug/kg	1600	340	1250
1,2-Dichloropropane	ND		ug/kg	5700	370	1250
Dibromochloromethane	ND		ug/kg	1600	500	1250
1,1,2-Trichloroethane	ND		ug/kg	2500	500	1250
Tetrachloroethene	ND		ug/kg	1600	230	1250
Chlorobenzene	ND		ug/kg	1600	570	1250
Trichlorofluoromethane	ND		ug/kg	8200	200	1250
1,2-Dichloroethane	ND		ug/kg	1600	240	1250
1,1,1-Trichloroethane	ND		ug/kg	1600	180	1250
Bromodichloromethane	ND		ug/kg	1600	380	1250
trans-1,3-Dichloropropene	ND		ug/kg	1600	200	1250
cis-1,3-Dichloropropene	ND		ug/kg	1600	210	1250
Bromoform	ND		ug/kg	6600	680	1250
1,1,2,2-Tetrachloroethane	ND		ug/kg	1600	280	1250
Benzene	1000	J	ug/kg	1600	190	1250
Toluene	2300	J	ug/kg	2500	180	1250
Ethylbenzene	14000		ug/kg	1600	240	1250
Chloromethane	ND		ug/kg	8200	1300	1250
Bromomethane	ND		ug/kg	3300	550	1250
Vinyl chloride	ND		ug/kg	3300	230	1250
Chloroethane	ND		ug/kg	3300	520	1250
1,1-Dichloroethene	ND		ug/kg	1600	340	1250
trans-1,2-Dichloroethene	ND		ug/kg	2500	350	1250
Trichloroethene	ND		ug/kg	1600	250	1250
1,2-Dichlorobenzene	ND		ug/kg	8200	300	1250
1,3-Dichlorobenzene	ND		ug/kg	8200	300	1250
1,4-Dichlorobenzene	ND		ug/kg	8200	400	1250
Methyl tert butyl ether	ND		ug/kg	3300	170	1250

SAMPLE RESULTS

Lab ID:	L1401509-01 D	Date Collected:	01/14/14 11:45
Client ID:	SB-4 (6-8)	Date Received:	01/15/14
Sample Location:	2424 HAMBURG TURNPIKE	Field Prep:	Not Specified

Volatile Organics by GC/MS - Westborough Lab

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
p/m-Xylene	12000		ug/kg	3300	530	1250
o-Xylene	600	J	ug/kg	3300	440	1250
cis-1,2-Dichloroethene	ND		ug/kg	1600	240	1250
Styrene	ND		ug/kg	3300	510	1250
Dichlorodifluoromethane	ND		ug/kg	16000	360	1250
Acetone	ND		ug/kg	16000	5100	1250
Carbon disulfide	ND		ug/kg	16000	3300	1250
2-Butanone	ND		ug/kg	16000	580	1250
4-Methyl-2-pentanone	ND		ug/kg	16000	400	1250
2-Hexanone	ND		ug/kg	16000	310	1250
Bromochloromethane	ND		ug/kg	8200	320	1250
1,2-Dibromoethane	ND		ug/kg	6600	290	1250
n-Butylbenzene	26000		ug/kg	1600	320	1250
sec-Butylbenzene	8200		ug/kg	1600	340	1250
1,2-Dibromo-3-chloropropane	ND		ug/kg	8200	1300	1250
Isopropylbenzene	9900		ug/kg	1600	270	1250
p-Isopropyltoluene	4600		ug/kg	1600	310	1250
n-Propylbenzene	48000		ug/kg	1600	210	1250
1,2,3-Trichlorobenzene	ND		ug/kg	8200	280	1250
1,2,4-Trichlorobenzene	ND		ug/kg	8200	1300	1250
1,3,5-Trimethylbenzene	21000		ug/kg	8200	240	1250
1,2,4-Trimethylbenzene	180000		ug/kg	8200	940	1250
Methyl Acetate	ND		ug/kg	33000	1200	1250
Cyclohexane	ND		ug/kg	33000	1800	1250
1,4-Dioxane	ND		ug/kg	160000	28000	1250
Freon-113	ND		ug/kg	33000	450	1250
Methyl cyclohexane	43000		ug/kg	6600	2100	1250

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	103		70-130
Toluene-d8	95		70-130
4-Bromofluorobenzene	104		70-130
Dibromofluoromethane	93		70-130

SAMPLE RESULTS

Lab ID:	L1401509-02	D	Date Collected:	01/14/14 12:30
Client ID:	SB-5 (6-8)		Date Received:	01/15/14
Sample Location:	2424 HAMBURG TURNPIKE		Field Prep:	Not Specified
Matrix:	Soil			
Analytical Method:	1,8260C			
Analytical Date:	01/19/14 16:43			
Analyst:	BN			
Percent Solids:	82%			

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methylene chloride	ND		ug/kg	6100	1200	500
1,1-Dichloroethane	ND		ug/kg	920	110	500
Chloroform	ND		ug/kg	920	230	500
Carbon tetrachloride	ND		ug/kg	610	130	500
1,2-Dichloropropane	ND		ug/kg	2100	140	500
Dibromochloromethane	ND		ug/kg	610	190	500
1,1,2-Trichloroethane	ND		ug/kg	920	190	500
Tetrachloroethene	ND		ug/kg	610	86.	500
Chlorobenzene	ND		ug/kg	610	210	500
Trichlorofluoromethane	ND		ug/kg	3000	74.	500
1,2-Dichloroethane	ND		ug/kg	610	89.	500
1,1,1-Trichloroethane	ND		ug/kg	610	68.	500
Bromodichloromethane	ND		ug/kg	610	140	500
trans-1,3-Dichloropropene	ND		ug/kg	610	74.	500
cis-1,3-Dichloropropene	ND		ug/kg	610	78.	500
Bromoform	ND		ug/kg	2400	250	500
1,1,2,2-Tetrachloroethane	ND		ug/kg	610	100	500
Benzene	800		ug/kg	610	72.	500
Toluene	8300		ug/kg	920	68.	500
Ethylbenzene	14000		ug/kg	610	90.	500
Chloromethane	ND		ug/kg	3000	480	500
Bromomethane	ND		ug/kg	1200	210	500
Vinyl chloride	ND		ug/kg	1200	86.	500
Chloroethane	ND		ug/kg	1200	190	500
1,1-Dichloroethene	ND		ug/kg	610	120	500
trans-1,2-Dichloroethene	ND		ug/kg	920	130	500
Trichloroethene	ND		ug/kg	610	93.	500
1,2-Dichlorobenzene	ND		ug/kg	3000	110	500
1,3-Dichlorobenzene	ND		ug/kg	3000	110	500
1,4-Dichlorobenzene	ND		ug/kg	3000	150	500
Methyl tert butyl ether	ND		ug/kg	1200	64.	500

SAMPLE RESULTS

Lab ID: L1401509-02 D
Client ID: SB-5 (6-8)
Sample Location: 2424 HAMBURG TURNPIKE
Date Collected: 01/14/14 12:30
Date Received: 01/15/14
Field Prep: Not Specified

Volatile Organics by GC/MS - Westborough Lab

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
p/m-Xylene	60000		ug/kg	1200	200	500
o-Xylene	19000		ug/kg	1200	160	500
cis-1,2-Dichloroethene	ND		ug/kg	610	91.	500
Styrene	ND		ug/kg	1200	190	500
Dichlorodifluoromethane	ND		ug/kg	6100	130	500
Acetone	ND		ug/kg	6100	1900	500
Carbon disulfide	ND		ug/kg	6100	1200	500
2-Butanone	ND		ug/kg	6100	220	500
4-Methyl-2-pentanone	ND		ug/kg	6100	150	500
2-Hexanone	ND		ug/kg	6100	120	500
Bromochloromethane	ND		ug/kg	3000	120	500
1,2-Dibromoethane	ND		ug/kg	2400	110	500
n-Butylbenzene	4400		ug/kg	610	120	500
sec-Butylbenzene	1300		ug/kg	610	120	500
1,2-Dibromo-3-chloropropane	ND		ug/kg	3000	480	500
Isopropylbenzene	2100		ug/kg	610	100	500
p-Isopropyltoluene	900		ug/kg	610	120	500
n-Propylbenzene	11000		ug/kg	610	77.	500
1,2,3-Trichlorobenzene	ND		ug/kg	3000	100	500
1,2,4-Trichlorobenzene	ND		ug/kg	3000	480	500
1,3,5-Trimethylbenzene	21000		ug/kg	3000	88.	500
1,2,4-Trimethylbenzene	74000		ug/kg	3000	350	500
Methyl Acetate	ND		ug/kg	12000	470	500
Cyclohexane	ND		ug/kg	12000	660	500
1,4-Dioxane	ND		ug/kg	61000	11000	500
Freon-113	ND		ug/kg	12000	170	500
Methyl cyclohexane	16000		ug/kg	2400	770	500

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	104		70-130
Toluene-d8	94		70-130
4-Bromofluorobenzene	99		70-130
Dibromofluoromethane	94		70-130

SAMPLE RESULTS

Lab ID:	L1401509-03 D	Date Collected:	01/14/14 14:15
Client ID:	SB-6 (2-4)	Date Received:	01/15/14
Sample Location:	2424 HAMBURG TURNPIKE	Field Prep:	Not Specified
Matrix:	Soil		
Analytical Method:	1,8260C		
Analytical Date:	01/19/14 17:11		
Analyst:	BN		
Percent Solids:	83%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methylene chloride	ND		ug/kg	1200	240	1000
1,1-Dichloroethane	ND		ug/kg	180	21.	1000
Chloroform	ND		ug/kg	180	45.	1000
Carbon tetrachloride	ND		ug/kg	120	25.	1000
1,2-Dichloropropane	ND		ug/kg	420	28.	1000
Dibromochloromethane	ND		ug/kg	120	37.	1000
1,1,2-Trichloroethane	ND		ug/kg	180	37.	1000
Tetrachloroethene	ND		ug/kg	120	17.	1000
Chlorobenzene	ND		ug/kg	120	42.	1000
Trichlorofluoromethane	ND		ug/kg	600	15.	1000
1,2-Dichloroethane	ND		ug/kg	120	18.	1000
1,1,1-Trichloroethane	ND		ug/kg	120	13.	1000
Bromodichloromethane	ND		ug/kg	120	28.	1000
trans-1,3-Dichloropropene	ND		ug/kg	120	14.	1000
cis-1,3-Dichloropropene	ND		ug/kg	120	15.	1000
Bromoform	ND		ug/kg	480	50.	1000
1,1,2,2-Tetrachloroethane	ND		ug/kg	120	21.	1000
Benzene	1500		ug/kg	120	14.	1000
Toluene	16000		ug/kg	180	14.	1000
Ethylbenzene	5700		ug/kg	120	18.	1000
Chloromethane	ND		ug/kg	600	94.	1000
Bromomethane	ND		ug/kg	240	41.	1000
Vinyl chloride	ND		ug/kg	240	17.	1000
Chloroethane	ND		ug/kg	240	38.	1000
1,1-Dichloroethene	ND		ug/kg	120	25.	1000
trans-1,2-Dichloroethene	ND		ug/kg	180	26.	1000
Trichloroethene	ND		ug/kg	120	18.	1000
1,2-Dichlorobenzene	ND		ug/kg	600	22.	1000
1,3-Dichlorobenzene	ND		ug/kg	600	22.	1000
1,4-Dichlorobenzene	ND		ug/kg	600	29.	1000
Methyl tert butyl ether	ND		ug/kg	240	12.	1000

SAMPLE RESULTS

Lab ID:	L1401509-03 D	Date Collected:	01/14/14 14:15
Client ID:	SB-6 (2-4)	Date Received:	01/15/14
Sample Location:	2424 HAMBURG TURNPIKE	Field Prep:	Not Specified

Volatile Organics by GC/MS - Westborough Lab

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
p/m-Xylene	21000		ug/kg	240	39.	1000
o-Xylene	8300		ug/kg	240	33.	1000
cis-1,2-Dichloroethene	ND		ug/kg	120	18.	1000
Styrene	ND		ug/kg	240	37.	1000
Dichlorodifluoromethane	ND		ug/kg	1200	26.	1000
Acetone	ND		ug/kg	1200	370	1000
Carbon disulfide	ND		ug/kg	1200	240	1000
2-Butanone	ND		ug/kg	1200	43.	1000
4-Methyl-2-pentanone	ND		ug/kg	1200	30.	1000
2-Hexanone	ND		ug/kg	1200	23.	1000
Bromochloromethane	ND		ug/kg	600	24.	1000
1,2-Dibromoethane	ND		ug/kg	480	21.	1000
n-Butylbenzene	600		ug/kg	120	24.	1000
sec-Butylbenzene	220		ug/kg	120	25.	1000
1,2-Dibromo-3-chloropropane	ND		ug/kg	600	95.	1000
Isopropylbenzene	460		ug/kg	120	20.	1000
p-Isopropyltoluene	140		ug/kg	120	23.	1000
n-Propylbenzene	2500		ug/kg	120	15.	1000
1,2,3-Trichlorobenzene	ND		ug/kg	600	20.	1000
1,2,4-Trichlorobenzene	ND		ug/kg	600	95.	1000
1,3,5-Trimethylbenzene	3300		ug/kg	600	17.	1000
1,2,4-Trimethylbenzene	14000		ug/kg	600	69.	1000
Methyl Acetate	ND		ug/kg	2400	92.	1000
Cyclohexane	ND		ug/kg	2400	130	1000
1,4-Dioxane	ND		ug/kg	12000	2100	1000
Freon-113	ND		ug/kg	2400	33.	1000
Methyl cyclohexane	1800		ug/kg	480	150	1000

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	105		70-130
Toluene-d8	94		70-130
4-Bromofluorobenzene	94		70-130
Dibromofluoromethane	90		70-130

SAMPLE RESULTS

Lab ID:	L1401509-04 D	Date Collected:	01/14/14 13:45
Client ID:	SB-7 (2-4)	Date Received:	01/15/14
Sample Location:	2424 HAMBURG TURNPIKE	Field Prep:	Not Specified
Matrix:	Soil		
Analytical Method:	1,8260C		
Analytical Date:	01/19/14 17:39		
Analyst:	BN		
Percent Solids:	86%		

Parameter	**Result**	**Qualifier**	**Units**	**RL**	**MDL**	**Dilution Factor**
Volatile Organics by GC/MS - Westborough Lab						
Methylene chloride	ND		ug/kg	580	120	50
1,1-Dichloroethane	ND		ug/kg	87	10.	50
Chloroform	ND		ug/kg	87	22.	50
Carbon tetrachloride	ND		ug/kg	58	12.	50
1,2-Dichloropropane	ND		ug/kg	200	13.	50
Dibromochloromethane	ND		ug/kg	58	18.	50
1,1,2-Trichloroethane	ND		ug/kg	87	18.	50
Tetrachloroethene	ND		ug/kg	58	8.2	50
Chlorobenzene	ND		ug/kg	58	20.	50
Trichlorofluoromethane	ND		ug/kg	290	7.0	50
1,2-Dichloroethane	ND		ug/kg	58	8.5	50
1,1,1-Trichloroethane	ND		ug/kg	58	6.4	50
Bromodichloromethane	ND		ug/kg	58	13.	50
trans-1,3-Dichloropropene	ND		ug/kg	58	7.0	50
cis-1,3-Dichloropropene	ND		ug/kg	58	7.4	50
Bromoform	ND		ug/kg	230	24.	50
1,1,2,2-Tetrachloroethane	ND		ug/kg	58	9.9	50
Benzene	83		ug/kg	58	6.9	50
Toluene	260		ug/kg	87	6.5	50
Ethylbenzene	250		ug/kg	58	8.6	50
Chloromethane	ND		ug/kg	290	46.	50
Bromomethane	ND		ug/kg	120	20.	50
Vinyl chloride	ND		ug/kg	120	8.2	50
Chloroethane	ND		ug/kg	120	18.	50
1,1-Dichloroethene	ND		ug/kg	58	12.	50
trans-1,2-Dichloroethene	ND		ug/kg	87	12.	50
Trichloroethene	ND		ug/kg	58	8.8	50
1,2-Dichlorobenzene	ND		ug/kg	290	11.	50
1,3-Dichlorobenzene	ND		ug/kg	290	11.	50
1,4-Dichlorobenzene	ND		ug/kg	290	14.	50
Methyl tert butyl ether	ND		ug/kg	120	6.0	50

SAMPLE RESULTS

Lab ID:	L1401509-04	D	Date Collected:	01/14/14 13:45
Client ID:	SB-7 (2-4)		Date Received:	01/15/14
Sample Location:	2424 HAMBURG TURNPIKE		Field Prep:	Not Specified

Parameter	**Result**	**Qualifier**	**Units**	**RL**	**MDL**	**Dilution Factor**
Volatile Organics by GC/MS - Westborough Lab						
p/m-Xylene	1400		ug/kg	120	19.	50
o-Xylene	480		ug/kg	120	16.	50
cis-1,2-Dichloroethene	ND		ug/kg	58	8.7	50
Styrene	ND		ug/kg	120	18.	50
Dichlorodifluoromethane	ND		ug/kg	580	13.	50
Acetone	ND		ug/kg	580	180	50
Carbon disulfide	ND		ug/kg	580	120	50
2-Butanone	ND		ug/kg	580	21.	50
4-Methyl-2-pentanone	ND		ug/kg	580	14.	50
2-Hexanone	ND		ug/kg	580	11.	50
Bromochloromethane	ND		ug/kg	290	11.	50
1,2-Dibromoethane	ND		ug/kg	230	10.	50
n-Butylbenzene	230		ug/kg	58	11.	50
sec-Butylbenzene	60		ug/kg	58	12.	50
1,2-Dibromo-3-chloropropane	ND		ug/kg	290	46.	50
Isopropylbenzene	46	J	ug/kg	58	9.7	50
p-Isopropyltoluene	56	J	ug/kg	58	11.	50
n-Propylbenzene	230		ug/kg	58	7.3	50
1,2,3-Trichlorobenzene	ND		ug/kg	290	9.8	50
1,2,4-Trichlorobenzene	ND		ug/kg	290	46.	50
1,3,5-Trimethylbenzene	960		ug/kg	290	8.3	50
1,2,4-Trimethylbenzene	3100		ug/kg	290	33.	50
Methyl Acetate	ND		ug/kg	1200	44.	50
Cyclohexane	ND		ug/kg	1200	62.	50
1,4-Dioxane	ND		ug/kg	5800	1000	50
Freon-113	ND		ug/kg	1200	16.	50
Methyl cyclohexane	390		ug/kg	230	73.	50

Surrogate	**% Recovery**	**Qualifier**	**Acceptance Criteria**
1,2-Dichloroethane-d4	99		70-130
Toluene-d8	94		70-130
4-Bromofluorobenzene	95		70-130
Dibromofluoromethane	95		70-130

SAMPLE RESULTS

Lab ID:	L1401509-05 D	Date Collected:	01/14/14 16:00
Client ID:	SB-8 (6-8)	Date Received:	01/15/14
Sample Location:	2424 HAMBURG TURNPIKE	Field Prep:	Not Specified
Matrix:	Soil		
Analytical Method:	1,8260C		
Analytical Date:	01/19/14 18:06		
Analyst:	BN		
Percent Solids:	64%		

Volatile Organics by GC/MS - Westborough Lab

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Methylene chloride	ND		ug/kg	7800	1600	500
1,1-Dichloroethane	ND		ug/kg	1200	140	500
Chloroform	ND		ug/kg	1200	290	500
Carbon tetrachloride	ND		ug/kg	780	160	500
1,2-Dichloropropane	ND		ug/kg	2700	180	500
Dibromochloromethane	ND		ug/kg	780	240	500
1,1,2-Trichloroethane	ND		ug/kg	1200	240	500
Tetrachloroethene	ND		ug/kg	780	110	500
Chlorobenzene	ND		ug/kg	780	270	500
Trichlorofluoromethane	ND		ug/kg	3900	95.	500
1,2-Dichloroethane	ND		ug/kg	780	110	500
1,1,1-Trichloroethane	ND		ug/kg	780	86.	500
Bromodichloromethane	ND		ug/kg	780	180	500
trans-1,3-Dichloropropene	ND		ug/kg	780	94.	500
cis-1,3-Dichloropropene	ND		ug/kg	780	99.	500
Bromoform	ND		ug/kg	3100	320	500
1,1,2,2-Tetrachloroethane	ND		ug/kg	780	130	500
Benzene	11000		ug/kg	780	92.	500
Toluene	2200		ug/kg	1200	87.	500
Ethylbenzene	39000		ug/kg	780	110	500
Chloromethane	ND		ug/kg	3900	610	500
Bromomethane	ND		ug/kg	1600	260	500
Vinyl chloride	ND		ug/kg	1600	110	500
Chloroethane	ND		ug/kg	1600	250	500
1,1-Dichloroethene	ND		ug/kg	780	160	500
trans-1,2-Dichloroethene	ND		ug/kg	1200	160	500
Trichloroethene	ND		ug/kg	780	120	500
1,2-Dichlorobenzene	ND		ug/kg	3900	140	500
1,3-Dichlorobenzene	ND		ug/kg	3900	140	500
1,4-Dichlorobenzene	ND		ug/kg	3900	190	500
Methyl tert butyl ether	ND		ug/kg	1600	81.	500

SAMPLE RESULTS

Lab ID:	L1401509-05	D	Date Collected:	01/14/14 16:00
Client ID:	SB-8 (6-8)		Date Received:	01/15/14
Sample Location:	2424 HAMBURG TURNPIKE		Field Prep:	Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
p/m-Xylene	160000		ug/kg	1600	250	500
o-Xylene	3600		ug/kg	1600	210	500
cis-1,2-Dichloroethene	ND		ug/kg	780	120	500
Styrene	ND		ug/kg	1600	240	500
Dichlorodifluoromethane	ND		ug/kg	7800	170	500
Acetone	ND		ug/kg	7800	2400	500
Carbon disulfide	ND		ug/kg	7800	1600	500
2-Butanone	ND		ug/kg	7800	280	500
4-Methyl-2-pentanone	ND		ug/kg	7800	190	500
2-Hexanone	ND		ug/kg	7800	150	500
Bromochloromethane	ND		ug/kg	3900	150	500
1,2-Dibromoethane	ND		ug/kg	3100	140	500
n-Butylbenzene	5200		ug/kg	780	150	500
sec-Butylbenzene	1500		ug/kg	780	160	500
1,2-Dibromo-3-chloropropane	ND		ug/kg	3900	620	500
Isopropylbenzene	3200		ug/kg	780	130	500
p-Isopropyltoluene	810		ug/kg	780	150	500
n-Propylbenzene	18000		ug/kg	780	98.	500
1,2,3-Trichlorobenzene	ND		ug/kg	3900	130	500
1,2,4-Trichlorobenzene	ND		ug/kg	3900	620	500
1,3,5-Trimethylbenzene	35000		ug/kg	3900	110	500
1,2,4-Trimethylbenzene	110000		ug/kg	3900	450	500
Methyl Acetate	ND		ug/kg	16000	600	500
Cyclohexane	ND		ug/kg	16000	840	500
1,4-Dioxane	ND		ug/kg	78000	14000	500
Freon-113	ND		ug/kg	16000	210	500
Methyl cyclohexane	49000		ug/kg	3100	980	500

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	106		70-130
Toluene-d8	95		70-130
4-Bromofluorobenzene	96		70-130
Dibromofluoromethane	92		70-130

SAMPLE RESULTS

Lab ID:	L1401509-06	D	Date Collected:	01/14/14 16:30
Client ID:	SB-9 (6-8)		Date Received:	01/15/14
Sample Location:	2424 HAMBURG TURNPIKE		Field Prep:	Not Specified
Matrix:	Soil			
Analytical Method:	1,8260C			
Analytical Date:	01/19/14 18:34			
Analyst:	BN			
Percent Solids:	85%			

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methylene chloride	ND		ug/kg	2900	590	250
1,1-Dichloroethane	ND		ug/kg	440	52.	250
Chloroform	ND		ug/kg	440	110	250
Carbon tetrachloride	ND		ug/kg	290	62.	250
1,2-Dichloropropane	ND		ug/kg	1000	67.	250
Dibromochloromethane	ND		ug/kg	290	91.	250
1,1,2-Trichloroethane	ND		ug/kg	440	90.	250
Tetrachloroethene	ND		ug/kg	290	41.	250
Chlorobenzene	ND		ug/kg	290	100	250
Trichlorofluoromethane	ND		ug/kg	1500	36.	250
1,2-Dichloroethane	ND		ug/kg	290	43.	250
1,1,1-Trichloroethane	ND		ug/kg	290	33.	250
Bromodichloromethane	ND		ug/kg	290	67.	250
trans-1,3-Dichloropropene	ND		ug/kg	290	36.	250
cis-1,3-Dichloropropene	ND		ug/kg	290	37.	250
Bromoform	ND		ug/kg	1200	120	250
1,1,2,2-Tetrachloroethane	ND		ug/kg	290	50.	250
Benzene	1600		ug/kg	290	35.	250
Toluene	1000		ug/kg	440	33.	250
Ethylbenzene	8000		ug/kg	290	43.	250
Chloromethane	ND		ug/kg	1500	230	250
Bromomethane	ND		ug/kg	590	100	250
Vinyl chloride	ND		ug/kg	590	42.	250
Chloroethane	ND		ug/kg	590	93.	250
1,1-Dichloroethene	ND		ug/kg	290	61.	250
trans-1,2-Dichloroethene	ND		ug/kg	440	62.	250
Trichloroethene	ND		ug/kg	290	45.	250
1,2-Dichlorobenzene	ND		ug/kg	1500	54.	250
1,3-Dichlorobenzene	ND		ug/kg	1500	54.	250
1,4-Dichlorobenzene	ND		ug/kg	1500	71.	250
Methyl tert butyl ether	ND		ug/kg	590	31.	250

SAMPLE RESULTS

Lab ID:	L1401509-06 D	Date Collected:	01/14/14 16:30
Client ID:	SB-9 (6-8)	Date Received:	01/15/14
Sample Location:	2424 HAMBURG TURNPIKE	Field Prep:	Not Specified

Volatile Organics by GC/MS - Westborough Lab

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
p/m-Xylene	16000		ug/kg	590	95.	250
o-Xylene	870		ug/kg	590	80.	250
cis-1,2-Dichloroethene	ND		ug/kg	290	44.	250
Styrene	ND		ug/kg	590	91.	250
Dichlorodifluoromethane	ND		ug/kg	2900	64.	250
Acetone	ND		ug/kg	2900	910	250
Carbon disulfide	ND		ug/kg	2900	590	250
2-Butanone	ND		ug/kg	2900	100	250
4-Methyl-2-pentanone	ND		ug/kg	2900	72.	250
2-Hexanone	ND		ug/kg	2900	55.	250
Bromochloromethane	ND		ug/kg	1500	58.	250
1,2-Dibromoethane	ND		ug/kg	1200	52.	250
n-Butylbenzene	3200		ug/kg	290	58.	250
sec-Butylbenzene	980		ug/kg	290	61.	250
1,2-Dibromo-3-chloropropane	ND		ug/kg	1500	230	250
Isopropylbenzene	1600		ug/kg	290	49.	250
p-Isopropyltoluene	620		ug/kg	290	56.	250
n-Propylbenzene	8200		ug/kg	290	37.	250
1,2,3-Trichlorobenzene	ND		ug/kg	1500	49.	250
1,2,4-Trichlorobenzene	ND		ug/kg	1500	230	250
1,3,5-Trimethylbenzene	10000		ug/kg	1500	42.	250
1,2,4-Trimethylbenzene	49000		ug/kg	1500	170	250
Methyl Acetate	ND		ug/kg	5900	220	250
Cyclohexane	ND		ug/kg	5900	320	250
1,4-Dioxane	ND		ug/kg	29000	5100	250
Freon-113	ND		ug/kg	5900	80.	250
Methyl cyclohexane	12000		ug/kg	1200	370	250

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	103		70-130
Toluene-d8	94		70-130
4-Bromofluorobenzene	101		70-130
Dibromofluoromethane	93		70-130

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 01/19/14 09:18
Analyst: BN

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 01-06 Batch: WG665659-3					
Methylene chloride	ND		ug/kg	10	2.0
1,1-Dichloroethane	ND		ug/kg	1.5	0.18
Chloroform	ND		ug/kg	1.5	0.37
Carbon tetrachloride	ND		ug/kg	1.0	0.21
1,2-Dichloropropane	ND		ug/kg	3.5	0.23
Dibromochloromethane	ND		ug/kg	1.0	0.31
1,1,2-Trichloroethane	ND		ug/kg	1.5	0.30
Tetrachloroethene	ND		ug/kg	1.0	0.14
Chlorobenzene	ND		ug/kg	1.0	0.35
Trichlorofluoromethane	ND		ug/kg	5.0	0.12
1,2-Dichloroethane	ND		ug/kg	1.0	0.15
1,1,1-Trichloroethane	ND		ug/kg	1.0	0.11
Bromodichloromethane	ND		ug/kg	1.0	0.23
trans-1,3-Dichloropropene	ND		ug/kg	1.0	0.12
cis-1,3-Dichloropropene	ND		ug/kg	1.0	0.13
Bromoform	ND		ug/kg	4.0	0.41
1,1,2,2-Tetrachloroethane	ND		ug/kg	1.0	0.17
Benzene	ND		ug/kg	1.0	0.12
Toluene	ND		ug/kg	1.5	0.11
Ethylbenzene	ND		ug/kg	1.0	0.15
Chloromethane	ND		ug/kg	5.0	0.78
Bromomethane	ND		ug/kg	2.0	0.34
Vinyl chloride	ND		ug/kg	2.0	0.14
Chloroethane	ND		ug/kg	2.0	0.32
1,1-Dichloroethene	ND		ug/kg	1.0	0.20
trans-1,2-Dichloroethene	ND		ug/kg	1.5	0.21
Trichloroethene	ND		ug/kg	1.0	0.15
1,2-Dichlorobenzene	ND		ug/kg	5.0	0.18
1,3-Dichlorobenzene	ND		ug/kg	5.0	0.18
1,4-Dichlorobenzene	ND		ug/kg	5.0	0.24
Methyl tert butyl ether	ND		ug/kg	2.0	0.10

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 01/19/14 09:18
Analyst: BN

Parameter	**Result**	**Qualifier**	**Units**	**RL**	**MDL**
Volatile Organics by GC/MS - Westborough Lab for sample(s): 01-06 Batch: WG665659-3					
p/m-Xylene	ND		ug/kg	2.0	0.32
o-Xylene	ND		ug/kg	2.0	0.27
cis-1,2-Dichloroethene	ND		ug/kg	1.0	0.15
Styrene	ND		ug/kg	2.0	0.31
Dichlorodifluoromethane	ND		ug/kg	10	0.22
Acetone	ND		ug/kg	10	3.1
Carbon disulfide	ND		ug/kg	10	2.0
2-Butanone	ND		ug/kg	10	0.36
4-Methyl-2-pentanone	ND		ug/kg	10	0.24
2-Hexanone	ND		ug/kg	10	0.19
Bromochloromethane	ND		ug/kg	5.0	0.20
1,2-Dibromoethane	ND		ug/kg	4.0	0.18
n-Butylbenzene	ND		ug/kg	1.0	0.20
sec-Butylbenzene	ND		ug/kg	1.0	0.20
1,2-Dibromo-3-chloropropane	ND		ug/kg	5.0	0.79
Isopropylbenzene	ND		ug/kg	1.0	0.17
p-Isopropyltoluene	ND		ug/kg	1.0	0.19
n-Propylbenzene	ND		ug/kg	1.0	0.12
1,2,3-Trichlorobenzene	ND		ug/kg	5.0	0.17
1,2,4-Trichlorobenzene	ND		ug/kg	5.0	0.79
1,3,5-Trimethylbenzene	ND		ug/kg	5.0	0.14
1,2,4-Trimethylbenzene	ND		ug/kg	5.0	0.57
Methyl Acetate	ND		ug/kg	20	0.76
Cyclohexane	ND		ug/kg	20	1.1
1,4-Dioxane	ND		ug/kg	100	17.
Freon-113	ND		ug/kg	20	0.27
Methyl cyclohexane	ND		ug/kg	4.0	1.3

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 01/19/14 09:18
Analyst: BN

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 01-06 Batch: WG665659-3					
Tentatively Identified Compounds					
No Tentatively Identified Compounds	ND		ug/kg		

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	98		70-130
Toluene-d8	93		70-130
4-Bromofluorobenzene	95		70-130
Dibromofluoromethane	101		70-130

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2424 HAMBURG TURNPIKE

Lab Number: L1401509

Project Number: 0298-014-001

Report Date: 01/22/14

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-06 Batch: WG665659-1 WG665659-2								
Methylene chloride	111		106		70-130	5		30
1,1-Dichloroethane	109		101		70-130	8		30
Chloroform	110		104		70-130	6		30
Carbon tetrachloride	108		96		70-130	12		30
1,2-Dichloropropane	111		105		70-130	6		30
Dibromochloromethane	102		100		70-130	2		30
1,1,2-Trichloroethane	102		100		70-130	2		30
Tetrachloroethene	101		91		70-130	10		30
Chlorobenzene	103		98		70-130	5		30
Trichlorofluoromethane	132		115		70-139	14		30
1,2-Dichloroethane	110		107		70-130	3		30
1,1,1-Trichloroethane	110		98		70-130	12		30
Bromodichloromethane	111		106		70-130	5		30
trans-1,3-Dichloropropene	101		97		70-130	4		30
cis-1,3-Dichloropropene	110		105		70-130	5		30
1,1-Dichloropropene	112		100		70-130	11		30
Bromoform	95		94		70-130	1		30
1,1,2,2-Tetrachloroethane	96		94		70-130	2		30
Benzene	110		102		70-130	8		30
Toluene	99		93		70-130	6		30
Ethylbenzene	101		94		70-130	7		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: 2424 HAMBURG TURNPIKE

Project Number: 0298-014-001

Lab Number: L1401509

Report Date: 01/22/14

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-06 Batch: WG665659-1 WG665659-2								
Chloromethane	97		88		52-130	10		30
Bromomethane	120		111		57-147	8		30
Vinyl chloride	116		101		67-130	14		30
Chloroethane	113		105		50-151	7		30
1,1-Dichloroethene	112		98		65-135	13		30
trans-1,2-Dichloroethene	109		100		70-130	9		30
Trichloroethene	111		102		70-130	8		30
1,2-Dichlorobenzene	98		95		70-130	3		30
1,3-Dichlorobenzene	98		93		70-130	5		30
1,4-Dichlorobenzene	98		94		70-130	4		30
Methyl tert butyl ether	107		103		66-130	4		30
p/m-Xylene	103		96		70-130	7		30
o-Xylene	103		96		70-130	7		30
cis-1,2-Dichloroethene	112		104		70-130	7		30
Dibromomethane	114		108		70-130	5		30
Styrene	104		98		70-130	6		30
Dichlorodifluoromethane	102		89		30-146	14		30
Acetone	138		114		54-140	19		30
Carbon disulfide	104		92		59-130	12		30
2-Butanone	126		111		70-130	13		30
Vinyl acetate	107		104		70-130	3		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2424 HAMBURG TURNPIKE

Project Number: 0298-014-001

Lab Number: L1401509

Report Date: 01/22/14

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-06 Batch: WG665659-1 WG665659-2								
4-Methyl-2-pentanone	104		101		70-130	3		30
1,2,3-Trichloropropane	95		93		68-130	2		30
2-Hexanone	100		92		70-130	8		30
Bromochloromethane	116		112		70-130	4		30
2,2-Dichloropropane	109		98		70-130	11		30
1,2-Dibromoethane	100		98		70-130	2		30
1,3-Dichloropropane	100		98		69-130	2		30
1,1,1,2-Tetrachloroethane	102		98		70-130	4		30
Bromobenzene	95		91		70-130	4		30
n-Butylbenzene	100		91		70-130	9		30
sec-Butylbenzene	98		90		70-130	9		30
tert-Butylbenzene	96		89		70-130	8		30
o-Chlorotoluene	97		90		70-130	7		30
p-Chlorotoluene	96		91		70-130	5		30
1,2-Dibromo-3-chloropropane	88		91		68-130	3		30
Hexachlorobutadiene	93		86		67-130	8		30
Isopropylbenzene	96		88		70-130	9		30
p-Isopropyltoluene	97		90		70-130	7		30
Naphthalene	94		93		70-130	1		30
Acrylonitrile	105		105		70-130	0		30
Isopropyl Ether	105		101		66-130	4		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2424 HAMBURG TURNPIKE
Lab Number: L1401509
Project Number: 0298-014-001
Report Date: 01/22/14

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-06 Batch: WG665659-1 WG665659-2								
tert-Butyl Alcohol	96		97		70-130	1		30
n-Propylbenzene	98		90		70-130	9		30
1,2,3-Trichlorobenzene	97		97		70-130	0		30
1,2,4-Trichlorobenzene	98		96		70-130	2		30
1,3,5-Trimethylbenzene	97		90		70-130	7		30
1,2,4-Trimethylbenzene	96		91		70-130	5		30
Methyl Acetate	98		96		51-146	2		30
Ethyl Acetate	104		103		70-130	1		30
Acrolein	93		91		70-130	2		30
Cyclohexane	112		98		59-142	13		30
1,4-Dioxane	111		109		65-136	2		30
Freon-113	117		102		50-139	14		30
1,4-Diethylbenzene	98		90		70-130	9		30
4-Ethyltoluene	97		90		70-130	7		30
1,2,4,5-Tetramethylbenzene	98		93		70-130	5		30
Tetrahydrofuran	101		94		66-130	7		30
Ethyl ether	116		111		67-130	4		30
trans-1,4-Dichloro-2-butene	92		90		70-130	2		30
Methyl cyclohexane	117		102		70-130	14		30
Ethyl-Tert-Butyl-Ether	106		102		70-130	4		30
Tertiary-Amyl Methyl Ether	108		103		70-130	5		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2424 HAMBURG TURNPIKE

Project Number: 0298-014-001

Lab Number: L1401509

Report Date: 01/22/14

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits

Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-06 Batch: WG665659-1 WG665659-2

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	98		98		70-130
Toluene-d8	93		94		70-130
4-Bromofluorobenzene	95		95		70-130
Dibromofluoromethane	100		101		70-130

SEMIVOLATILES

SAMPLE RESULTS

Lab ID:	L1401509-01	Date Collected:	01/14/14 11:45
Client ID:	SB-4 (6-8)	Date Received:	01/15/14
Sample Location:	2424 HAMBURG TURNPIKE	Field Prep:	Not Specified
Matrix:	Soil	Extraction Method:	EPA 3546
Analytical Method:	1,8270D	Extraction Date:	01/17/14 03:10
Analytical Date:	01/18/14 22:59		
Analyst:	RC		
Percent Solids:	76%		

Parameter	**Result**	**Qualifier**	**Units**	**RL**	**MDL**	**Dilution Factor**
Semivolatile Organics by GC/MS - Westborough Lab						
Acenaphthene	490		ug/kg	170	44.	1
Fluoranthene	3200		ug/kg	130	40.	1
Naphthalene	8000		ug/kg	220	72.	1
Benzo(a)anthracene	1100		ug/kg	130	42.	1
Benzo(a)pyrene	760		ug/kg	170	53.	1
Benzo(b)fluoranthene	1200		ug/kg	130	44.	1
Benzo(k)fluoranthene	380		ug/kg	130	41.	1
Chrysene	1200		ug/kg	130	42.	1
Acenaphthylene	340		ug/kg	170	40.	1
Anthracene	860		ug/kg	130	36.	1
Benzo(ghi)perylene	470		ug/kg	170	45.	1
Fluorene	1300		ug/kg	220	62.	1
Phenanthrene	3800		ug/kg	130	42.	1
Dibenzo(a,h)anthracene	120	J	ug/kg	130	42.	1
Indeno(1,2,3-cd)pyrene	540		ug/kg	170	48.	1
Pyrene	2300		ug/kg	130	42.	1

Surrogate	**% Recovery**	**Qualifier**	**Acceptance Criteria**
Nitrobenzene-d5	78		23-120
2-Fluorobiphenyl	82		30-120
4-Terphenyl-d14	81		18-120

SAMPLE RESULTS

Lab ID:	L1401509-02	D	Date Collected:	01/14/14 12:30
Client ID:	SB-5 (6-8)		Date Received:	01/15/14
Sample Location:	2424 HAMBURG TURNPIKE		Field Prep:	Not Specified
Matrix:	Soil		Extraction Method:	EPA 3546
Analytical Method:	1,8270D		Extraction Date:	01/17/14 03:10
Analytical Date:	01/21/14 20:21			
Analyst:	RC			
Percent Solids:	82%			

Parameter	**Result**	**Qualifier**	**Units**	**RL**	**MDL**	**Dilution Factor**
Semivolatile Organics by GC/MS - Westborough Lab						
Acenaphthene	3300		ug/kg	3200	840	20
Fluoranthene	140000		ug/kg	2400	750	20
Naphthalene	50000		ug/kg	4100	1400	20
Benzo(a)anthracene	71000		ug/kg	2400	800	20
Benzo(a)pyrene	63000		ug/kg	3200	1000	20
Benzo(b)fluoranthene	79000		ug/kg	2400	820	20
Benzo(k)fluoranthene	33000		ug/kg	2400	780	20
Chrysene	71000		ug/kg	2400	800	20
Acenaphthylene	21000		ug/kg	3200	760	20
Anthracene	39000		ug/kg	2400	680	20
Benzo(ghi)perylene	38000		ug/kg	3200	850	20
Fluorene	24000		ug/kg	4100	1200	20
Phenanthrene	130000		ug/kg	2400	800	20
Dibenzo(a,h)anthracene	10000		ug/kg	2400	790	20
Indeno(1,2,3-cd)pyrene	41000		ug/kg	3200	900	20
Pyrene	110000		ug/kg	2400	790	20

Surrogate	**% Recovery**	**Qualifier**	**Acceptance Criteria**
Nitrobenzene-d5	**0**	Q	23-120
2-Fluorobiphenyl	**0**	Q	30-120
4-Terphenyl-d14	**0**	Q	18-120

SAMPLE RESULTS

Lab ID:	L1401509-03 D	Date Collected:	01/14/14 14:15
Client ID:	SB-6 (2-4)	Date Received:	01/15/14
Sample Location:	2424 HAMBURG TURNPIKE	Field Prep:	Not Specified
Matrix:	Soil	Extraction Method:	EPA 3546
Analytical Method:	1,8270D	Extraction Date:	01/17/14 03:10
Analytical Date:	01/21/14 20:46		
Analyst:	RC		
Percent Solids:	83%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Acenaphthene	ND		ug/kg	3200	820	20
Fluoranthene	3400		ug/kg	2400	730	20
Naphthalene	48000		ug/kg	4000	1300	20
Benzo(a)anthracene	1600	J	ug/kg	2400	780	20
Benzo(a)pyrene	1600	J	ug/kg	3200	970	20
Benzo(b)fluoranthene	2300	J	ug/kg	2400	800	20
Benzo(k)fluoranthene	1000	J	ug/kg	2400	760	20
Chrysene	1600	J	ug/kg	2400	780	20
Acenaphthylene	ND		ug/kg	3200	740	20
Anthracene	760	J	ug/kg	2400	660	20
Benzo(ghi)perylene	1600	J	ug/kg	3200	830	20
Fluorene	1400	J	ug/kg	4000	1100	20
Phenanthrene	3200		ug/kg	2400	780	20
Dibenzo(a,h)anthracene	ND		ug/kg	2400	770	20
Indeno(1,2,3-cd)pyrene	1800	J	ug/kg	3200	880	20
Pyrene	2700		ug/kg	2400	770	20

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	**0**	Q	23-120
2-Fluorobiphenyl	**0**	Q	30-120
4-Terphenyl-d14	**0**	Q	18-120

SAMPLE RESULTS

Lab ID:	L1401509-04	Date Collected:	01/14/14 13:45
Client ID:	SB-7 (2-4)	Date Received:	01/15/14
Sample Location:	2424 HAMBURG TURNPIKE	Field Prep:	Not Specified
Matrix:	Soil	Extraction Method:	EPA 3546
Analytical Method:	1,8270D	Extraction Date:	01/17/14 03:34
Analytical Date:	01/19/14 00:22		
Analyst:	RC		
Percent Solids:	86%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Acenaphthene	ND		ug/kg	150	40.	1
Fluoranthene	270		ug/kg	120	35.	1
Naphthalene	600		ug/kg	190	64.	1
Benzo(a)anthracene	190		ug/kg	120	38.	1
Benzo(a)pyrene	190		ug/kg	150	47.	1
Benzo(b)fluoranthene	260		ug/kg	120	39.	1
Benzo(k)fluoranthene	96	J	ug/kg	120	37.	1
Chrysene	180		ug/kg	120	38.	1
Acenaphthylene	100	J	ug/kg	150	36.	1
Anthracene	75	J	ug/kg	120	32.	1
Benzo(ghi)perylene	130	J	ug/kg	150	40.	1
Fluorene	56	J	ug/kg	190	55.	1
Phenanthrene	180		ug/kg	120	38.	1
Dibenzo(a,h)anthracene	ND		ug/kg	120	37.	1
Indeno(1,2,3-cd)pyrene	140	J	ug/kg	150	43.	1
Pyrene	220		ug/kg	120	37.	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	73		23-120
2-Fluorobiphenyl	71		30-120
4-Terphenyl-d14	79		18-120

Project Name:	2424 HAMBURG TURNPIKE	**Lab Number:**	L1401509
Project Number:	0298-014-001	**Report Date:**	01/22/14

SAMPLE RESULTS

Lab ID:	L1401509-05	Date Collected:	01/14/14 16:00
Client ID:	SB-8 (6-8)	Date Received:	01/15/14
Sample Location:	2424 HAMBURG TURNPIKE	Field Prep:	Not Specified
Matrix:	Soil	Extraction Method:	EPA 3546
Analytical Method:	1,8270D	Extraction Date:	01/17/14 03:35
Analytical Date:	01/19/14 00:50		
Analyst:	RC		
Percent Solids:	64%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Acenaphthene	ND		ug/kg	200	53.	1
Fluoranthene	300		ug/kg	150	47.	1
Naphthalene	10000		ug/kg	260	85.	1
Benzo(a)anthracene	110	J	ug/kg	150	50.	1
Benzo(a)pyrene	71	J	ug/kg	200	62.	1
Benzo(b)fluoranthene	120	J	ug/kg	150	52.	1
Benzo(k)fluoranthene	51	J	ug/kg	150	49.	1
Chrysene	160		ug/kg	150	50.	1
Acenaphthylene	ND		ug/kg	200	48.	1
Anthracene	74	J	ug/kg	150	42.	1
Benzo(ghi)perylene	60	J	ug/kg	200	53.	1
Fluorene	130	J	ug/kg	260	73.	1
Phenanthrene	420		ug/kg	150	50.	1
Dibenzo(a,h)anthracene	ND		ug/kg	150	50.	1
Indeno(1,2,3-cd)pyrene	60	J	ug/kg	200	57.	1
Pyrene	230		ug/kg	150	50.	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	62		23-120
2-Fluorobiphenyl	70		30-120
4-Terphenyl-d14	74		18-120

SAMPLE RESULTS

Lab ID:	L1401509-06	Date Collected:	01/14/14 16:30
Client ID:	SB-9 (6-8)	Date Received:	01/15/14
Sample Location:	2424 HAMBURG TURNPIKE	Field Prep:	Not Specified
Matrix:	Soil	Extraction Method:	EPA 3546
Analytical Method:	1,8270D	Extraction Date:	01/17/14 03:35
Analytical Date:	01/19/14 01:18		
Analyst:	RC		
Percent Solids:	85%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Acenaphthene	83	J	ug/kg	150	40.	1
Fluoranthene	1000		ug/kg	120	36.	1
Naphthalene	3300		ug/kg	190	64.	1
Benzo(a)anthracene	470		ug/kg	120	38.	1
Benzo(a)pyrene	390		ug/kg	150	47.	1
Benzo(b)fluoranthene	480		ug/kg	120	39.	1
Benzo(k)fluoranthene	210		ug/kg	120	37.	1
Chrysene	460		ug/kg	120	38.	1
Acenaphthylene	200		ug/kg	150	36.	1
Anthracene	360		ug/kg	120	32.	1
Benzo(ghi)perylene	250		ug/kg	150	40.	1
Fluorene	350		ug/kg	190	55.	1
Phenanthrene	1300		ug/kg	120	38.	1
Dibenzo(a,h)anthracene	51	J	ug/kg	120	37.	1
Indeno(1,2,3-cd)pyrene	250		ug/kg	150	43.	1
Pyrene	760		ug/kg	120	38.	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	70		23-120
2-Fluorobiphenyl	70		30-120
4-Terphenyl-d14	75		18-120

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270D
Analytical Date: 01/18/14 16:30
Analyst: RC

Extraction Method: EPA 3546
Extraction Date: 01/17/14 03:10

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01-06 Batch: WG665228-1					
Acenaphthene	ND		ug/kg	130	34.
Fluoranthene	ND		ug/kg	99	30.
Naphthalene	ND		ug/kg	160	55.
Benzo(a)anthracene	ND		ug/kg	99	32.
Benzo(a)pyrene	ND		ug/kg	130	40.
Benzo(b)fluoranthene	ND		ug/kg	99	33.
Benzo(k)fluoranthene	ND		ug/kg	99	32.
Chrysene	ND		ug/kg	99	32.
Acenaphthylene	ND		ug/kg	130	31.
Anthracene	ND		ug/kg	99	28.
Benzo(ghi)perylene	ND		ug/kg	130	34.
Fluorene	ND		ug/kg	160	47.
Phenanthrene	ND		ug/kg	99	32.
Dibenzo(a,h)anthracene	ND		ug/kg	99	32.
Indeno(1,2,3-cd)pyrene	ND		ug/kg	130	37.
Pyrene	ND		ug/kg	99	32.

Tentatively Identified Compounds			
Unknown	150	J	ug/kg

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270D
Analytical Date: 01/18/14 16:30
Analyst: RC

Extraction Method: EPA 3546
Extraction Date: 01/17/14 03:10

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01-06 Batch: WG665228-1					

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	83		25-120
Phenol-d6	84		10-120
Nitrobenzene-d5	89		23-120
2-Fluorobiphenyl	84		30-120
2,4,6-Tribromophenol	88		0-136
4-Terphenyl-d14	88		18-120

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2424 HAMBURG TURNPIKE

Project Number: 0298-014-001

Lab Number: L1401509

Report Date: 01/22/14

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-06 Batch: WG665228-2 WG665228-3								
Acenaphthene	97		97		31-137	0		50
1,2,4-Trichlorobenzene	84		82		38-107	2		50
Hexachlorobenzene	92		92		40-140	0		50
Bis(2-chloroethyl)ether	92		90		40-140	2		50
2-Chloronaphthalene	92		94		40-140	2		50
1,2-Dichlorobenzene	87		82		40-140	6		50
1,3-Dichlorobenzene	85		80		40-140	6		50
1,4-Dichlorobenzene	84		81		28-104	4		50
3,3'-Dichlorobenzidine	61		51		40-140	18		50
2,4-Dinitrotoluene	**97**	Q	**100**	Q	28-89	3		50
2,6-Dinitrotoluene	94		94		40-140	0		50
Fluoranthene	101		104		40-140	3		50
4-Chlorophenyl phenyl ether	95		97		40-140	2		50
4-Bromophenyl phenyl ether	91		93		40-140	2		50
Bis(2-chloroisopropyl)ether	91		89		40-140	2		50
Bis(2-chloroethoxy)methane	93		89		40-117	4		50
Hexachlorobutadiene	84		85		40-140	1		50
Hexachlorocyclopentadiene	71		69		40-140	3		50
Hexachloroethane	88		85		40-140	3		50
Isophorone	95		92		40-140	3		50
Naphthalene	90		90		40-140	0		50

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2424 HAMBURG TURNPIKE

Lab Number: L1401509

Project Number: 0298-014-001

Report Date: 01/22/14

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-06 Batch: WG665228-2 WG665228-3								
Nitrobenzene	97		96		40-140	1		50
NitrosoDiPhenylAmine(NDPA)/DPA	101		100			1		50
n-Nitrosodi-n-propylamine	93		90		32-121	3		50
Bis(2-Ethylhexyl)phthalate	117		120		40-140	3		50
Butyl benzyl phthalate	106		107		40-140	1		50
Di-n-butylphthalate	109		113		40-140	4		50
Di-n-octylphthalate	121		123		40-140	2		50
Diethyl phthalate	107		106		40-140	1		50
Dimethyl phthalate	99		100		40-140	1		50
Benzo(a)anthracene	104		106		40-140	2		50
Benzo(a)pyrene	104		104		40-140	0		50
Benzo(b)fluoranthene	93		95		40-140	2		50
Benzo(k)fluoranthene	113		114		40-140	1		50
Chrysene	104		105		40-140	1		50
Acenaphthylene	93		94		40-140	1		50
Anthracene	108		110		40-140	2		50
Benzo(ghi)perylene	95		99		40-140	4		50
Fluorene	98		98		40-140	0		50
Phenanthrene	104		108		40-140	4		50
Dibenzo(a,h)anthracene	84		89		40-140	6		50
Indeno(1,2,3-cd)pyrene	88		92		40-140	4		50

Lab Control Sample Analysis
Batch Quality Control

Project Name: 2424 HAMBURG TURNPIKE
Project Number: 0298-014-001

Lab Number: L1401509
Report Date: 01/22/14

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-06 Batch: WG665228-2 WG665228-3								
Pyrene	100		102		35-142	2		50
Biphenyl	99		99			0		50
4-Chloroaniline	88		91		40-140	3		50
2-Nitroaniline	90		91		47-134	1		50
3-Nitroaniline	47		35		26-129	29		50
4-Nitroaniline	86		83		41-125	4		50
Dibenzofuran	104		103		40-140	1		50
2-Methylnaphthalene	91		91		40-140	0		50
1,2,4,5-Tetrachlorobenzene	91		89		40-117	2		50
Acetophenone	94		90		14-144	4		50
2,4,6-Trichlorophenol	92		92		30-130	0		50
P-Chloro-M-Cresol	102		102		26-103	0		50
2-Chlorophenol	88		88		25-102	0		50
2,4-Dichlorophenol	90		90		30-130	0		50
2,4-Dimethylphenol	100		96		30-130	4		50
2-Nitrophenol	88		86		30-130	2		50
4-Nitrophenol	107		104		11-114	3		50
2,4-Dinitrophenol	84		85		4-130	1		50
4,6-Dinitro-o-cresol	90		86		10-130	5		50
Pentachlorophenol	98		99		17-109	1		50
Phenol	**93**	Q	89		26-90	4		50

Lab Control Sample Analysis
Batch Quality Control

Project Name: 2424 HAMBURG TURNPIKE
Project Number: 0298-014-001

Lab Number: L1401509
Report Date: 01/22/14

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-06 Batch: WG665228-2 WG665228-3								
2-Methylphenol	95		90		30-130.	5		50
3-Methylphenol/4-Methylphenol	95		92		30-130	3		50
2,4,5-Trichlorophenol	93		96		30-130	3		50
Benzoic Acid	66		68			3		50
Benzyl Alcohol	87		85		40-140	2		50
Carbazole	101		102		54-128	1		50

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2-Fluorophenol	74		70		25-120
Phenol-d6	77		75		10-120
Nitrobenzene-d5	87		84		23-120
2-Fluorobiphenyl	81		81		30-120
2,4,6-Tribromophenol	84		86		0-136
4-Terphenyl-d14	83		83		18-120

INORGANICS
&
MISCELLANEOUS

SAMPLE RESULTS

Lab ID: L1401509-01
Client ID: SB-4 (6-8)
Sample Location: 2424 HAMBURG TURNPIKE
Matrix: Soil

Date Collected: 01/14/14 11:45
Date Received: 01/15/14
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	76.2		%	0.100	NA	1	-	01/16/14 23:21	30,2540G	RT

Project Name: 2424 HAMBURG TURNPIKE
Lab Number: L1401509
Project Number: 0298-014-001
Report Date: 01/22/14

SAMPLE RESULTS

Lab ID: L1401509-02
Client ID: SB-5 (6-8)
Sample Location: 2424 HAMBURG TURNPIKE
Matrix: Soil
Date Collected: 01/14/14 12:30
Date Received: 01/15/14
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	81.7		%	0.100	NA	1	-	01/16/14 23:21	30,2540G	RT

SAMPLE RESULTS

Lab ID: L1401509-03
Client ID: SB-6 (2-4)
Sample Location: 2424 HAMBURG TURNPIKE
Matrix: Soil

Date Collected: 01/14/14 14:15
Date Received: 01/15/14
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	82.8		%	0.100	NA	1	-	01/16/14 23:21	30,2540G	RT

SAMPLE RESULTS

Lab ID: L1401509-04
Client ID: SB-7 (2-4)
Sample Location: 2424 HAMBURG TURNPIKE
Matrix: Soil

Date Collected: 01/14/14 13:45
Date Received: 01/15/14
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	86.0		%	0.100	NA	1	-	01/16/14 23:21	30,2540G	RT

Project Name: 2424 HAMBURG TURNPIKE
Lab Number: L1401509
Project Number: 0298-014-001
Report Date: 01/22/14

SAMPLE RESULTS

Lab ID: L1401509-05
Client ID: SB-8 (6-8)
Sample Location: 2424 HAMBURG TURNPIKE
Matrix: Soil

Date Collected: 01/14/14 16:00
Date Received: 01/15/14
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	64.1		%	0.100	NA	1	-	01/16/14 23:21	30,2540G	RT

SAMPLE RESULTS

Lab ID: L1401509-06
Client ID: SB-9 (6-8)
Sample Location: 2424 HAMBURG TURNPIKE
Matrix: Soil

Date Collected: 01/14/14 16:30
Date Received: 01/15/14
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	84.9		%	0.100	NA	1	-	01/16/14 23:21	30,2540G	RT

Lab Duplicate Analysis
Batch Quality Control

Project Name: 2424 HAMBURG TURNPIKE

Project Number: 0298-014-001

Lab Number: L1401509

Report Date: 01/22/14

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-06 QC Batch ID: WG665196-1 QC Sample: L1401410-01 Client ID: DUP Sample						
Solids, Total	86.5	87.0	%	1		20

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Reagent H2O Preserved Vials Frozen on: NA

Cooler Information Cooler	**Custody Seal**
A	Absent

Container Information

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1401509-01A	Amber 120ml unpreserved	A	N/A	2.7	Y	Absent	NYTCL-8260(14)
L1401509-01B	Amber 120ml unpreserved	A	N/A	2.7	Y	Absent	NYTCL-8270(14),TS(7)
L1401509-02A	Amber 120ml unpreserved	A	N/A	2.7	Y	Absent	NYTCL-8260(14)
L1401509-02B	Amber 120ml unpreserved	A	N/A	2.7	Y	Absent	NYTCL-8270(14),TS(7)
L1401509-03A	Amber 120ml unpreserved	A	N/A	2.7	Y	Absent	NYTCL-8260(14)
L1401509-03B	Amber 120ml unpreserved	A	N/A	2.7	Y	Absent	NYTCL-8270(14),TS(7)
L1401509-04A	Amber 120ml unpreserved	A	N/A	2.7	Y	Absent	NYTCL-8260(14)
L1401509-04B	Amber 120ml unpreserved	A	N/A	2.7	Y	Absent	NYTCL-8270(14),TS(7)
L1401509-05A	Amber 120ml unpreserved	A	N/A	2.7	Y	Absent	NYTCL-8260(14)
L1401509-05B	Amber 120ml unpreserved	A	N/A	2.7	Y	Absent	NYTCL-8270(14),TS(7)
L1401509-06A	Amber 120ml unpreserved	A	N/A	2.7	Y	Absent	NYTCL-8260(14)
L1401509-06B	Amber 120ml unpreserved	A	N/A	2.7	Y	Absent	NYTCL-8270(14),TS(7)

*Values in parentheses indicate holding time in days

GLOSSARY

Acronyms

EDL - Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).

EPA - Environmental Protection Agency.

LCS - Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LCSD - Laboratory Control Sample Duplicate: Refer to LCS.

LFB - Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

MDL - Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

MS - Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.

MSD - Matrix Spike Sample Duplicate: Refer to MS.

NA - Not Applicable.

NC - Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.

NI - Not Ignitable.

RL - Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

RPD - Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.

SRM - Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.

Footnotes

1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Data Qualifiers

A - Spectra identified as "Aldol Condensation Product".

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit.

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

Data Qualifiers

M	- Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
NJ	- Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
P	- The RPD between the results for the two columns exceeds the method-specified criteria.
Q	- The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
R	- Analytical results are from sample re-analysis.
RE	- Analytical results are from sample re-extraction.
S	- Analytical results are from modified screening analysis.

REFERENCES

1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IV, 2007.

30 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WPCF. 18th Edition. 1992.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

Last revised December 11, 2013

The following analytes are not included in our NELAP Scope of Accreditation:

Westborough Facility
EPA 524.2: Acetone, 2-Butanone (Methyl ethyl ketone (MEK)), Tert-butyl alcohol, 2-Hexanone, Tetrahydrofuran, 1,3,5-Trichlorobenzene, 4-Methyl-2-pentanone (MIBK), Carbon disulfide, Diethyl ether.
EPA 8260C: 1,2,4,5-Tetramethylbenzene, 4-Ethyltoluene, Iodomethane (methyl iodide), Methyl methacrylate, Azobenzene.
EPA 8330A/B: PETN, Picric Acid, Nitroglycerine, 2,6-DANT, 2,4-DANT.
EPA 8270D: 1-Methylnaphthalene, Dimethylnaphthalene,1,4-Diphenylhydrazine.
EPA 625: 4-Chloroaniline, 4-Methylphenol.
SM4500: Soil: Total Phosphorus, TKN, NO2, NO3.
EPA 9071: Total Petroleum Hydrocarbons, Oil & Grease.

Mansfield Facility
EPA 8270D: Biphenyl.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

The following analytes are included in our Massachusetts DEP Scope of Accreditation, Westborough Facility:

Drinking Water
EPA 200.8: Sb,As,Ba,Be,Cd,Cr,Cu,Pb,Ni,Se,Tl; **EPA 200.7**: Ba,Be,Ca,Cd,Cr,Cu,Na; **EPA 245.1:** Mercury;
EPA 300.0: Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B**
EPA 332: Perchlorate.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT, Enterolert-QT.**

Non-Potable Water
EPA 200.8: Al,Sb,As,Be,Cd,Cr,Cu,Pb,Mn,Ni,Se,Ag,Tl,Zn;
EPA 200.7: Al,Sb,As,Be,Cd,Ca,Cr,Co,Cu,Fe,Pb,Mg,Mn,Mo,Ni,K,Se,Ag,Na,Sr,Ti,Tl,V,Zn;
EPA 245.1, SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2340B, SM2320B, SM4500CL-E, SM4500F-BC, SM426C, SM4500NH3-BH, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **SM4500NO3-F, EPA 353.2**: Nitrate-N**, SM4500NH3-BC-NES, EPA 351.1, SM4500P-E, SM4500P-B, E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, SM14 510AC, EPA 420.1, SM4500-CN-CE, SM2540D.**
EPA 624: Volatile Halocarbons & Aromatics,
EPA 608: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9222D-MF**.

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

Serial_No:01221415:47

CHAIN OF CUSTODY

PAGE 1 OF 1

Date Rec'd in Lab: 1/16/14

ALPHA Job #: L1401509

ALPHA ANALYTICAL

WESTBORO, MA
TEL: 508-898-9220
FAX: 508-898-9193

MANSFIELD, MA
TEL: 508-822-9300
FAX: 508-822-3288

Client Information

Client: Turnkey
Address: 2558 Hamburg Turnpike
Buffalo NY ~~14228~~ 14218
Phone: 716 856-0599
Fax: 716 856-0583
Email:

☐ These samples have been previously analyzed by Alpha

Project Information

Project Name: 2424 Hamburg Turnpike
Project Location: 2424 Hamburg Turnpike
Project #: 0298-014-001
Project Manager: Mike Lesakowski
ALPHA Quote #:

Turn-Around Time

☒ Standard ☐ RUSH *(only confirmed if pre-approved!)*

Date Due: 1/22/14 **Time:**

Report Information - Data Deliverables

☐ FAX ☐ EMAIL
☒ ADEx ☐ Add'l Deliverables

Billing Information

☐ Same as Client info PO #:

Regulatory Requirements/Report Limits

State /Fed Program	*Criteria*

Other Project Specific Requirements/Comments/Detection Limits:

SAMPLE HANDLING
*Filtration*_________
☐ Done
☐ Not needed
☐ Lab to do
Preservation
☐ Lab to do
(Please specify below)

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	ANALYSIS TCL + CP51 VOC	CP51 SVOC	Sample Specific Comments	TOTAL # BOTTLES
01509-01	SB-4 (6-8)	1-14-14	1145	Soil	PWW	X	X		2
-02	SB-5 (6-8)	↓	1230	↓	↓	X	X		2
-03	SB-6 (2-4)		1415			X	X		2
-04	SB-7 (2-4)		1345			X	X		2
-05	SB-8 (6-8)		1600			X	X		2
-06	SB-9 (6-8)		1630			X	X		2

Container Type	
Preservative	

Relinquished By:	Date/Time	Received By:	Date/Time
	1-15-14 1648		1/15/14 1648
	1/15/14 2155		1/15/14 2155
	1-16-14 0022		1/16/14 0022

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

FORM NO: 01-01 (rev. 14-OCT-07)

ANALYTICAL REPORT

Lab Number:	L1401510
Client:	Benchmark & Turnkey Companies 2558 Hamburg Turnpike Suite 300 Buffalo, NY 14218
ATTN:	Mike Lesakowski
Phone:	(716) 856-0599
Project Name:	2424 HAMBURG TURNPIKE
Project Number:	0298-014-001
Report Date:	01/22/14

Certifications & Approvals: MA (M-MA086), NY (11148), CT (PH-0574), NH (2003), NJ NELAP (MA935), RI (LAO00065), ME (MA00086), PA (68-03671), USDA (Permit #P-330-11-00240), NC (666), TX (T104704476), DOD (L2217), US Army Corps of Engineers.

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com

Alpha Sample ID	Client ID	Sample Location	Collection Date/Time
L1401510-01	TMW-2	2424 HAMBURG TURNPIKE	01/14/14 15:15
L1401510-02	TMW-3	2424 HAMBURG TURNPIKE	01/14/14 15:00

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet all of the requirements of NELAC, for all NELAC accredited parameters. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. Performance criteria for CAM and RCP methods allow for some LCS compound failures to occur and still be within method compliance. In these instances, the specific failures are not narrated but are noted in the associated QC table. This information is also incorporated in the Data Usability format for our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY
For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Cynthia McQueen Cynthia McQueen

Title: Technical Director/Representative Date: 01/22/14

ORGANICS

VOLATILES

SAMPLE RESULTS

Lab ID:	L1401510-01	D	Date Collected:	01/14/14 15:15
Client ID:	TMW-2		Date Received:	01/15/14
Sample Location:	2424 HAMBURG TURNPIKE		Field Prep:	Not Specified
Matrix:	Water			
Analytical Method:	1,8260C			
Analytical Date:	01/20/14 19:31			
Analyst:	PD			

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methylene chloride	ND		ug/l	120	35.	50
1,1-Dichloroethane	ND		ug/l	120	35.	50
Chloroform	ND		ug/l	120	35.	50
Carbon tetrachloride	ND		ug/l	25	6.7	50
1,2-Dichloropropane	ND		ug/l	50	6.6	50
Dibromochloromethane	ND		ug/l	25	7.5	50
1,1,2-Trichloroethane	ND		ug/l	75	25.	50
Tetrachloroethene	ND		ug/l	25	9.1	50
Chlorobenzene	ND		ug/l	120	35.	50
Trichlorofluoromethane	ND		ug/l	120	35.	50
1,2-Dichloroethane	ND		ug/l	25	6.6	50
1,1,1-Trichloroethane	ND		ug/l	120	35.	50
Bromodichloromethane	ND		ug/l	25	9.6	50
trans-1,3-Dichloropropene	ND		ug/l	25	8.2	50
cis-1,3-Dichloropropene	ND		ug/l	25	7.2	50
Bromoform	ND		ug/l	100	32.	50
1,1,2,2-Tetrachloroethane	ND		ug/l	25	7.2	50
Benzene	520		ug/l	25	7.9	50
Toluene	3000		ug/l	120	35.	50
Ethylbenzene	1500		ug/l	120	35.	50
Chloromethane	ND		ug/l	120	35.	50
Bromomethane	ND		ug/l	120	35.	50
Vinyl chloride	ND		ug/l	50	16.	50
Chloroethane	ND		ug/l	120	35.	50
1,1-Dichloroethene	ND		ug/l	25	7.1	50
trans-1,2-Dichloroethene	ND		ug/l	120	35.	50
Trichloroethene	ND		ug/l	25	8.7	50
1,2-Dichlorobenzene	ND		ug/l	120	35.	50
1,3-Dichlorobenzene	ND		ug/l	120	35.	50
1,4-Dichlorobenzene	ND		ug/l	120	35.	50
Methyl tert butyl ether	ND		ug/l	120	35.	50

SAMPLE RESULTS

Lab ID:	L1401510-01	D	Date Collected:	01/14/14 15:15
Client ID:	TMW-2		Date Received:	01/15/14
Sample Location:	2424 HAMBURG TURNPIKE		Field Prep:	Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
p/m-Xylene	5600		ug/l	120	35.	50
o-Xylene	2200		ug/l	120	35.	50
cis-1,2-Dichloroethene	ND		ug/l	120	35.	50
Styrene	ND		ug/l	120	35.	50
Dichlorodifluoromethane	ND		ug/l	250	50.	50
Acetone	140	J	ug/l	250	50.	50
Carbon disulfide	ND		ug/l	250	50.	50
2-Butanone	ND		ug/l	250	50.	50
4-Methyl-2-pentanone	ND		ug/l	250	50.	50
2-Hexanone	ND		ug/l	250	50.	50
Bromochloromethane	ND		ug/l	120	35.	50
1,2-Dibromoethane	ND		ug/l	100	32.	50
n-Butylbenzene	ND		ug/l	120	35.	50
sec-Butylbenzene	ND		ug/l	120	35.	50
tert-Butylbenzene	ND		ug/l	120	35.	50
1,2-Dibromo-3-chloropropane	ND		ug/l	120	35.	50
Isopropylbenzene	56	J	ug/l	120	35.	50
p-Isopropyltoluene	ND		ug/l	120	35.	50
Naphthalene	340		ug/l	120	35.	50
n-Propylbenzene	210		ug/l	120	35.	50
1,2,3-Trichlorobenzene	ND		ug/l	120	35.	50
1,2,4-Trichlorobenzene	ND		ug/l	120	35.	50
1,3,5-Trimethylbenzene	490		ug/l	120	35.	50
1,2,4-Trimethylbenzene	2000		ug/l	120	35.	50
Methyl Acetate	ND		ug/l	100	12.	50
Cyclohexane	180	J	ug/l	500	12.	50
1,4-Dioxane	ND		ug/l	12000	2000	50
Freon-113	ND		ug/l	120	35.	50
Methyl cyclohexane	97	J	ug/l	500	14.	50

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	112		70-130
Toluene-d8	106		70-130
4-Bromofluorobenzene	94		70-130
Dibromofluoromethane	85		70-130

SAMPLE RESULTS

Lab ID: L1401510-02
Client ID: TMW-3
Sample Location: 2424 HAMBURG TURNPIKE
Matrix: Water
Analytical Method: 1,8260C
Analytical Date: 01/22/14 10:34
Analyst: MS

Date Collected: 01/14/14 15:00
Date Received: 01/15/14
Field Prep: Not Specified

Parameter	**Result**	**Qualifier**	**Units**	**RL**	**MDL**	**Dilution Factor**
Volatile Organics by GC/MS - Westborough Lab						
Methylene chloride	ND		ug/l	2.5	0.70	1
1,1-Dichloroethane	ND		ug/l	2.5	0.70	1
Chloroform	ND		ug/l	2.5	0.70	1
Carbon tetrachloride	ND		ug/l	0.50	0.13	1
1,2-Dichloropropane	ND		ug/l	1.0	0.13	1
Dibromochloromethane	ND		ug/l	0.50	0.15	1
1,1,2-Trichloroethane	ND		ug/l	1.5	0.50	1
Tetrachloroethene	ND		ug/l	0.50	0.18	1
Chlorobenzene	ND		ug/l	2.5	0.70	1
Trichlorofluoromethane	ND		ug/l	2.5	0.70	1
1,2-Dichloroethane	0.34	J	ug/l	0.50	0.13	1
1,1,1-Trichloroethane	ND		ug/l	2.5	0.70	1
Bromodichloromethane	ND		ug/l	0.50	0.19	1
trans-1,3-Dichloropropene	ND		ug/l	0.50	0.16	1
cis-1,3-Dichloropropene	ND		ug/l	0.50	0.14	1
Bromoform	ND		ug/l	2.0	0.65	1
1,1,2,2-Tetrachloroethane	ND		ug/l	0.50	0.14	1
Benzene	6.3		ug/l	0.50	0.16	1
Toluene	12		ug/l	2.5	0.70	1
Ethylbenzene	8.6		ug/l	2.5	0.70	1
Chloromethane	ND		ug/l	2.5	0.70	1
Bromomethane	ND		ug/l	2.5	0.70	1
Vinyl chloride	ND		ug/l	1.0	0.33	1
Chloroethane	ND		ug/l	2.5	0.70	1
1,1-Dichloroethene	ND		ug/l	0.50	0.14	1
trans-1,2-Dichloroethene	ND		ug/l	2.5	0.70	1
Trichloroethene	ND		ug/l	0.50	0.17	1
1,2-Dichlorobenzene	ND		ug/l	2.5	0.70	1
1,3-Dichlorobenzene	ND		ug/l	2.5	0.70	1
1,4-Dichlorobenzene	ND		ug/l	2.5	0.70	1
Methyl tert butyl ether	ND		ug/l	2.5	0.70	1

SAMPLE RESULTS

Lab ID:	L1401510-02	Date Collected:	01/14/14 15:00
Client ID:	TMW-3	Date Received:	01/15/14
Sample Location:	2424 HAMBURG TURNPIKE	Field Prep:	Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
p/m-Xylene	46		ug/l	2.5	0.70	1
o-Xylene	24		ug/l	2.5	0.70	1
cis-1,2-Dichloroethene	ND		ug/l	2.5	0.70	1
Styrene	ND		ug/l	2.5	0.70	1
Dichlorodifluoromethane	ND		ug/l	5.0	1.0	1
Acetone	15		ug/l	5.0	1.0	1
Carbon disulfide	1.1	J	ug/l	5.0	1.0	1
2-Butanone	ND		ug/l	5.0	1.0	1
4-Methyl-2-pentanone	ND		ug/l	5.0	1.0	1
2-Hexanone	ND		ug/l	5.0	1.0	1
Bromochloromethane	ND		ug/l	2.5	0.70	1
1,2-Dibromoethane	ND		ug/l	2.0	0.65	1
n-Butylbenzene	2.0	J	ug/l	2.5	0.70	1
sec-Butylbenzene	0.79	J	ug/l	2.5	0.70	1
tert-Butylbenzene	ND		ug/l	2.5	0.70	1
1,2-Dibromo-3-chloropropane	ND		ug/l	2.5	0.70	1
Isopropylbenzene	1.8	J	ug/l	2.5	0.70	1
p-Isopropyltoluene	ND		ug/l	2.5	0.70	1
Naphthalene	9.2		ug/l	2.5	0.70	1
n-Propylbenzene	6.7		ug/l	2.5	0.70	1
1,2,3-Trichlorobenzene	ND		ug/l	2.5	0.70	1
1,2,4-Trichlorobenzene	ND		ug/l	2.5	0.70	1
1,3,5-Trimethylbenzene	22		ug/l	2.5	0.70	1
1,2,4-Trimethylbenzene	85		ug/l	2.5	0.70	1
Methyl Acetate	ND		ug/l	2.0	0.23	1
Cyclohexane	5.4	J	ug/l	10	0.24	1
1,4-Dioxane	ND		ug/l	250	41.	1
Freon-113	ND		ug/l	2.5	0.70	1
Methyl cyclohexane	8.8	J	ug/l	10	0.29	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	117		70-130
Toluene-d8	109		70-130
4-Bromofluorobenzene	102		70-130
Dibromofluoromethane	97		70-130

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 01/20/14 13:09
Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 01 Batch: WG665926-3					
Methylene chloride	ND		ug/l	2.5	0.70
1,1-Dichloroethane	ND		ug/l	2.5	0.70
Chloroform	ND		ug/l	2.5	0.70
Carbon tetrachloride	ND		ug/l	0.50	0.13
1,2-Dichloropropane	ND		ug/l	1.0	0.13
Dibromochloromethane	ND		ug/l	0.50	0.15
1,1,2-Trichloroethane	ND		ug/l	1.5	0.50
Tetrachloroethene	ND		ug/l	0.50	0.18
Chlorobenzene	ND		ug/l	2.5	0.70
Trichlorofluoromethane	ND		ug/l	2.5	0.70
1,2-Dichloroethane	ND		ug/l	0.50	0.13
1,1,1-Trichloroethane	ND		ug/l	2.5	0.70
Bromodichloromethane	ND		ug/l	0.50	0.19
trans-1,3-Dichloropropene	ND		ug/l	0.50	0.16
cis-1,3-Dichloropropene	ND		ug/l	0.50	0.14
Bromoform	ND		ug/l	2.0	0.65
1,1,2,2-Tetrachloroethane	ND		ug/l	0.50	0.14
Benzene	ND		ug/l	0.50	0.16
Toluene	ND		ug/l	2.5	0.70
Ethylbenzene	ND		ug/l	2.5	0.70
Chloromethane	ND		ug/l	2.5	0.70
Bromomethane	ND		ug/l	2.5	0.70
Vinyl chloride	ND		ug/l	1.0	0.33
Chloroethane	ND		ug/l	2.5	0.70
1,1-Dichloroethene	ND		ug/l	0.50	0.14
trans-1,2-Dichloroethene	ND		ug/l	2.5	0.70
Trichloroethene	ND		ug/l	0.50	0.17
1,2-Dichlorobenzene	ND		ug/l	2.5	0.70
1,3-Dichlorobenzene	ND		ug/l	2.5	0.70
1,4-Dichlorobenzene	ND		ug/l	2.5	0.70
Methyl tert butyl ether	ND		ug/l	2.5	0.70

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 01/20/14 13:09
Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 01 Batch: WG665926-3					
p/m-Xylene	ND		ug/l	2.5	0.70
o-Xylene	ND		ug/l	2.5	0.70
cis-1,2-Dichloroethene	ND		ug/l	2.5	0.70
Styrene	ND		ug/l	2.5	0.70
Dichlorodifluoromethane	ND		ug/l	5.0	1.0
Acetone	ND		ug/l	5.0	1.0
Carbon disulfide	ND		ug/l	5.0	1.0
2-Butanone	ND		ug/l	5.0	1.0
4-Methyl-2-pentanone	ND		ug/l	5.0	1.0
2-Hexanone	ND		ug/l	5.0	1.0
Bromochloromethane	ND		ug/l	2.5	0.70
1,2-Dibromoethane	ND		ug/l	2.0	0.65
n-Butylbenzene	ND		ug/l	2.5	0.70
sec-Butylbenzene	ND		ug/l	2.5	0.70
tert-Butylbenzene	ND		ug/l	2.5	0.70
1,2-Dibromo-3-chloropropane	ND		ug/l	2.5	0.70
Isopropylbenzene	ND		ug/l	2.5	0.70
p-Isopropyltoluene	ND		ug/l	2.5	0.70
Naphthalene	ND		ug/l	2.5	0.70
n-Propylbenzene	ND		ug/l	2.5	0.70
1,2,3-Trichlorobenzene	ND		ug/l	2.5	0.70
1,2,4-Trichlorobenzene	ND		ug/l	2.5	0.70
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.70
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.70
Methyl Acetate	ND		ug/l	2.0	0.23
Cyclohexane	ND		ug/l	10	0.24
1,4-Dioxane	ND		ug/l	250	41.
Freon-113	ND		ug/l	2.5	0.70
Methyl cyclohexane	ND		ug/l	10	0.29

Project Name:	2424 HAMBURG TURNPIKE	**Lab Number:**	L1401510
Project Number:	0298-014-001	**Report Date:**	01/22/14

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 01/20/14 13:09
Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 01 Batch: WG665926-3					

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	113		70-130
Toluene-d8	108		70-130
4-Bromofluorobenzene	92		70-130
Dibromofluoromethane	103		70-130

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 01/22/14 10:07
Analyst: MS

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 02 Batch: WG666244-3					
Methylene chloride	ND		ug/l	2.5	0.70
1,1-Dichloroethane	ND		ug/l	2.5	0.70
Chloroform	ND		ug/l	2.5	0.70
Carbon tetrachloride	ND		ug/l	0.50	0.13
1,2-Dichloropropane	ND		ug/l	1.0	0.13
Dibromochloromethane	ND		ug/l	0.50	0.15
1,1,2-Trichloroethane	ND		ug/l	1.5	0.50
Tetrachloroethene	ND		ug/l	0.50	0.18
Chlorobenzene	ND		ug/l	2.5	0.70
Trichlorofluoromethane	ND		ug/l	2.5	0.70
1,2-Dichloroethane	ND		ug/l	0.50	0.13
1,1,1-Trichloroethane	ND		ug/l	2.5	0.70
Bromodichloromethane	ND		ug/l	0.50	0.19
trans-1,3-Dichloropropene	ND		ug/l	0.50	0.16
cis-1,3-Dichloropropene	ND		ug/l	0.50	0.14
Bromoform	ND		ug/l	2.0	0.65
1,1,2,2-Tetrachloroethane	ND		ug/l	0.50	0.14
Benzene	ND		ug/l	0.50	0.16
Toluene	ND		ug/l	2.5	0.70
Ethylbenzene	ND		ug/l	2.5	0.70
Chloromethane	ND		ug/l	2.5	0.70
Bromomethane	ND		ug/l	2.5	0.70
Vinyl chloride	ND		ug/l	1.0	0.33
Chloroethane	ND		ug/l	2.5	0.70
1,1-Dichloroethene	ND		ug/l	0.50	0.14
trans-1,2-Dichloroethene	ND		ug/l	2.5	0.70
Trichloroethene	ND		ug/l	0.50	0.17
1,2-Dichlorobenzene	ND		ug/l	2.5	0.70
1,3-Dichlorobenzene	ND		ug/l	2.5	0.70
1,4-Dichlorobenzene	ND		ug/l	2.5	0.70
Methyl tert butyl ether	ND		ug/l	2.5	0.70

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 01/22/14 10:07
Analyst: MS

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 02 Batch: WG666244-3					
p/m-Xylene	ND		ug/l	2.5	0.70
o-Xylene	ND		ug/l	2.5	0.70
cis-1,2-Dichloroethene	ND		ug/l	2.5	0.70
Styrene	ND		ug/l	2.5	0.70
Dichlorodifluoromethane	ND		ug/l	5.0	1.0
Acetone	ND		ug/l	5.0	1.0
Carbon disulfide	ND		ug/l	5.0	1.0
2-Butanone	ND		ug/l	5.0	1.0
4-Methyl-2-pentanone	ND		ug/l	5.0	1.0
2-Hexanone	ND		ug/l	5.0	1.0
Bromochloromethane	ND		ug/l	2.5	0.70
1,2-Dibromoethane	ND		ug/l	2.0	0.65
n-Butylbenzene	ND		ug/l	2.5	0.70
sec-Butylbenzene	ND		ug/l	2.5	0.70
tert-Butylbenzene	ND		ug/l	2.5	0.70
1,2-Dibromo-3-chloropropane	ND		ug/l	2.5	0.70
Isopropylbenzene	ND		ug/l	2.5	0.70
p-Isopropyltoluene	ND		ug/l	2.5	0.70
Naphthalene	ND		ug/l	2.5	0.70
n-Propylbenzene	ND		ug/l	2.5	0.70
1,2,3-Trichlorobenzene	ND		ug/l	2.5	0.70
1,2,4-Trichlorobenzene	ND		ug/l	2.5	0.70
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.70
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.70
Methyl Acetate	ND		ug/l	2.0	0.23
Cyclohexane	ND		ug/l	10	0.24
1,4-Dioxane	ND		ug/l	250	41.
Freon-113	ND		ug/l	2.5	0.70
Methyl cyclohexane	ND		ug/l	10	0.29

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 01/22/14 10:07
Analyst: MS

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 02 Batch: WG666244-3					

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	118		70-130
Toluene-d8	125		70-130
4-Bromofluorobenzene	91		70-130
Dibromofluoromethane	103		70-130

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2424 HAMBURG TURNPIKE
Lab Number: L1401510
Project Number: 0298-014-001
Report Date: 01/22/14

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 Batch: WG665926-1 WG665926-2								
Methylene chloride	94		92		70-130	2		20
1,1-Dichloroethane	108		104		70-130	4		20
Chloroform	106		103		70-130	3		20
2-Chloroethylvinyl ether	116		115		70-130	1		20
Carbon tetrachloride	97		94		63-132	3		20
1,2-Dichloropropane	105		102		70-130	3		20
Dibromochloromethane	100		98		63-130	2		20
1,1,2-Trichloroethane	117		113		70-130	3		20
Tetrachloroethene	100		96		70-130	4		20
Chlorobenzene	105		102		75-130	3		20
Trichlorofluoromethane	107		104		62-150	3		20
1,2-Dichloroethane	107		106		70-130	1		20
1,1,1-Trichloroethane	102		97		67-130	5		20
Bromodichloromethane	105		102		67-130	3		20
trans-1,3-Dichloropropene	107		105		70-130	2		20
cis-1,3-Dichloropropene	101		99		70-130	2		20
1,1-Dichloropropene	93		89		70-130	4		20
Bromoform	96		93		54-136	3		20
1,1,2,2-Tetrachloroethane	106		105		67-130	1		20
Benzene	103		100		70-130	3		20
Toluene	107		103		70-130	4		20

Lab Control Sample Analysis
Batch Quality Control

Project Name: 2424 HAMBURG TURNPIKE
Lab Number: L1401510
Project Number: 0298-014-001
Report Date: 01/22/14

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 Batch: WG665926-1 WG665926-2								
Ethylbenzene	106		102		70-130	4		20
Chloromethane	96		90		64-130	6		20
Bromomethane	108		101		39-139	7		20
Vinyl chloride	98		93		55-140	5		20
Chloroethane	115		112		55-138	3		20
1,1-Dichloroethene	87		97		61-145	11		20
trans-1,2-Dichloroethene	101		97		70-130	4		20
Trichloroethene	108		104		70-130	4		20
1,2-Dichlorobenzene	104		100		70-130	4		20
1,3-Dichlorobenzene	105		100		70-130	5		20
1,4-Dichlorobenzene	103		100		70-130	3		20
Methyl tert butyl ether	104		102		63-130	2		20
p/m-Xylene	109		105		70-130	4		20
o-Xylene	108		103		70-130	5		20
cis-1,2-Dichloroethene	100		98		70-130	2		20
Dibromomethane	106		104		70-130	2		20
1,2,3-Trichloropropane	114		111		64-130	3		20
Acrylonitrile	108		107		70-130	1		20
Isopropyl Ether	102		100		70-130	2		20
tert-Butyl Alcohol	**131**	Q	120		70-130	9		20
Styrene	116		112		70-130	4		20

Lab Control Sample Analysis
Batch Quality Control

Project Name: 2424 HAMBURG TURNPIKE
Lab Number: L1401510
Project Number: 0298-014-001
Report Date: 01/22/14

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 Batch: WG665926-1 WG665926-2								
Dichlorodifluoromethane	72		68		36-147	6		20
Acetone	82		81		58-148	1		20
Carbon disulfide	58		64		51-130	10		20
2-Butanone	104		97		63-138	7		20
Vinyl acetate	90		89		70-130	1		20
4-Methyl-2-pentanone	110		108		59-130	2		20
2-Hexanone	110		109		57-130	1		20
Bromochloromethane	102		99		70-130	3		20
2,2-Dichloropropane	98		93		63-133	5		20
1,2-Dibromoethane	105		104		70-130	1		20
1,3-Dichloropropane	110		108		70-130	2		20
1,1,1,2-Tetrachloroethane	107		102		64-130	5		20
Bromobenzene	96		93		70-130	3		20
n-Butylbenzene	117		112		53-136	4		20
sec-Butylbenzene	107		103		70-130	4		20
tert-Butylbenzene	102		97		70-130	5		20
o-Chlorotoluene	105		101		70-130	4		20
p-Chlorotoluene	103		99		70-130	4		20
1,2-Dibromo-3-chloropropane	111		107		41-144	4		20
Hexachlorobutadiene	103		88		63-130	16		20
Isopropylbenzene	97		93		70-130	4		20

Lab Control Sample Analysis
Batch Quality Control

Project Name: 2424 HAMBURG TURNPIKE
Lab Number: L1401510
Project Number: 0298-014-001
Report Date: 01/22/14

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 Batch: WG665926-1 WG665926-2								
p-Isopropyltoluene	108		103		70-130	5		20
Naphthalene	104		100		70-130	4		20
n-Propylbenzene	108		104		69-130	4		20
1,2,3-Trichlorobenzene	109		104		70-130	5		20
1,2,4-Trichlorobenzene	104		90		70-130	14		20
1,3,5-Trimethylbenzene	107		103		64-130	4		20
1,2,4-Trimethylbenzene	110		106		70-130	4		20
Methyl Acetate	114		117		70-130	3		20
Ethyl Acetate	119		117		70-130	2		20
Cyclohexane	101		96		70-130	5		20
Ethyl-Tert-Butyl-Ether	98		96		70-130	2		20
Tertiary-Amyl Methyl Ether	98		95		66-130	3		20
1,4-Dioxane	148		130		56-162	13		20
Freon-113	80		87		70-130	8		20
1,4-Diethylbenzene	108		103		70-130	5		20
4-Ethyltoluene	103		98		70-130	5		20
1,2,4,5-Tetramethylbenzene	109		104		70-130	5		20
Ethyl ether	98		98		59-134	0		20
trans-1,4-Dichloro-2-butene	75		74		70-130	1		20
Iodomethane	**63**	Q	**69**	Q	70-130	9		20
Methyl cyclohexane	108		102		70-130	6		20

Lab Control Sample Analysis
Batch Quality Control

Project Name: 2424 HAMBURG TURNPIKE
Project Number: 0298-014-001

Lab Number: L1401510
Report Date: 01/22/14

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 Batch: WG665926-1 WG665926-2								

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	111		109		70-130
Toluene-d8	107		105		70-130
4-Bromofluorobenzene	93		93		70-130
Dibromofluoromethane	105		104		70-130

Lab Control Sample Analysis
Batch Quality Control

Project Name: 2424 HAMBURG TURNPIKE

Project Number: 0298-014-001

Lab Number: L1401510

Report Date: 01/22/14

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 02 Batch: WG666244-1 WG666244-2								
Methylene chloride	82		82		70-130	0		20
1,1-Dichloroethane	95		93		70-130	2		20
Chloroform	110		92		70-130	18		20
2-Chloroethylvinyl ether	111		113		70-130	2		20
Carbon tetrachloride	101		87		63-132	15		20
1,2-Dichloropropane	107		106		70-130	1		20
Dibromochloromethane	99		98		63-130	1		20
1,1,2-Trichloroethane	116		113		70-130	3		20
Tetrachloroethene	100		98		70-130	2		20
Chlorobenzene	103		103		75-130	0		20
Trichlorofluoromethane	135		132		62-150	2		20
1,2-Dichloroethane	112		104		70-130	7		20
1,1,1-Trichloroethane	106		90		67-130	16		20
Bromodichloromethane	107		106		67-130	1		20
trans-1,3-Dichloropropene	106		107		70-130	1		20
cis-1,3-Dichloropropene	102		101		70-130	1		20
1,1-Dichloropropene	99		82		70-130	19		20
Bromoform	92		97		54-136	5		20
1,1,2,2-Tetrachloroethane	105		104		67-130	1		20
Benzene	106		89		70-130	17		20
Toluene	107		106		70-130	1		20

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2424 HAMBURG TURNPIKE

Project Number: 0298-014-001

Lab Number: L1401510

Report Date: 01/22/14

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 02 Batch: WG666244-1 WG666244-2								
Ethylbenzene	104		107		70-130	3		20
Chloromethane	127		124		64-130	2		20
Bromomethane	131		**148**	Q	39-139	12		20
Vinyl chloride	129		126		55-140	2		20
Chloroethane	**139**	Q	**139**	Q	55-138	0		20
1,1-Dichloroethene	97		93		61-145	4		20
trans-1,2-Dichloroethene	89		86		70-130	3		20
Trichloroethene	112		109		70-130	3		20
1,2-Dichlorobenzene	102		104		70-130	2		20
1,3-Dichlorobenzene	101		101		70-130	0		20
1,4-Dichlorobenzene	102		101		70-130	1		20
Methyl tert butyl ether	79		80		63-130	1		20
p/m-Xylene	110		108		70-130	2		20
o-Xylene	102		102		70-130	0		20
cis-1,2-Dichloroethene	87		84		70-130	4		20
Dibromomethane	106		107		70-130	1		20
1,2,3-Trichloropropane	114		118		64-130	3		20
Acrylonitrile	84		85		70-130	1		20
Isopropyl Ether	79		78		70-130	1		20
tert-Butyl Alcohol	93		93		70-130	0		20
Styrene	108		112		70-130	4		20

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2424 HAMBURG TURNPIKE
Project Number: 0298-014-001

Lab Number: L1401510
Report Date: 01/22/14

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 02 Batch: WG666244-1 WG666244-2								
Dichlorodifluoromethane	130		125		36-147	4		20
Acetone	68		75		58-148	10		20
Carbon disulfide	82		80		51-130	2		20
2-Butanone	111		96		63-138	14		20
Vinyl acetate	79		79		70-130	0		20
4-Methyl-2-pentanone	106		105		59-130	1		20
2-Hexanone	103		107		57-130	4		20
Bromochloromethane	103		89		70-130	15		20
2,2-Dichloropropane	98		84		63-133	15		20
1,2-Dibromoethane	102		104		70-130	2		20
1,3-Dichloropropane	108		109		70-130	1		20
1,1,1,2-Tetrachloroethane	102		102		64-130	0		20
Bromobenzene	93		91		70-130	2		20
n-Butylbenzene	116		119		53-136	3		20
sec-Butylbenzene	108		109		70-130	1		20
tert-Butylbenzene	99		101		70-130	2		20
o-Chlorotoluene	105		106		70-130	1		20
p-Chlorotoluene	99		104		70-130	5		20
1,2-Dibromo-3-chloropropane	105		111		41-144	6		20
Hexachlorobutadiene	97		94		63-130	3		20
Isopropylbenzene	97		97		70-130	0		20

Lab Control Sample Analysis
Batch Quality Control

Project Name: 2424 HAMBURG TURNPIKE
Lab Number: L1401510
Project Number: 0298-014-001
Report Date: 01/22/14

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 02 Batch: WG666244-1 WG666244-2								
p-Isopropyltoluene	107		107		70-130	0		20
Naphthalene	98		102		70-130	4		20
n-Propylbenzene	109		108		69-130	1		20
1,2,3-Trichlorobenzene	102		106		70-130	4		20
1,2,4-Trichlorobenzene	98		97		70-130	1		20
1,3,5-Trimethylbenzene	106		108		64-130	2		20
1,2,4-Trimethylbenzene	111		111		70-130	0		20
Methyl Acetate	94		93		70-130	1		20
Ethyl Acetate	111		94		70-130	17		20
Cyclohexane	93		75		70-130	**21**	Q	20
Ethyl-Tert-Butyl-Ether	75		76		70-130	1		20
Tertiary-Amyl Methyl Ether	87		76		66-130	13		20
1,4-Dioxane	117		115		56-162	2		20
Freon-113	73		71		70-130	3		20
1,4-Diethylbenzene	93		97		70-130	4		20
4-Ethyltoluene	94		95		70-130	1		20
1,2,4,5-Tetramethylbenzene	97		98		70-130	1		20
Ethyl ether	92		92		59-134	0		20
trans-1,4-Dichloro-2-butene	71		73		70-130	3		20
Iodomethane	78		80		70-130	3		20
Methyl cyclohexane	99		96		70-130	3		20

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2424 HAMBURG TURNPIKE

Project Number: 0298-014-001

Lab Number: L1401510

Report Date: 01/22/14

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 02 Batch: WG666244-1 WG666244-2								

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	115		100		70-130
Toluene-d8	105		105		70-130
4-Bromofluorobenzene	91		90		70-130
Dibromofluoromethane	104		90		70-130

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Reagent H2O Preserved Vials Frozen on: NA

Cooler Information

Cooler	**Custody Seal**
A	Absent

Container Information

Container ID	**Container Type**	**Cooler**	**pH**	**Temp deg C**	**Pres**	**Seal**	**Analysis(*)**
L1401510-01A	Vial HCl preserved	A	N/A	2.7	Y	Absent	NYTCL-8260(14)
L1401510-01B	Vial HCl preserved	A	N/A	2.7	Y	Absent	NYTCL-8260(14)
L1401510-01C	Vial HCl preserved	A	N/A	2.7	Y	Absent	NYTCL-8260(14)
L1401510-02A	Vial HCl preserved	A	N/A	2.7	Y	Absent	NYTCL-8260(14)
L1401510-02B	Vial HCl preserved	A	N/A	2.7	Y	Absent	NYTCL-8260(14)
L1401510-02C	Vial HCl preserved	A	N/A	2.7	Y	Absent	NYTCL-8260(14)

*Values in parentheses indicate holding time in days

GLOSSARY

Acronyms

EDL - Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).

EPA - Environmental Protection Agency.

LCS - Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LCSD - Laboratory Control Sample Duplicate: Refer to LCS.

LFB - Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

MDL - Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

MS - Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.

MSD - Matrix Spike Sample Duplicate: Refer to MS.

NA - Not Applicable.

NC - Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.

NI - Not Ignitable.

RL - Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

RPD - Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.

SRM - Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.

Footnotes

1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Data Qualifiers

A - Spectra identified as "Aldol Condensation Product".

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit.

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

Data Qualifiers

M	- Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
NJ	- Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
P	- The RPD between the results for the two columns exceeds the method-specified criteria.
Q	- The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
R	- Analytical results are from sample re-analysis.
RE	- Analytical results are from sample re-extraction.
S	- Analytical results are from modified screening analysis.

REFERENCES

1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IV, 2007.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

Last revised December 11, 2013

The following analytes are not included in our NELAP Scope of Accreditation:

Westborough Facility
EPA 524.2: Acetone, 2-Butanone (Methyl ethyl ketone (MEK)), Tert-butyl alcohol, 2-Hexanone, Tetrahydrofuran, 1,3,5-Trichlorobenzene, 4-Methyl-2-pentanone (MIBK), Carbon disulfide, Diethyl ether.
EPA 8260C: 1,2,4,5-Tetramethylbenzene, 4-Ethyltoluene, Iodomethane (methyl iodide), Methyl methacrylate, Azobenzene.
EPA 8330A/B: PETN, Picric Acid, Nitroglycerine, 2,6-DANT, 2,4-DANT.
EPA 8270D: 1-Methylnaphthalene, Dimethylnaphthalene,1,4-Diphenylhydrazine.
EPA 625: 4-Chloroaniline, 4-Methylphenol.
SM4500: Soil: Total Phosphorus, TKN, NO2, NO3.
EPA 9071: Total Petroleum Hydrocarbons, Oil & Grease.

Mansfield Facility
EPA 8270D: Biphenyl.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

The following analytes are included in our Massachusetts DEP Scope of Accreditation, Westborough Facility:

Drinking Water
EPA 200.8: Sb,As,Ba,Be,Cd,Cr,Cu,Pb,Ni,Se,Tl; **EPA 200.7**: Ba,Be,Ca,Cd,Cr,Cu,Na; **EPA 245.1:** Mercury;
EPA 300.0: Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B**
EPA 332: Perchlorate.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT, Enterolert-QT.**

Non-Potable Water
EPA 200.8: Al,Sb,As,Be,Cd,Cr,Cu,Pb,Mn,Ni,Se,Ag,Tl,Zn;
EPA 200.7: Al,Sb,As,Be,Cd,Ca,Cr,Co,Cu,Fe,Pb,Mg,Mn,Mo,Ni,K,Se,Ag,Na,Sr,Ti,Tl,V,Zn;
EPA 245.1, SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2340B, SM2320B, SM4500CL-E, SM4500F-BC, SM426C, SM4500NH3-BH, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **SM4500NO3-F, EPA 353.2**: Nitrate-N**, SM4500NH3-BC-NES, EPA 351.1, SM4500P-E, SM4500P-B, E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, SM14 510AC, EPA 420.1, SM4500-CN-CE, SM2540D.**
EPA 624: Volatile Halocarbons & Aromatics,
EPA 608: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9222D-MF**.

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

ALPHA ANALYTICAL

WESTBORO, MA
TEL: 508-898-9220
FAX: 508-898-9193

MANSFIELD, MA
TEL: 508-822-9300
FAX: 508-822-3288

CHAIN OF CUSTODY

PAGE 1 OF 1

Date Rec'd in Lab: 1/16/14

ALPHA Job #: L1401510

Client Information

Client: Turnkey
Address: 2558 Hamburg Turnpike
Buffalo NY 14218
Phone: 716 856 0599
Fax: 716 856 0583
Email:

☐ These samples have been previously analyzed by Alpha

Project Information

Project Name: 2424 Hamburg Turnpike
Project Location: 2424 Hamburg Turnpike
Project #: 0278-014-001
Project Manager: Mike Lesakowski
ALPHA Quote #:

Turn-Around Time

☒ Standard ☐ RUSH *(only confirmed if pre-approved!)*

Date Due: 1/22/14 Time:

Report Information - Data Deliverables

☐ FAX ☐ EMAIL
☒ ADEx ☐ Add'l Deliverables

Billing Information

☐ Same as Client info PO #:

Regulatory Requirements/Report Limits

State /Fed Program	*Criteria*

Other Project Specific Requirements/Comments/Detection Limits:

SAMPLE HANDLING
Filtration
☐ Done
☐ Not needed
☐ Lab to do
Preservation
☐ Lab to do
(Please specify below)

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	ANALYSIS: TCL + CP51 VOC	Sample Specific Comments	TOTAL # BOTTLES
01510 -01	TMW-2	1-14-14	15^{15}	GW	PWW	X		3
-02	TMW-3	1-14-14	15^{00}	GW	PWW	X		3

Container Type
Preservative

Relinquished By:	Date/Time	Received By:	Date/Time
	1-15-14 1648		1/15/14 1648
	1/15/14 2155		1-15-14 2155
	1/16/14 0022		1/16/14 0022

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

FORM NO: 01-01 (rev. 14-OCT-07)

APPENDIX C

SITE-SPECIFIC HEALTH AND SAFETY PLAN

SITE HEALTH AND SAFETY PLAN
for
BROWNFIELD CLEANUP PROGRAM
RI ACTIVITIES

2424 HAMBURG TURNPIKE SITE

BUFFALO, NEW YORK

December 2015 0345-015-001

Prepared for:

2424 HAMBURG TURNPIKE, LLC

2424 HAMBURG TURNPIKE SITE
HEALTH AND SAFETY PLAN FOR RI ACTIVITIES

ACKNOWLEDGEMENT

Plan Reviewed by (initial):

Corporate Health and Safety Director: Thomas H. Forbes, P.E.

Project Manager: Michael Lesakowski

Designated Site Safety and Health Officer: Lori Riker, P.E.

Acknowledgement:
I acknowledge that I have reviewed the information contained in this site-specific Health and Safety Plan, and understand the hazards associated with performance of the field activities described herein. I agree to comply with the requirements of this plan.

NAME (PRINT)	SIGNATURE	DATE

2424 HAMBURG TURNPIKE SITE
HEALTH AND SAFETY PLAN FOR RI ACTIVITIES

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2424 HAMBURG TURNPIKE SITE
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HEALTH AND SAFETY PLAN FOR RI ACTIVITIES

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ATTACHMENTS

1.0 INTRODUCTION

1.1 General

In accordance with OSHA requirements contained in 29 CFR 1910.120, this Health and Safety Plan (HASP) describes the specific health and safety practices and procedures to be employed by Benchmark Environmental Engineering & Science, PLLC in association with TurnKey Environmental Restoration, LLC and employees (referred to jointly hereafter as "Benchmark") during Remedial Investigation (RI) activities at the 2424 Hamburg Turnpike Site (Site) located in the City of Lackawanna, Erie County, New York. This HASP presents procedures for Benchmark employees who will be involved with RI field activities; it does not cover the activities of other contractors, subcontractors or other individuals on the Site. These firms will be required to develop and enforce their own HASPs as discussed in Section 2.0. Benchmark accepts no responsibility for the health and safety of contractor, subcontractor or other personnel.

This HASP presents information on known Site health and safety hazards using available historical information, and identifies the equipment, materials and procedures that will be used to eliminate or control these hazards. Environmental monitoring will be performed during the course of field activities to provide real-time data for on-going assessment of potential hazards.

1.2 Background

The BCP Site consists of a 1.04 acre property, located in a highly developed mixed use industrial, commercial and residential area of the City of Lackawanna, Erie County, New York. Erie County Real Property identifies the Site as 2424 Hamburg Turnpike (SBL 141.59-5-2).

The Site is currently unoccupied with two vacant commercial buildings consisting of a former automobile service building with four repair bays and eight (8) in-ground hydraulic lifts and one (1) shed. The Site also includes asphalt paved areas as well as concrete slabs suspected to have been associated with former on-Site structures.

Previous environmental investigations completed at the Site have revealed evidence of environmental contamination related to the former uses of the Site. Elevated levels of volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), primarily polycyclic aromatic hydrocarbons (PAHs), have been detected on-Site at concentrations exceeding regulatory guidelines..

1.3 Known and Suspected Environmental Conditions

Previous investigations have confirmed that the history of being utilized as a gasoline station and automotive repair facility has impacted the Site, which will require remediation prior to redevelopment.

TurnKey completed a Phase II Environmental Investigation consisting of ten (10) soil borings (SB-1 through SB-10), three of which were converted into temporary one-inch diameter monitoring wells (SB-4/TMW-1, SB-5/TMW-2 and SB-7/TMW-3), to assess subsurface conditions on-Site, including the area of potential contamination discovered during utility upgrade activities along Hamburg Turnpike (Spill No. 1204435) and areas proximate to the in-ground lifts within the service building and the four underground anomalies identified during the geophysical survey. Sample locations from the previous study are shown on Figure 3.

Elevated PID readings above background (0.0 ppm) and petroleum odors were identified in seven (7) of the ten (10) soil borings (SB-4 through SB-10) with the highest PID reading noted as 1,098 ppm at SB-6 (2-4'). In addition, approximately one-inch of floating petroleum product was noted in a monitoring well, TMW-1, completed north of the former UST excavation area.

Six soil samples were analyzed by the laboratory for Target Compound List (TCL) plus CP-51 VOCs and CP-51 SVOCs and two groundwater samples were analyzed for TCL plus CP-51 VOCs. The following bullet points summarize laboratory analytical results:

- Petroleum VOCs were detected at concentrations above CP-51 and/or Part 375 Protection of Groundwater, Unrestricted and/or Restricted Residential Use SCOs in all six soil samples.
- Three soil samples exhibited S-VOC concentrations above CP-51 and/or Part 375 Protection of Groundwater, Unrestricted, Restricted Residential, Commercial and/or Industrial Use SCOs.
- Both groundwater samples exhibited petroleum VOCs at concentrations above Class GA Groundwater Quality Standards (GWQS) with the more significant concentrations (16,333 micrograms per liter (ug/L) total VOCs)

identified at TMW-2. Due to the presence of product at TMW-1, concentrations exceeding GWQS are assumed to be present.

The RI will be performed in support of the BCP to determine the nature and extent of impacts from these known and suspect environmental conditions on this parcel.

1.4 Parameters of Interest

Based on the previous investigations, constituents of potential concern (COPCs) in soil and groundwater at the Site include:

- **Volatile Organic Compounds (VOCs)** – VOCs present at elevated concentration may include 1,2,4- and 1,3,5-trimethylbenzene, isopropylbenzene, n-propylbenzene, benzene, toluene, ethylbenzene and xylenes. These VOCs are typically associated with petroleum products.

- **Semi-Volatile Organic Compounds (SVOCs) –** SVOCs present at elevated concentrations may include polynuclear aromatic hydrocarbons (PAHs), which are byproducts of incomplete combustion and impurities in petroleum products.

1.5 Overview of RI Activities

Benchmark personnel will be on-Site to observe and perform RI and IRM activities. The field activities to be completed as part of the RI and IRM are described below.

Remedial Investigation Activities

1. **Surface Soil/Fill Sampling:** Benchmark will collect surface soil/fill samples from Site from the upper 2-inches below the topsoil/vegetative covers for the purpose of determining the nature and extent of potential COPC impacts in the surface soil/fill.

2. **Subsurface Soil/Fill Sampling:** Benchmark will collect subsurface soil/fill samples from the test trenches, test pits and soil boring to be completed as part of the RI. The purpose of the subsurface soil/fill samples is for determining the nature and extent of potential COPC impacts in the subsurface soil/fill.

3. **Monitoring Well Installation/Development and Sampling:** Benchmark will observe the installation on-Site groundwater monitoring wells, develop the wells, and

collect groundwater samples for the purpose of determining the nature and extent of potential COPC impacts.

4. **Subslab Vapor Sampling:** Benchmark will collect subslab vapor, ambient indoor air, and ambient outdoor air samples for the purpose of determining the nature and extent of potential COPC impacts.

2.0 ORGANIZATIONAL STRUCTURE

This section of the HASP describes the lines of authority, responsibility and communication as they pertain to health and safety functions at the Site. The purpose of this chapter is to identify the personnel who impact the development and implementation of the HASP and to describe their roles and responsibilities. This chapter also identifies other contractors and subcontractors involved in work operations and establish the lines of communications among them for health and safety matters. The organizational structure described in this chapter is consistent with the requirements of 29 CFR 1910.120(b)(2). This section will be reviewed by the Project Manager and updated as necessary to reflect the current organizational structure at this Site.

2.1 Roles and Responsibilities

Benchmark personnel on the Site must comply with the minimum requirements of this HASP. The specific responsibilities and authority of management, safety and health, and other personnel on this Site are detailed in the following paragraphs.

2.1.1 Corporate Health and Safety Director

The Benchmark Corporate Health and Safety Director is ***Mr. Thomas H. Forbes, P.E.*** The Corporate Health and Safety Director responsible for developing and implementing the Health and Safety program and policies for Benchmark Environmental Engineering & Science, PLLC and TurnKey Environmental Restoration, LLC, and consulting with corporate management to ensure adequate resources are available to properly implement these programs and policies. The Corporate Health and Safety Director coordinates Benchmark's Health and Safety training and medical monitoring programs and assists project management and field staff in developing site-specific health and safety plans.

2.1.2 Project Manager

The Project Manager for this Site is ***Mr. Michael Lesakowski.*** The Project Manager has the responsibility and authority to direct all Benchmark work operations at the Site. The Project Manager coordinates safety and health functions with the Site Safety and Health Officer, and bears ultimate responsibility for proper implementation of this HASP. He may delegate authority to expedite and facilitate any application of the program, including modifications to the overall project approach as necessary to circumvent unsafe work conditions. Specific duties of the Project Manager include:

- Preparing and coordinating the Site work plan.
- Providing Benchmark workers with work assignments and overseeing their performance.
- Coordinating health and safety efforts with the Site Safety and Health Officer (SSHO).
- Reviewing the emergency response coordination plan to assure its effectiveness.
- Serving as the primary liaison with Site contractors and the property owner.

2.1.3 Site Safety and Health Officer

The Site Safety and Health Officer (SSHO) for this Site is ***Ms. Lori Riker***. The qualified alternate SSHO is ***Mr. Bryan Mayback.*** The SSHO reports to the Project Manager. The SSHO is on-site or readily accessible to the Site during work operations and has the authority to halt Site work if unsafe conditions are detected. The specific responsibilities of the SSHO are:

- Managing the safety and health functions for Benchmark personnel on the Site.
- Serving as the point of contact for safety and health matters.
- Ensuring that Benchmark field personnel working on the Site have received proper training (per 29 CFR Part 1910.120(e)), that they have obtained medical clearance to wear respiratory protection (per 29 CFR Part 1910.134), and that they are properly trained in the selection, use and maintenance of personal protective equipment, including qualitative respirator fit testing.
- Performing or overseeing Site monitoring as required by the HASP.
- Assisting in the preparation and review of the HASP.
- Maintaining site-specific safety and health records as described in this HASP.

- Coordinating with the Project Manager, Site Workers, and Contractor's SSHO as necessary for safety and health efforts.

2.1.4 Site Workers

Site workers are responsible for: complying with this HASP or a more stringent HASP, if appropriate (i.e., Contractor and Subcontractor's HASP); using proper PPE; reporting unsafe acts and conditions to the SSHO; and following the safety and health instructions of the Project Manager and SSHO.

2.1.5 Other Site Personnel

Other Site personnel who will have health and safety responsibilities will include the Test Pit Contractor and Drilling Contractor, who will be responsible for developing, implementing and enforcing a Health and Safety Plan equally stringent or more stringent than Benchmark's HASP. Benchmark assumes no responsibility for the health and safety of anyone outside its direct employ. Each Contractor's HASP shall cover all non-TurnKey/Benchmark Site personnel. Each Contractor shall assign a SSHO who will coordinate with Benchmark's SSHO as necessary to ensure effective lines of communication and consistency between contingency plans.

In addition to Benchmark and Contractor personnel, other individuals who may have responsibilities in the work zone include subcontractors and governmental agencies performing Site inspection work (i.e., the New York State Department of Environmental Conservation). The Contractors shall be responsible for ensuring that these individuals have received OSHA-required training (29 CFR 1910.120(e)), including initial, refresher and site-specific training, and shall be responsible for the safety and health of these individuals while they are on-site.

3.0 HAZARD EVALUATION

Due to the presence of certain contaminants at the Site, the possibility exists that workers will be exposed to hazardous substances during field activities. The principal points of exposure would be through direct contact with and incidental ingestion of soil, and through the inhalation of contaminated particles or vapors. Other points of exposure may include direct contact with groundwater. In addition, the use of drilling and/or medium to large-sized construction equipment (e.g., excavator) will also present conditions for potential physical injury to workers. Further, since work will be performed outdoors, the potential exists for heat/cold stress to impact workers, especially those wearing protective equipment and clothing. Adherence to the medical evaluations, worker training relative to chemical hazards, safe work practices, proper personal protection, environmental monitoring, establishment work zones and Site control, appropriate decontamination procedures and contingency planning outlined herein will reduce the potential for chemical exposures and physical injuries.

3.1 Chemical Hazards

As discussed in Section 1.3, historic activities have potentially resulted in impacts to Site soils, groundwater, and sub-slab vapors. Visual and olfactory observations, as well as elevated PID readings, indicate a potential VOC impact to Site soil. In addition to VOCs, soil and groundwater may be impacted by SVOCs (PAHs) due to historic use as a petroleum refinery. Table 1 lists exposure limits for airborne concentrations of the COPCs identified in Section 1.4 of this HASP. Brief descriptions of the toxicology of the prevalent COPCs and related health and safety guidance and criteria are provided below.

1. **Petroleum Hydrocarbons:**

   - **1,2,4-Trimethylbenzene (CAS #95-63-6)** is a common gasoline additive. Acute exposure predominantly results in skin irritation and inhalation causes chemical pneumonitis. Symptoms include headache, dizziness, fatigue, muscular weakness, drowsiness.

   - **1,3,5-Trimethylbenzene (CAS #108-67-8)** is a colorless, odorless flammable liquid. The substance is irritating to the eyes , the skin and the respiratory tract . If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis. The substance may cause effects on the central nervous system.

- **Isopropylbenzene (CAS #98-82-8)** is a colorless, gasoline-like odor flammable liquid. Acute exposure typically results in irritation of the eyes, mucous membranes and upper respiratory tract. Can be absorbed through the skin. Possible central nervous system depressant. Symptoms may include irritation, dizziness, nausea, lack of coordination and narcosis.

- **N-Propylbenzene (CAS #103-65-1)** is a colorless to pale yellow flammable liquid. Inhalation or contact may irritate or burn skin and eyes. In case fire, smoke-vapor may produce irritating, corrosive and/or toxic gases. Vapors may cause dizziness or suffocation.

- **Ethylbenzene (CAS #100-41-4)** is a component of automobile gasoline. Over-exposure may cause kidney, skin liver and/or respiratory disease. Signs of exposure may include dermatitis, irritation of the eyes and mucus membranes, headache. Narcosis and coma may result in more severe cases.

- **Toluene (CAS #108-88-3)** is a common component of paint thinners and automobile fuel. Acute exposure predominantly results in central nervous system depression. Symptoms include headache, dizziness, fatigue, muscular weakness, drowsiness, and coordination loss. Repeated exposures may cause removal of lipids from the skin, resulting in dry, fissured dermatitis.

- **Xylenes (o, m, and p) (CAS #95-47-6, 108-38-3, and 106-42-3)** are colorless, flammable liquids present in paint thinners and fuels. Acute exposure may cause central nervous system depression, resulting in headache, dizziness, fatigue, muscular weakness, drowsiness, and coordination loss. Repeated exposures may also cause removal of lipids from the skin, producing dry, fissured dermatitis. Exposure of high concentrations of vapor may cause eye irritation and damage, as well as irritation of the mucus membranes.

2. **Polycyclic Aromatic Hydrocarbons (PAHs)** are formed as a result of the pyrolysis and incomplete combustion of organic matter such as fossil fuel. PAH aerosols formed during the combustion process disperse throughout the atmosphere, resulting in the deposition of PAH condensate in soil, water and on vegetation. In addition, several products formed from petroleum processing

operations (e.g., roofing materials and asphalt) also contain elevated levels of PAHs. Hence, these compounds are widely dispersed in the environment. PAHs are characterized by a molecular structure containing three or more fused, unsaturated carbon rings. Seven of the PAHs are classified by USEPA as probable human carcinogens (USEPA Class B2). These are: benzo(a)pyrene; benzo(a)anthracene; benzo(b)fluoranthene; benzo(k)fluoranthene; chrysene; dibenzo(a,h)anthracene; and indeno(1,2,3-cd)pyrene. The primary route of exposure to PAHs is through incidental ingestion and inhalation of contaminated particulates. PAHs are characterized by an organic odor, and exist as oily liquids in pure form. Acute exposure symptoms may include acne-type blemishes in areas of the skin exposed to sunlight.

With respect to the anticipated RI activities discussed in Section 1.5, possible routes of exposure to the above-mentioned contaminants are presented in Table 2. The use of proper respiratory equipment, as outlined in Section 7.0 of this HASP, will minimize the potential for exposure to airborne contamination. Exposure to contaminants through dermal and other routes will also be minimized through the use of protective clothing (Section 7.0), safe work practices (Section 6.0), and proper decontamination procedures (Section 12.0).

3.2 Physical Hazards

RI field activities at the Site may present the following physical hazards:

- The potential for physical injury during heavy construction equipment use, such as backhoes, excavators and drilling equipment.
- The potential for heat/cold stress to employees during the summer/winter months (see Section 10.0).
- The potential for slip and fall injuries due to rough, uneven terrain and/or open excavations.

These hazards represent only some of the possible means of injury that may be present during RI operations and sampling activities at the Site. Since it is impossible to list all potential sources of injury, it shall be the responsibility of each individual to exercise proper care and caution during all phases of the work.

4.0 TRAINING

4.1 Site Workers

Personnel performing RI activities at the Site (such as, but not limited to, equipment operators, general laborers, and drillers) and who may be exposed to hazardous substances, health hazards, or safety hazards and their supervisors/managers responsible for the Site shall receive training in accordance with 29 CFR 1910.120(e) before they are permitted to engage in operations in the exclusion zone or contaminant reduction zone. This training includes an initial 40-hour Hazardous Waste Site Worker Protection Course, an 8-hour Annual Refresher Course subsequent to the initial 40-hour training, and 3 days of actual field experience under the direct supervision of a trained, experienced supervisor. Additional site-specific training shall also be provided by the SSHO prior to the start of field activities. A description of topics to be covered by this training is provided below.

4.1.1 Initial and Refresher Training

Initial and refresher training is conducted by a qualified instructor as specified under OSHA 29 CFR 1910.120(e)(5), and is specifically designed to meet the requirements of OSHA 29 CFR 1910.120(e)(3) and 1910.120(e)(8). The training covers, as a minimum, the following topics:

- OSHA HAZWOPER regulations.
- Site safety and hazard recognition, including chemical and physical hazards.
- Medical monitoring requirements.
- Air monitoring, permissible exposure limits, and respiratory protection level classifications.
- Appropriate use of personal protective equipment (PPE), including chemical compatibility and respiratory equipment selection and use.
- Work practices to minimize risk.
- Work zones and Site control.

- Safe use of engineering controls and equipment.
- Decontamination procedures.
- Emergency response and escape.
- Confined space entry procedures.
- Heat and cold stress monitoring.
- Elements of a Health and Safety Plan.
- Spill containment.

Initial training also incorporates workshops for PPE and respiratory equipment use (Levels A, B and C), and respirator fit testing. Records and certification received from the course instructor documenting each employee's successful completion of the training identified above are maintained on file at Benchmark's Buffalo, NY office. Contractors and Subcontractors are required to provide similar documentation of training for all their personnel who will be involved in on-site work activities.

Any employee who has not been certified as having received health and safety training in conformance with 29 CFR 1910.120(e) is prohibited from working in the exclusion and contamination reduction zones, or to engage in any on-site work activities that may involve exposure to hazardous substances or wastes.

4.1.2 Site Training

Site workers are given a copy of the HASP and provided a site-specific briefing prior to the commencement of work to ensure that employees are familiar with the HASP and the information and requirements it contains. The Site briefing shall be provided by the SSHO prior to initiating field activities and shall include:

- Names of personnel and alternates responsible for Site safety and health.
- Safety, health and other hazards present on the Site.
- The site lay-out including work zones and places of refuge.

- The emergency communications system and emergency evacuation procedures.
- Use of PPE.
- Work practices by which the employee can minimize risks from hazards.
- Safe use of engineering controls and equipment on the site.
- Medical surveillance, including recognition of symptoms and signs of over-exposure as described in Chapter 5 of this HASP.
- Decontamination procedures as detailed in Chapter 12 of this HASP.
- The emergency response plan as detailed in Chapter 15 of this HASP.
- Confined space entry procedures, if required, as detailed in Chapter 13 of this HASP.
- The spill containment program as detailed in Chapter 9 of this HASP.
- Site control as detailed in Chapter 11 of this HASP.

Supplemental health and safety briefings will also be conducted by the SSHO on an as-needed basis during the course of the work. Supplemental briefings are provided as necessary to notify employees of any changes to this HASP as a result of information gathered during ongoing Site characterization and analysis. Conditions for which the SSHO may schedule additional briefings include, but are not limited to: a change in Site conditions (e.g., based on monitoring results); changes in the work schedule/plan; newly discovered hazards; and safety incidents occurring during Site work.

4.2 Supervisor Training

On-site safety and health personnel who are directly responsible for or who supervise the safety and health of workers engaged in hazardous waste operations (i.e., SSHO) shall receive, in addition to the appropriate level of worker training described in Section 4.1, above, 8 additional hours of specialized supervisory training, in compliance with 29 CFR 1910.120(e)(4).

4.3 Emergency Response Training

Emergency response training is addressed in Appendix A of this HASP, Emergency Response Plan.

4.4 Site Visitors

Each Contractor's SSHO will provide a site-specific briefing to Site visitors and other non-Benchmark personnel who enter the Site beyond the Site entry point. The site-specific briefing will provide information about Site hazards, the Site layout including work zones and places of refuge, the emergency communications system and emergency evacuation procedures, and other pertinent safety and health requirements as appropriate.

Site visitors will not be permitted to enter the exclusion zone or contaminant reduction zones unless they have received the level of training required for Site workers as described in Section 4.1.

5.0 MEDICAL MONITORING

Medical monitoring examinations are provided to Benchmark employees as stipulated under 29 CFR Part 1910.120(f). These exams include initial employment, annual and employment termination physicals for Benchmark employees involved in hazardous waste site field operations. Post-exposure examinations are also provided for employees who may have been injured, received a health impairment, or developed signs or symptoms of over-exposure to hazardous substances or were accidentally exposed to substances at concentrations above the permissible exposure limits without necessary personal protective equipment. Such exams are performed as soon as possible following development of symptoms or the known exposure event.

Medical evaluations are performed by Health Works, an occupational health care provider under contract with Benchmark. Health Works is located in Seneca Square Plaza, 1900 Ridge Road, West Seneca, New York 14224. The facility can be reached at (716) 823-5050 to schedule routine appointments or post-exposure examinations.

Medical evaluations are conducted according to the Benchmark Medical Monitoring Program and include an evaluation of the workers' ability to use respiratory protective equipment. The examinations include:

- Occupational/medical history review.
- Physical exam, including vital sign measurement.
- Spirometry testing.
- Eyesight testing.
- Audio testing (minimum baseline and exit, annual for employees routinely exposed to greater than 85db).
- EKG (for employees >40 yrs age or as medical conditions dictate).
- Chest X-ray (baseline and exit, and every 5 years).
- Blood biochemistry (including blood count, white cell differential count, serum multiplastic screening).

- Medical certification of physical requirements (i.e., sight, musculoskeletal, cardiovascular) for safe job performance and to wear respiratory protection equipment.

The purpose of the medical evaluation is to determine an employee's fitness for duty on hazardous waste sites; and to establish baseline medical data.

In conformance with OSHA regulations, Benchmark will maintain and preserve medical records for a period of 30 years following termination of employment. Employees are provided a copy of the physician's post-exam report, and have access to their medical records and analyses.

6.0 SAFE WORK PRACTICES

Benchmark employees shall conform to the following safe work practices during on-site work activities conducted within the exclusion and contamination reduction zones:

- Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand-to-mouth contact is strictly prohibited.
- The hands and face must be thoroughly washed upon leaving the work area and prior to engaging in any activity indicated above.
- Respiratory protective equipment and clothing must be worn by all personnel entering the Site as required by the HASP or as modified by the Site safety officer. Excessive facial hair (i.e., beards, long mustaches or sideburns) that interferes with the satisfactory respirator-to-face seal is prohibited.
- Contact with surfaces/materials either suspected or known to be contaminated will be avoided to minimize the potential for transfer to personnel, cross contamination and need for decontamination.
- Medicine and alcohol can synergize the effects of exposure to toxic chemicals. Due to possible contraindications, use of prescribed drugs should be reviewed with the Benchmark occupational physician. Alcoholic beverage and illegal drug intake are strictly forbidden during the workday.
- Personnel shall be familiar with standard operating safety procedures and additional instructions contained in this Health and Safety Plan.
- On-site personnel shall use the "buddy" system. No one may work alone (i.e., out of earshot or visual contact with other workers) in the exclusion zone.
- Personnel and equipment in the contaminated area shall be minimized, consistent with effective Site operations.
- Employees have the obligation to immediately report and if possible, correct unsafe work conditions.
- Use of contact lenses on-site will not be permitted. Spectacle kits for insertion into full-face respirators will be provided for Benchmark employees, as requested and required.

The recommended specific safety practices for working around the contractor's equipment (e.g., backhoes, bulldozers, excavators, drill rigs etc.) are as follows:

- Although the Contractor and subcontractors are responsible for their equipment and safe operation of the Site, Benchmark personnel are also responsible for their own safety.
- Subsurface work will not be initiated without first clearing underground utility services.
- Heavy equipment should not be operated within 20 feet of overhead wires. This distance may be increased if windy conditions are anticipated or if lines carry high voltage. The Site should also be sufficiently clear to ensure the project staff can move around the heavy machinery safely.
- Care should be taken to avoid overhead wires when moving heavy-equipment from location to location.
- Hard hats, safety boots and safety glasses should be worn in the vicinity of heavy equipment. Hearing protection is also recommended.
- The work Site should be kept neat. This will prevent personnel from tripping and will allow for fast emergency exit from the Site.
- Proper lighting must be provided when working at night.
- Construction activities should be discontinued during an electrical storm or severe weather conditions.
- The presence of combustible gases should be checked before igniting any open flame.
- Personnel shall stand upwind of any construction operation when not immediately involved in sampling/logging/observing activities.
- Personnel will not approach the edge of an unsecured trench/excavation closer than 2 feet.

7.0 PERSONAL PROTECTIVE EQUIPMENT

7.1 Equipment Selection

Personal protective equipment (PPE) will be donned when work activities may result in exposure to physical or chemical hazards beyond acceptable limits, and when such exposure can be mitigated through appropriate PPE. The selection of PPE will be based on an evaluation of the performance characteristics of the PPE relative to the requirements and limitations of the Site, the task-specific conditions and duration, and the hazards and potential hazards identified at the Site.

Equipment designed to protect the body against contact with known or suspect chemical hazards are grouped into four categories according to the degree of protection afforded. These categories designated A through D consistent with United States Environmental Protection Agency (USEPA) Level of Protection designation, are:

- **Level A:** Should be selected when the highest level of respiratory, skin and eye protection is needed.

- **Level B:** Should be selected when the highest level of respiratory protection is needed, but a lesser level of skin protection is required. Level B protection is the minimum level recommended on initial Site entries until the hazards have been further defined by on-site studies. Level B (or Level A) is also necessary for oxygen-deficient atmospheres.

- **Level C:** Should be selected when the types of airborne substances are known, the concentrations have been measured and the criteria for using air-purifying respirators are met. In atmospheres where no airborne contaminants are present, Level C provides dermal protection only.

- **Level D:** Should not be worn on any Site with elevated respiratory or skin hazards. This is generally a work uniform providing minimal protection.

OSHA requires the use of certain PPE under conditions where an immediate danger to life and health (IDLH) may be present. Specifically, OSHA 29 CFR 1910.120(g)(3)(iii) requires use of a positive pressure self-contained breathing apparatus, or positive pressure air-line respirator equipped with an escape air supply when chemical exposure levels present a substantial possibility of immediate serious injury, illness or death, or impair the ability to escape. Similarly, OSHA 29 CFR 1910.120(g)(3)(iv) requires donning totally-encapsulating chemical protective suits (with a protection level equivalent to Level A protection) in conditions where skin absorption of a hazardous substance may result in a substantial possibility of immediate serious illness, injury or death, or impair the ability to escape.

In situations where the types of chemicals, concentrations, and possibilities of contact are unknown, the appropriate level of protection must be selected based on professional experience and judgment until the hazards can be further characterized. The individual components of clothing and equipment must be assembled into a full protective ensemble to protect the worker from site-specific hazards, while at the same time minimizing hazards and drawbacks of the personal protective gear itself. Ensemble components are detailed below for levels A/B, C, and D protection.

7.2 Protection Ensembles

7.2.1 Level A/B Protection Ensemble

Level A/B ensembles include similar respiratory protection, however Level A provides a higher degree of dermal protection than Level B. Use of Level A over Level B is determined by: comparing the concentrations of identified substances in the air with skin toxicity data, and assessing the effect of the substance (by its measured air concentrations or splash potential) on the small area of the head and neck unprotected by Level B clothing.

The recommended PPE for level A/B is:

- Pressure-demand, full-face piece self-contained breathing apparatus (MSHA/-NIOSH approved) or pressure-demand supplied-air respirator with escape self-contained breathing apparatus (SCBA).
- Chemical-resistant clothing. For Level A, clothing consists of totally-encapsulating chemical resistant suit. Level B incorporates hooded one-or two-piece chemical splash suit.
- Inner and outer chemical resistant gloves.
- Chemical-resistant safety boots/shoes.
- Hardhat.

7.2.2 Level C Protection Ensemble

Level C protection is distinguished from Level B by the equipment used to protect the respiratory system, assuming the same type of chemical-resistant clothing is used. The main selection criterion for Level C is that conditions permit wearing an air-purifying device. The device (when required) must be an air-purifying respirator (MSHA/NIOSH approved) equipped with filter cartridges. Cartridges must be able to remove the substances encountered. Respiratory protection will be used only with proper fitting, training and the approval of a qualified individual. In addition, an air-purifying respirator can be used only if: oxygen content of the atmosphere is at least 19.5% in volume; substances are identified and concentrations measured; substances have adequate warning properties; the individual passes a qualitative fit-test for the mask; and an appropriate cartridge/canister is used, and its service limit concentration is not exceeded.

Recommended PPE for Level C conditions includes:

- Full-face piece, air-purifying respirator equipped with MSHA and NIOSH approved organic vapor/acid gas/dust/mist combination cartridges or as designated by the SSHO.
- Chemical-resistant clothing (hooded, one or two-piece chemical splash suit or disposable chemical-resistant one-piece suit).
- Inner and outer chemical-resistant gloves.
- Chemical-resistant safety boots/shoes.
- Hardhat.

An air-monitoring program is part of all response operations when atmospheric contamination is known or suspected. It is particularly important that the air be monitored thoroughly when personnel are wearing air-purifying respirators. Continual surveillance using direct-reading instruments is needed to detect any changes in air quality necessitating a higher level of respiratory protection.

7.2.3 Level D Protection Ensemble

As indicated above, Level D protection is primarily a work uniform. It can be worn in areas where only boots can be contaminated, where there are no inhalable toxic substances and where the atmospheric contains at least 19.5% oxygen.

Recommended PPE for Level D includes:

- Coveralls.
- Safety boots/shoes.
- Safety glasses or chemical splash goggles.
- Hardhat.
- Optional gloves; escape mask; face shield.

7.2.4 Recommended Level of Protection for Site Tasks

Based upon current information regarding both the contaminants suspected to be present at the Site and the various tasks that are included in the remedial activities, the minimum required levels of protection for these tasks shall be as identified in Table 3.

8.0 EXPOSURE MONITORING

8.1 General

Based on the results of historic sample analysis and the nature of the proposed work activities at the Site, the possibility exist that organic vapors and/or particulates may be released to the air during intrusive construction activities. Ambient breathing zone concentrations may at times, exceed the permissible exposure limits (PELs) established by OSHA for the individual compounds (see Table 1), in which case respiratory protection will be required. Respiratory and dermal protection may be modified (upgraded or downgraded) by the SSHO based upon real-time field monitoring data.

8.1.1 On-Site Work Zone Monitoring

Benchmark personnel will conduct routine, real-time air monitoring during intrusive construction phases such as excavation, backfilling, drilling, etc. The work area will be monitored at regular intervals using a photoionization detector (PID) and a particulate meter. Observed values will be recorded and maintained as part of the permanent field record.

Additional air monitoring measurements may be made by Benchmark personnel to verify field conditions during subcontractor oversight activities. Monitoring instruments will be protected from surface contamination during use. Additional monitoring instruments may be added if the situations or conditions change. Monitoring instruments will be calibrated in accordance with manufacturer's instructions before use.

8.1.2 Off-Site Community Air Monitoring

In addition to on-Site monitoring within the work zone(s), monitoring at the down-wind portion of the Site perimeter will be conducted. This will provide a real-time method for determination of vapor and/or particulate releases to the surrounding community as a result of ground intrusive investigation work.

Ground intrusive activities are defined in the Generic Community Air Monitoring Plan and attached as Appendix C. Ground intrusive activities include soil/piping excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells. Non-intrusive activities include the collection of soil and sediment samples or the collection of groundwater samples from existing wells. Continuous monitoring is required for ground intrusive activities and periodic monitoring is required for non-intrusive activities. Periodic monitoring consists of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring while bailing a well, and taking a reading prior to leaving a sampling location. This may be upgraded to continuous if the sampling location is in close proximity to individuals not involved in the Site activity (i.e., on a curb of a busy street). The action levels below will be used during periodic monitoring.

8.2 Monitoring Action Levels

8.2.1 On-Site Work Zone Action Levels

The PID, or other appropriate instrument(s), will be used by Benchmark personnel to monitor organic vapor concentrations as specified in this HASP. Combustible gas will be monitored with the "combustible gas" option on the combustible gas meter or other appropriate instrument(s). In addition, fugitive dust/particulate concentrations will be monitored during major soil intrusion (viz., well/boring installation) using a real-time particulate monitor as specified in this plan. In the absence of such monitoring, appropriate respiratory protection for particulates shall be donned. Sustained readings obtained in the breathing zone may be interpreted (with regard to other Site conditions) as follows for Benchmark personnel:

- Total atmospheric concentrations of unidentified vapors or gases ranging from 0 to 1 ppm above background on the PID) - Continue operations under Level D (see Appendix A).

- Total atmospheric concentrations of unidentified vapors or gases yielding sustained readings from >1 ppm to 5 ppm above background on the PID (vapors not suspected of containing high levels of chemicals toxic to the skin) - Continue operations under Level C (see Appendix A).

- Total atmospheric concentrations of unidentified vapors or gases yielding sustained readings of >5 ppm to 50 ppm above background on the PID - Continue operations under Level B (see Attachment 1), re-evaluate and alter (if possible) construction methods to achieve lower vapor concentrations.

- Total atmospheric concentrations of unidentified vapors or gases above 50 ppm on the PID - Discontinue operations and exit the work zone immediately.

The particulate monitor will be used to monitor respirable dust concentrations during intrusive activities and during handling of Site soil/fill. Action levels based on the instrument readings shall be as follows:

- Less than 50 mg/m^3 - Continue field operations.
- 50-150 mg/m^3 - Don dust/particulate mask or equivalent
- Greater than 150 mg/m^3 - Don dust/particulate mask or equivalent. Initiate engineering controls to reduce respirable dust concentration (viz., wetting of excavated soils or tools at discretion of Site Health and Safety Officer).

Readings from the field equipment will be recorded and documented on the appropriate Project Field Forms. Instruments will be calibrated before use on a daily basis and the procedure will be documented on the appropriate Project Field Forms.

8.2.2 Community Air Monitoring Action Levels

In addition to the action levels prescribed in Section 8.2.1 for Benchmark personnel on-site, the following criteria shall also be adhered to for the protection of downwind receptors consistent with NYSDOH requirements (Appendix C):

- **ORGANIC VAPOR PERIMETER MONITORING:**
  - If the sustained ambient air concentration of organic vapors at the downwind perimeter of the exclusion zone exceeds 5 ppm above background for the 15-minute average, work activities will be temporarily halted and monitoring continued. If the sustained organic vapor decreases below 5 ppm over background, work activities can resume with continued monitoring.
  - If the sustained ambient air concentration of organic vapors at the downwind perimeter of the exclusion zone are greater than 5 ppm over background but less than 25 ppm for the 15-minute average, activities can resume provided that: the organic vapor level 200 feet downwind of the working site or half the distance to the nearest off-site residential or commercial structure, whichever

is less, but in no case less than 20 feet, is below 5 ppm over background; and more frequent intervals of monitoring, as directed by the Site Health and Safety Officer, are conducted.

- If the sustained organic vapor level is above 25 ppm at the perimeter of the exclusion zone for the 15-minute average, the Site Health and Safety Officer must be notified and work activities shut down. The Site Health and Safety Officer will determine when re-entry of the exclusion zone is possible and will implement downwind air monitoring to ensure vapor emissions do not impact the nearest off-site residential or commercial structure at levels exceeding those specified in the ***Organic Vapor Contingency Monitoring Plan*** below. All readings will be recorded and will be available for New York State Department of Environmental Conservation (DEC) and Department of Health (DOH) personnel to review.

- **ORGANIC VAPOR CONTINGENCY MONITORING PLAN:**
  - If the sustained organic vapor level is greater than 5 ppm over background 200 feet downwind from the work area or half the distance to the nearest off-site residential or commercial property, whichever is less, all work activities must be halted.
  - If, following the cessation of the work activities or as the result of an emergency, sustained organic levels persist above 5 ppm above background 200 feet downwind or half the distance to the nearest off-site residential or commercial property from the work area, then the air quality must be monitored within 20 feet of the perimeter of the nearest off-site residential or commercial structure (20-foot zone).
  - If efforts to abate the emission source are unsuccessful and if sustained organic vapor levels approach or exceed 5 ppm above background within the 20-foot zone for more than 30 minutes, or are sustained at levels greater than 10 ppm above background for longer than one minute, then the ***Major Vapor Emission Response Plan*** (see below) will automatically be placed into effect.

- **MAJOR VAPOR EMISSION RESPONSE PLAN:**

  Upon activation, the following activities will be undertaken:

  1. All Emergency Response Contacts as listed in this Health and Safety Plan and the Emergency Response Plan (Appendix A) will be advised.

2. The local police authorities will immediately be contacted by the Site Health and Safety Officer and advised of the situation.

3. Frequent air monitoring will be conducted at 30-minute intervals within the 20-foot zone. If two (2) sustained successive readings below action levels are measured, air monitoring may be halted or modified by the Site Health and Safety Officer.

The following personnel are to be notified in the listed sequence in the event that a Major Vapor Emission Plan is activated:

Responsible Person	Contact	Phone Number
SSHO	Police	911
SSHO	State Emergency Response Hotline	(800) 457-7362

Additional emergency numbers are listed in the Emergency Response Plan included as Appendix A.

- **EXPLOSIVE VAPORS:**
  - Sustained atmospheric concentrations of greater than 10% LEL in the work area - Initiate combustible gas monitoring at the downwind portion of the Site perimeter.
  - Sustained atmospheric concentrations of greater than 10% LEL at the downwind Site perimeter – Halt work and contact local Fire Department.

- **AIRBORNE PARTICULATE COMMUNITY AIR MONITORING**

  Respirable (PM-10) particulate monitoring will be performed on a continuous basis at the upwind and downwind perimeter of the exclusion zone. The monitoring will be performed using real-time monitoring equipment capable of measuring PM-10 and integrating over a period of 15-minutes for comparison to the airborne particulate action levels. The equipment will be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration will be visually assessed during all work activities. All readings will be recorded and will be available for NYSDEC and NYSDOH review. Readings will be interpreted as follows:

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (ug/m^3) greater than the background (upwind perimeter) reading for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression provided that the downwind PM-10 particulate levels do not exceed 150 ug/m^3 above the upwind level and that visible dust is not migrating from the work area.

- If, after implementation of dust suppression techniques downwind PM-10 levels are greater than 150 ug/m^3 above the upwind level, work activities must be stopped and dust suppression controls re-evaluated. Work can resume provided that supplemental dust suppression measures and/or other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 ug/m^3 of the upwind level and in preventing visible dust migration.

Pertinent emergency response information including the telephone number of the Fire Department is included in the Emergency Response Plan (Appendix A).

9.0 SPILL RELEASE/RESPONSE

This chapter of the HASP describes the potential for and procedures related to spills or releases of known or suspected petroleum and/or hazardous substances on the Site. The purpose of this Section of the HASP is to plan appropriate response, control, counter-measures and reporting, consistent with OSHA requirements in 29 CFR 1910.120(b)(4)(ii)(J) and (j)(1)(viii). The spill containment program addresses the following elements:

- Potential hazardous material spills and available controls.
- Initial notification and evaluation.
- Spill response.
- Post-spill evaluation.

9.1 Potential Spills and Available Controls

An evaluation was conducted to determine the potential for hazardous material and oil/petroleum spills at this Site. For the purpose of this evaluation, hazardous materials posing a significant spill potential are considered to be:

- CERCLA Hazardous Substances as identified in 40 CFR Part 302, where such materials pose the potential for release in excess of their corresponding Reportable Quantity (RQ).

- Extremely Hazardous Substances as identified in 40 CFR Part 355, Appendix A, where such materials pose the potential for release in excess of their corresponding Reportable Quantity (RQ).

- Hazardous Chemicals as defined under Section 311(e) of the Emergency Planning and Community Right-To-Know Act of 1986, where such chemicals are present or will be stored in excess of 10,000 lbs.

- Toxic Chemicals as defined in 40 CFR Part 372, where such chemicals are present or will be stored in excess of 10,000 lbs.

- Chemicals regulated under 6NYCRR Part 597, where such materials pose the potential for release in excess of their corresponding Reportable Quantity (RQ).

Oil/petroleum products are considered to pose a significant spill potential whenever the following situations occur:

- The potential for a "harmful quantity" of oil (including petroleum and non-petroleum-based fuels and lubricants) to reach navigable waters of the U.S. exists (40 CFR Part 112.4). Harmful quantities are considered by USEPA to be volumes that could form a visible sheen on the water or violate applicable water quality standards.

- The potential for any amount of petroleum to reach any waters of NY State, including groundwater, exists. Petroleum, as defined by NY State in 6NYCRR Part 612, is a petroleum-based heat source, energy source, or engine lubricant/maintenance fluid.

- The potential for any release, to soil or water, of petroleum from a bulk storage facility regulated under 6NYCRR Part 612. A regulated petroleum storage facility is defined by NY State as a site having stationary tank(s) and intra-facility piping, fixtures and related equipment with an aggregate storage volume of 1,100 gallons or greater.

9.2 Initial Spill Notification and Evaluation

Any worker who discovers a hazardous substance or oil/petroleum spill will immediately notify the Project Manager and SSHO. The worker will, to the best of his/her ability, report the material involved, the location of the spill, the estimated quantity of material spilled, the direction/flow of the spill material, related fire/explosion incidents, if any, and any associated injuries. The Emergency Response Plan presented in Attachment H2 of this HASP will immediately be implemented if an emergency release has occurred.

Following initial report of a spill, the Project Manager will make an evaluation as to whether the release exceeds RQ levels. If an RQ level is exceeded, the Project Manager will notify the Site owner and NYSDEC at 1-800-457-7362 within 2 hours of spill discovery. The Project Manager will also determine what additional agencies (e.g., USEPA) are to be contacted regarding the release, and will follow-up with written reports as required by the applicable regulations.

9.3 Spill Response

For spill situations, the following general response guidelines will apply:

- Only those personnel involved in overseeing or performing containment operations will be allowed within the spill area. If necessary, the area will be roped, ribboned, or otherwise blocked off to prevent unauthorized access.
- Appropriate PPE, as specified by the SSHO, will be donned before entering the spill area.
- Ignition points will be extinguished/removed if fire or explosion hazards exist.
- Surrounding reactive materials will be removed.
- Drains or drainage in the spill area will be blocked to prevent inflow of spilled materials or applied materials.

For minor spills, the Contractor will maintain a Spill Control and Containment Kit in the Field Office or other readily accessible storage location. The kit will consist of, at a minimum, a 50 lb. bag of "speedy dry" granular absorbent material, absorbent pads, shovels, empty 5-gallon pails and an empty open-top 55-gallon drum. Spilled materials will be absorbed, and shoveled into a 55-gallon drum for proper disposal (NYSDEC approval will be secured for on-site treatment of the impacted soils/absorbent materials, if applicable). Impacted soils will be hand-excavated to the point that no visible signs of contamination remains, and will be drummed with the absorbent.

In the event of a major release or a release that threatens surface water, a spill response contractor will be called to the Site. The response contractor may use heavy equipment (e.g., excavator, backhoe, etc.) to berm the soils surrounding the spill Site or create diversion trenching to mitigate overland migration or release to navigable waters. Where feasible, pumps will be used to transfer free liquid to storage containers. Spill control/cleanup contractors in the Western New York area that may be contacted for assistance include:

- The Environmental Service Group of NY, Inc.: (716) 695-6720
- Environmental Products and Services, Inc.: (716) 447-4700
- Op-Tech: (716) 873-7680

9.4 Post-Spill Evaluation

If a reportable quantity of hazardous material or oil/petroleum is spilled as determined by the Project Manager, a written report will be prepared as indicated in Section 9.2. The report will identify the root cause of the spill, type and amount of material released, date/time of release, response actions, agencies notified and/or involved in cleanup, and procedures to be implemented to avoid repeat incidents. In addition, all re-useable spill cleanup and containment materials will be decontaminated, and spill kit supplies/disposable items will be replenished.

10.0 HEAT/COLD STRESS MONITORING

Since some of the work activities at the Site will be scheduled for both the summer and winter months, measures will be taken to minimize heat/cold stress to Benchmark employees. The Site Safety and Health Officer and/or his or her designee will be responsible for monitoring Benchmark field personnel for symptoms of heat/cold stress.

10.1 Heat Stress Monitoring

Personal protective equipment may place an employee at risk of developing heat stress, a common and potentially serious illnesses often encountered at construction, landfill, waste disposal, industrial or other unsheltered sites. The potential for heat stress is dependent on a number of factors, including environmental conditions, clothing, workload, physical conditioning and age. Personal protective equipment may severely reduce the body's normal ability to maintain temperature equilibrium (via evaporation and convection), and require increased energy expenditure due to its bulk and weight.

Proper training and preventive measures will mitigate the potential for serious illness. Heat stress prevention is particularly important because once a person suffers from heat stroke or heat exhaustion, that person may be predisposed to additional heat related illness. To avoid heat stress, the following steps should be taken:

- Adjust work schedules.
- Modify work/rest schedules according to monitoring requirements.
- Mandate work slowdowns as needed.
- Perform work during cooler hours of the day if possible or at night if adequate lighting can be provided.
- Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods.
- Maintain worker's body fluids at normal levels. This is necessary to ensure that the cardiovascular system functions adequately. Daily fluid intake must approximately equal the amount of water lost in sweat (i.e., eight fluid ounces must be ingested for approximately every 1 lb of weight lost). The normal thirst mechanism is not sensitive enough to ensure that enough water will be consumed

to replace lost perspiration. When heavy sweating occurs, workers should be encouraged to drink more.

- Train workers to recognize the symptoms of heat related illness.

Heat-Related Illness - Symptoms:

- Heat rash may result from continuous exposure to heat or humid air.
- Heat cramps are caused by heavy sweating with inadequate electrolyte replacement. Signs and symptoms include: muscle spasms; pain in the hands, feet and abdomen.
- Heat exhaustion occurs from increased stress on various body organs including inadequate blood circulation due to cardiovascular insufficiency or dehydration. Signs and symptoms include: pale, cool, moist skin; heavy sweating; dizziness; nausea; fainting.
- Heat stroke is the most serious form of heat stress. Temperature regulation fails and the body temperature rises to critical levels. Immediate action must be taken to cool the body before serious injury and death occur. Competent medical help must be obtained. Signs and symptoms are: red, hot, usually dry skin; lack of or reduced perspiration; nausea; dizziness and confusion; strong, rapid pulse; coma.

The monitoring of personnel wearing protective clothing should commence when the ambient temperature is 70 degrees Fahrenheit or above. For monitoring the body's recuperative ability to excess heat, one or more of the following techniques should be used as a screening mechanism.

- Heart rate may be measured by the radial pulse for 30 seconds as early as possible in the resting period. The rate at the beginning of the rest period should not exceed 100 beats per minute. If the rate is higher, the next work period should be shortened by 10 minutes (or 33%), while the length of the rest periods stay the same, If the pulse rate is 100 beats per minute at the beginning of the nest rest period, the following work cycle should be further shortened by 33%.
- Body temperature may be measured orally with a clinical thermometer as early as possible in the resting period. Oral temperature at the beginning of the rest period should not exceed 99.6 degrees Fahrenheit. If it does, the next work period

should be shortened by 10 minutes (or 33%), while the length of the rest period remains the same. However, if the oral temperature exceeds 99.6 degrees Fahrenheit at the beginning of the next period, the work cycle may be further shortened by 33%. Oral temperature should be measured at the end of the rest period to make sure that it has dropped below 99.6 degrees Fahrenheit. No Benchmark employee will be permitted to continue wearing semi-permeable or impermeable garments when his/her oral temperature exceeds 100.6 degrees Fahrenheit.

10.2 Cold Stress Monitoring

Exposure to cold conditions may result in frostbite or hypothermia, each of which progresses in stages as shown below.

- **Frostbite** occurs when body tissue (usually on the extremities) begins to freeze. The three states of frostbite are:

  1) **Frost nip** - This is the first stage of the freezing process. It is characterized by a whitened area of skin, along with a slight burning or painful sensation. Treatment consists of removing the victim from the cold conditions, removal of boots and gloves, soaking the injured part in warm water (102 to 108 degrees Fahrenheit) and drinking a warm beverage. Do not rub skin to generate friction/ heat.

  2) **Superficial Frostbite** - This is the second stage of the freezing process. It is characterized by a whitish gray area of tissue, which will be firm to the touch but will yield little pain. The treatment is identical for Frost nip.

  3) **Deep Frostbite** - In this final stage of the freezing process the affected tissue will be cold, numb and hard and will yield little to no pain. Treatment is identical to that for Frost nip.

- **Hypothermia** is a serious cold stress condition occurring when the body loses heat at a rate faster than it is produced. If untreated, hypothermia may be fatal. The stages of hypothermia may not be clearly defined or visible at first, but generally include:

  1) Shivering
  2) Apathy (i.e., a change to an indifferent or uncaring mood)
  3) Unconsciousness

4) Bodily freezing

Employees exhibiting signs of hypothermia should be treated by medical professionals. Steps that can be taken while awaiting help include:

1) Remove the victim from the cold environment and remove wet or frozen clothing. (Do this carefully as frostbite may have started.)

2) Perform active re-warming with hot liquids for drinking (Note: do not give the victim any liquid containing alcohol or caffeine) and a warm water bath (102 to 108 degrees Fahrenheit).

3) Perform passive re-warming with a blanket or jacket wrapped around the victim.

In any potential cold stress situation, it is the responsibility of the Site Health and Safety Officer to encourage the following:

- Education of workers to recognize the symptoms of frostbite and hypothermia.
- Workers should dress warmly, with more layers of thin clothing as opposed to one thick layer.
- Personnel should remain active and keep moving.
- Personnel should be allowed to take shelter in a heated areas, as necessary.
- Personnel should drink warm liquids (no caffeine or alcohol if hypothermia has set in).
- For monitoring the body's recuperation from excess cold, oral temperature recordings should occur:
    - At the Site Safety Technicians discretion when suspicion is based on changes in a worker's performance or mental status.
    - At a workers request.
    - As a screening measure, two times per shift, under unusually hazardous conditions (e.g., wind chill less than 20 degrees Fahrenheit or wind chill less than 30 degrees Fahrenheit with precipitation).

- As a screening measure, whenever anyone worker on-site develops hypothermia.

Any person developing moderate hypothermia (a core body temperature of 92 degrees Fahrenheit) will not be allowed to return to work for 48 hours without the recommendation of a qualified medical doctor.

11.0 WORK ZONES AND SITE CONTROL

Work zones around the areas designated for construction activities will be established on a daily basis and communicated to employees and other Site users by the SSHO. It shall be each Contractor's Site Safety and Health Officer's responsibility to ensure that Site workers are aware of the work zone boundaries and to enforce proper procedures in each area. The zones will include:

- Exclusion Zone ("Hot Zone") - The area where contaminated materials may be exposed, excavated or handled and all areas where contaminated equipment or personnel may travel. Flagging tape will delineate the zone. Personnel entering the Exclusion Zone must wear the prescribed level of personal protective equipment identified in Section 7.

- Contamination Reduction Zone - The zone where decontamination of personnel and equipment takes place. Any potentially contaminated clothing, equipment and samples must remain in the Contamination Reduction Zone until decontaminated.

- Support Zone - The part of the site that is considered non-contaminated or "clean." Support equipment will be located in this zone, and personnel may wear normal work clothes within this zone.

In the absence of other task-specific work zone boundaries established by the SSHO, the following boundaries will apply to investigation and construction activities involving disruption or handling of Site soils or groundwater:

- Exclusion Zone: 50 foot radius from the outer limit of the sampling/construction activity.

- Contaminant Reduction Zone: 100 foot radius from the outer limit of the sampling/construction activity.

- Support Zone: Areas outside the Contaminant Reduction Zone.

Access of non-essential personnel to the Exclusion and Contamination Reduction Zones will be strictly controlled by the SSHO. Only personnel who are essential to the completion of the task will be allowed access to these areas and only if they are wearing the prescribed level of protection. Entrance of personnel must be approved by the SSHO.

The SSHO will maintain a Health and Safety Logbook containing the names of Benchmark workers and their level of protection. The zone boundaries may be changed by the SSHO as environmental conditions warrant, and to respond to the necessary changes in work locations on-site.

12.0 DECONTAMINATION

12.1 Decontamination for Benchmark Employees

The degree of decontamination required is a function of a particular task and the environment within which it occurs. The following decontamination procedure will remain flexible, thereby allowing the decontamination crew to respond appropriately to the changing environmental conditions that may arise at the Site. Benchmark personnel on-site shall follow the procedure below, or the Contractor's procedure (if applicable), whichever is more stringent.

Station 1 - Equipment Drop: Deposit visibly contaminated (if any) re-useable equipment used in the contamination reduction and exclusion zones (tools, containers, monitoring instruments, radios, clipboards, etc.) on plastic sheeting.

Station 2 - Boots and Gloves Wash and Rinse: Scrub outer boots and outer gloves. Deposit tape and gloves in waste disposal container.

Station 3 - Tape, Outer Boot and Glove Removal: Remove tape, outer boots and gloves. Deposit tape and gloves in waste disposal container.

Station 4 - Canister or Mask Change: If worker leaves exclusive zone to change canister (or mask), this is the last step in the decontamination procedure. Worker's canister is exchanged, new outer gloves and boot cover donned, and worker returns to duty.

Station 5 - Outer Garment/Face Piece Removal: Protective suit removed and deposited in separate container provided by Contractor. Face piece or goggles are removed if used. Avoid touching face with fingers. Face piece and/or goggles deposited on plastic sheet. Hard hat removed and placed on plastic sheet.

Station 6 - Inner Glove Removal: Inner gloves are the last personal protective equipment to be removed. Avoid touching the outside of the gloves with bare fingers. Dispose of these gloves in waste disposal container.

Following PPE removal, personnel shall wash hands, face and forearms with absorbent wipes. If field activities proceed for duration of 6 consecutive months or longer, shower facilities will be provided for worker use in accordance with OSHA 29 CFR 1910.120(n).

12.2 Decontamination for Medical Emergencies

In the event of a minor, non-life threatening injury, personnel should follow the decontamination procedures as defined, and then administer first-aid.

In the event of a major injury or other serious medical concern (e.g., heat stroke), immediate first-aid is to be administered and the victim transported to the hospital in lieu of further decontamination efforts unless exposure to a Site contaminant would be considered "Immediately Dangerous to Life or Health."

12.3 Decontamination of Field Equipment

The Contractor in accordance with his approved Health and Safety Plan in the Contamination Reduction Zone will conduct decontamination of heavy equipment. As a minimum, this will include manually removing heavy soil contamination, followed by steam cleaning on an impermeable pad.

Benchmark personnel will conduct decontamination of tools used for sample collection purposes. It is expected that tools will be constructed of nonporous, nonabsorbent materials (i.e., metal), which will aid in the decontamination effort. Any tool or part of a tool made of porous, absorbent material (i.e., wood) will be placed into suitable containers and prepared for disposal.

Decontamination of bailers, split-spoons, spatula knives, and other tools used for environmental sampling and examination shall be as follows:

- Disassemble the equipment
- Water wash to remove visible foreign matter.
- Wash with detergent.
- Rinse parts with distilled-deionized water.
- Allow to air dry.
- Wrap parts in aluminum foil or polyethylene.

13.0 CONFINED SPACE ENTRY

OSHA 29 CFR 1910.146 identifies a confined space as a space that is large enough and so configured that an employee can physically enter and do assigned work, has limited or restricted means for entry and exit, and is not intended for continuous employee occupancy. Confined spaces include, but are not limited to, trenches, storage tanks, process vessels, pits, sewers, tunnels, underground utility vaults, pipelines, sumps, wells, and excavations.

Confined space entry by Benchmark employees is not anticipated to be necessary to complete the RI activities identified in Section 2.0. In the event that the scope of work changes or confined space entry appears necessary, the Project Manager will be consulted to determine if feasible engineering alternatives to confined space entry can be implemented. If confined space entry by Benchmark employees cannot be avoided through reasonable engineering measures, task-specific confined space entry procedures will be developed and a confined-space entry permit will be issued through Benchmark's corporate Health and Safety Director. Benchmark employees shall not enter a confined space without these procedures and permits in place.

14.0 FIRE PREVENTION AND PROTECTION

14.1 General Approach

Recommended practices and standards of the National Fire Protection Association (NFPA) and other applicable regulations will be followed in the development and application of Project Fire Protection Programs. When required by regulatory authorities, the project management will prepare and submit a Fire Protection Plan for the approval of the contracting officers, authorized representative or other designated official. Essential considerations for the Fire Protection Plan will include:

- Proper Site preparation and safe storage of combustible and flammable materials.
- Availability of coordination with private and public fire authorities.
- Adequate job-site fire protection and inspections for fire prevention.
- Adequate indoctrination and training of employees.

14.2 Equipment and Requirements

Fire extinguishers will be provided by each Contractor and are required on heavy equipment and in each field trailer. Fire extinguishers will be inspected, serviced, and maintained in accordance with the manufacturer's instructions. As a minimum, extinguishers shall be checked monthly and weighed semi-annually, and recharged if necessary. Recharge or replacement shall be mandatory immediately after each use.

14.3 Flammable and Combustible Substances

Storage, handling or use of flammable and combustible substances will be under the supervision of qualified persons. Tanks, containers and pumping equipment, whether portable or stationary, used for the storage and handling of flammable and combustible liquids, will meet the recommendations of the National Fire Protection Association.

14.4 Hot Work

If the scope of work necessitates welding or blowtorch operation, the hot work permit presented in Appendix B will be completed by the SSHO and reviewed/issued by the Project Manager.

15.0 EMERGENCY INFORMATION

In accordance with OSHA 29 CFR Part 1910, an Emergency Response Plan is attached to this HASP as Appendix A. The hospital route map is presented within Appendix A as Figure 1.

16.0 REFERENCES

1. New York State Department of Environmental Conservation. *DER-10; Technical Guidance for Site Investigation and Remediation.* May 2010.

TABLES

BENCHMARK
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TABLE 1

TOXICITY DATA FOR CONSTITUENTS OF POTENTIAL CONCERN

2424 Hamburg Turnpike Site
Lackawanna, New York

Parameter	Synonyms	CAS No.	Code	Concentration Limits [1]		
				PEL	TLV	IDLH
Volatile Organic Compounds (VOCs): ppm						
Benzene	Benzol, Phenyl hydride	71-43-2	Ca	1	0.5	500
Ethylbenzene	Ethylbenzol, Phenylethane	100-41-4	*none*	100	100	800
Toluene	Methyl benzene, Methyl benzol	108-88-3	C-300	200	50	500
Xylene, Total	o-, m-, p-isomers	1330-20-7	*none*	100	100	900
Semi-volatile Organic Compounds (SVOCs)[2]: ppm						
Acenaphthene	*none*	83-32-9	*none*	--	--	--
Acenaphthylene	*none*	208-96-8	*none*	--	--	--
Anthracene	*none*	120-12-7	*none*	--	--	--
Benzo(a)anthracene	*none*	56-55-3	*none*	--	--	--
Benzo(a)pyrene	*none*	50-32-8	*none*	--	--	--
Benzo(b)fluoranthene	*none*	205-99-2	*none*	--	--	--
Benzo(ghi)perylene	*none*	191-24-2	*none*	--	--	--
Benzo(k)fluoranthene	*none*	207-08-9	*none*	--	--	--
Chrysene	*none*	218-01-9	*none*	--	--	--
Dibenzo(a,h)anthracene	*none*	53-70-3	*none*	--	--	--
Fluoranthene	*none*	206-44-0	*none*	--	--	--
Fluorene	*none*	86-73-7	*none*	--	--	--
Indeno(1,2,3-cd)pyrene	*none*	193-39-5	*none*	--	--	--
Naphthalene	Naphthalin, Tar camphor, White tar	91-20-3	*none*	10	10	250
Phenanthrene	*none*	85-01-8	*none*	--	--	--
Pyrene	*none*	129-00-0	*none*	--	--	--

Notes:
1. Concentration limits as reported by NIOSH Pocket Guide to Chemical Hazards, February 2004 (NIOSH Publication No. 97-140, fourth printing with changes and updates).
2. " -- " = concentration limit not available; exposure should be minimized to the extent feasible through appropriate engineering controls & PPE.

Explanation:
Ca = NIOSH considers constituent to be a potential occupational carcinogen.
C-## = Ceiling Level equals the maximum exposure concentration allowable during the work day.
IDLH = Immediately Dangerous to Life or Health.
ND indicates that an IDLH has not as yet been determined.
TLV = Threshold Limit Value, established by American Conference of Industrial Hygienists (ACGIH), equals the maximum exposure concentration allowable for 8 hours/day @ 40 hours/week.
TLVs are the amounts of chemicals in the air that almost all healthy adult workers are predicted to be able to tolerate without adverse effects. There are three types.
TLV-TWA (TLV-Time-Weighted Average) which is averaged over the normal eight-hour day/forty-hour work week. (Most TLVs.)
TLV-STEL or Short Term Exposure Limits are 15 minute exposures that should not be exceeded for even an instant. It is not a stand alone value but is accompanied by the TLV-TWA.
TLV-C or Ceiling limits are the concentration that should not be exceeded during any part of the working exposure.
Unless the initials "STEL" or "C" appear in the Code column, the TLV value should be considered to be the eight-hour TLV-TWA.
PEL = Permissible Exposure Limit, established by OSHA, equals the maximium exposure conconcentration allowable for 8 hours per day @ 40 hours per week

TABLE 2

POTENTIAL ROUTES OF EXPOSURE TO THE CONSTITUENTS OF POTENTIAL CONCERN

2424 Hamburg Turnpike Site
Lackawanna, New York

Activity [1]	Direct Contact with Soil/Fill	Inhalation of Vapors or Dust	Direct Contact with Groundwater
Remedial Investigation Tasks			
1. Surface/Subsurface Soil Sampling	x	x	
2. Monitoring Well Installation/Development and Sampling	x	x	x
3. Subslab Vapor Sampling	x	x	

Notes:

1. Activity as described in Section 1.5 of the Health and Safety Plan.

TABLE 3

REQUIRED LEVELS OF PROTECTION FOR RI TASKS

2424 Hamburg Turnpike Site
Lackawanna, New York

Activity	Respiratory Protection [1]	Clothing	Gloves [2]	Boots [2, 3]	Other Required PPE/Modifications [2, 4]
Remedial Investigation Tasks					
1. Surface/Subsurface Soil Sampling	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L/N	outer: L inner: STSS	HH SGSS
2. Monitoring Well Installation/Development and Sampling	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L/N	outer: L inner: STSS	SGSS
3. Subslab Vapor Sampling	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L/N	outer: L inner: STSS	HH SGSS

Notes:

1. Respiratory equipment shall conform to guidelines presented in Section 7.0 of this HASP. The Level C requirement is an air-purifying respirator equiped with organic compound/acid gas/dust cartridge.
2. HH = hardhat; L= Latex; L/N = latex inner glove, nitrile outer glove; N = Nitrile; S = Saranex; SG = safety glasses; SGSS = safety glasses with sideshields; STSS = steel toe safety shoes.
3. Latex outer boot (or approved overboot) required whenever contact with contaminated materials may occur. SSHO may downgrade to STSS (steel-toed safety shoes) if contact will be limited to cover/replacement soils.
4. Dust masks shall be donned as directed by the SSHO (site safety and health officer) or site safety technician whenever potentially contaminated airborne particulates (i.e., dust) are present in significant amounts in the breathing zone. Goggles may be substituted with safety glasses w/side-shields whenever contact with contaminated liquids is not anticipated.

FIGURES

F:\CAD\Benchmark\2424 Hamburg Turnpike, LLC\HASP\Figure 1; Site Location and Vicinity Map.dwg

FIGURE 1

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www.delorme.com

BENCHMARK
ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0599

SITE LOCATION & VICINITY MAP

HEALTH AND SAFTEY PLAN

2424 HAMBURG TURNPIKE SITE

LACKAWANNA, NEW YORK

PREPARED FOR

2424 HAMBURG TURNPIKE, LLC

PROJECT NO.: 0345-015-001

DATE: DECEMBER 2015

DRAFTED BY: KRR

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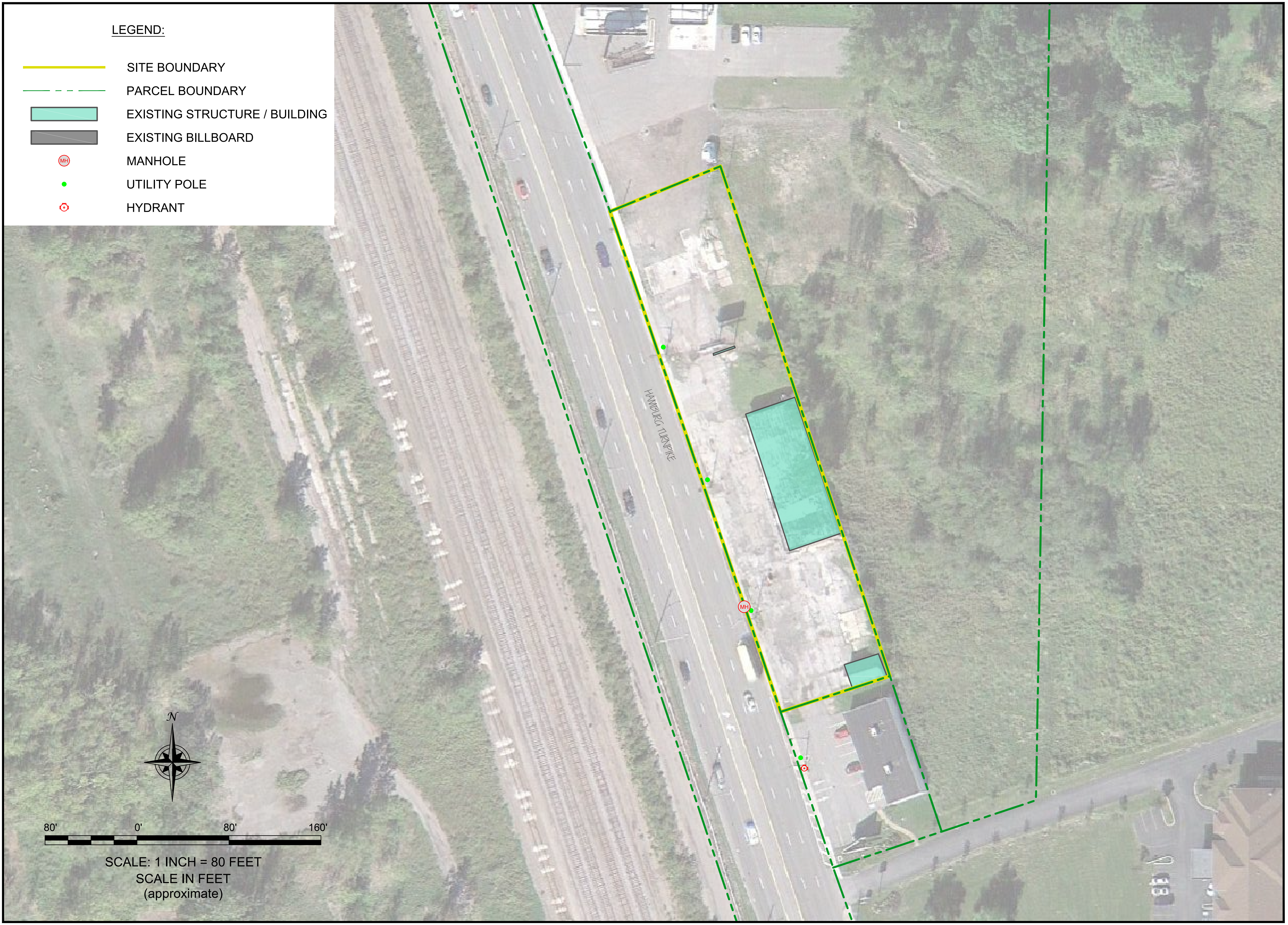
F:\CAD\Benchmark\2424 Hamburg Turnpike, LLC\HASP\Figure 2; Site Plan.dwg



DATE: DECEMBER 2015
DRAFTED BY: KRR

BENCHMARK
ENVIRONMENTAL
ENGINEERING &
SCIENCE, PLLC

2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0599

JOB NO.: 0345-015-001

SITE PLAN

HEALTH AND SAFETY PLAN

2424 HAMBURG TURNPIKE SITE

LACKAWANNA, NEW YORK

PREPARED FOR

2424 HAMBURG TURNPIKE, LLC

FIGURE 2

ATTACHMENT A

EMERGENCY RESPONSE PLAN

EMERGENCY RESPONSE PLAN
for
BROWNFIELD CLEANUP PROGRAM
RI ACTIVITIES

2424 HAMBURG TURNPIKE SITE
LACKAWANNA, NEW YORK

December 2015 0345-015-001

Prepared for:

2424 HAMBURG TURNPIKE, LLC

2424 HAMBURG TURNPIKE SITE
HEALTH AND SAFETY PLAN FOR RI ACTIVITIES
APPENDIX A: EMERGENCY RESPONSE PLAN

TABLE OF CONTENTS

LIST OF FIGURES

1.0 GENERAL

This report presents the site-specific Emergency Response Plan (ERP) referenced in the Site Health and Safety Plan (HASP) prepared for Remedial Investigation (RI) activities at the 2424 Hamburg Turnpike Site in Lackawanna, New York. This appendix of the HASP describes potential emergencies that may occur at the Site; procedures for responding to those emergencies; roles and responsibilities during emergency response; and training all workers must receive in order to follow emergency procedures. This ERP also describes the provisions this Site has made to coordinate its emergency response planning with other contractors on-site and with off-site emergency response organizations.

This ERP is consistent with the requirements of 29 CFR 1910.120(l) and provides the following site-specific information:

- Pre-emergency planning.
- Personnel roles, lines of authority, and communication.
- Emergency recognition and prevention.
- Safe distances and places of refuge.
- Evacuation routes and procedures.
- Decontamination procedures.
- Emergency medical treatment and first aid.
- Emergency alerting and response procedures.
- Critique of response and follow-up.
- Emergency personal protective equipment (PPE) and equipment.

2.0 PRE-EMERGENCY PLANNING

This Site has been evaluated for potential emergency occurrences, based on site hazards, the required work tasks, the site topography, and prevailing weather conditions. The results of that evaluation indicate the potential for the following site emergencies to occur at the locations indicated.

Type of Emergency:

1. Medical, due to physical injury

Source of Emergency:

1. Slip/trip/fall

Location of Source:

1. Non-specific

3.0 ON-SITE EMERGENCY RESPONSE EQUIPMENT

Emergency procedures may require specialized equipment to facilitate worker rescue, contamination control and reduction, or post-emergency clean up. Emergency response equipment available on the Site is listed below. The equipment inventory and storage locations are based on the potential emergencies described above. This equipment inventory is designed to meet on-site emergency response needs and any specialized equipment needs that off-site responders might require because of the hazards at this Site but not ordinarily stocked.

Any additional personal protective equipment (PPE) required and stocked for emergency response is also listed in below. During an emergency, the Emergency Response Coordinator (ERC) is responsible for specifying the level of PPE required for emergency response. At a minimum, PPE used by emergency responders will comply with Section 7.0, Personal Protective Equipment, of this HASP. Emergency response equipment is inspected at regular intervals and maintained in good working order. The equipment inventory is replenished as necessary to maintain response capabilities.

Emergency Equipment	Quantity	Location
First Aid Kit	1	Site Vehicle
Chemical Fire Extinguisher	2 (minimum)	All heavy equipment and Site Vehicle

Emergency PPE	Quantity	Location
Full-face respirator	1 for each worker	Site Vehicle
Chemical-resistant suits	4 (minimum)	Site Vehicle

4.0 EMERGENCY PLANNING MAPS

An area-specific map of the Site will be developed on a daily basis during performance of field activities. The map will be marked to identify critical on-site emergency planning information, including: emergency evacuation routes, a place of refuge, an assembly point, and the locations of key site emergency equipment. Site zone boundaries will be shown to alert responders to known areas of contamination. There are no major topographical features, however the direction of prevailing winds/weather conditions that could affect emergency response planning are also marked on the map. The map will be posted at site-designated place of refuge and inside the Benchmark personnel field vehicle.

5.0 EMERGENCY CONTACTS

The following identifies the emergency contacts for this ERP.

Emergency Telephone Numbers:

Project *Manager: Michael Lesakowski*
Work: (716) 856-0599
Mobile: (716) 848-0599

Corporate Health and Safety Director: *Thomas H. Forbes, P.E..*
Work: (716) 856-0599
Mobile: (716) 983-3143

Site Safety and Health Officer (SSHO): *Lori Riker, P.E.*
Work: (716) 856-0635
Mobile: (716) 870-1165

Alternate SSHO: *Bryan Mayback*
Work: (716) 856-0635
Mobile: (716) 289-1072

BUFFALO MERCY HOSPITAL (ER):	(716) 826-7000
FIRE:	911
AMBULANCE:	911
BUFFALO POLICE:	911
STATE EMERGENCY RESPONSE HOTLINE:	(800) 457-7362
NATIONAL RESPONSE HOTLINE:	(800) 424-8802
NYSDOH:	(716) 847-4385
NYSDEC:	(716) 851-7220
NYSDEC 24-HOUR SPILL HOTLINE:	(800) 457-7252

The Site location is:

2424 Hamburg Turnpike
Lackawanna, New York 14218
Site Phone Number: (Insert Cell Phone or Field Trailer): ____________________

6.0 EMERGENCY ALERTING & EVACUATION

Internal emergency communication systems are used to alert workers to danger, convey safety information, and maintain site control. Any effective system can be employed. Two-way radio headsets or field telephones are often used when work teams are far from the command post. Hand signals and air-horn blasts are also commonly used. Every system must have a backup. It shall be the responsibility of each contractor's Site Health and Safety Officer to ensure all personnel entering the site understand an adequate method of internal communication. Unless all personnel are otherwise informed, the following signals shall be used.

1) Emergency signals by portable air horn, siren, or whistle: two short blasts, personal injury; continuous blast, emergency requiring site excavation.

2) Visual signals: hand gripping throat, out of air/cannot breathe; hands on top of head, need assistance; thumbs up, affirmative/ everything is OK; thumbs down, no/negative; grip partner's wrist or waist, leave area immediately.

If evacuation notice is given, site workers leave the worksite with their respective buddies, if possible, by way of the nearest exit. Emergency decontamination procedures detailed in Section 12.0 of the HASP are followed to the extent practical without compromising the safety and health of site personnel. The evacuation routes and assembly area will be determined by conditions at the time of the evacuation based on wind direction, the location of the hazard source, and other factors as determined by rehearsals and inputs from emergency response organizations. Wind direction indicators are located so that workers can determine a safe up wind or cross wind evacuation route and assembly area if not informed by the emergency response coordinator at the time the evacuation alarm sounds. Since work conditions and work zones within the site may be changing on daily basis, it shall be the responsibility of the construction Site Health and Safety Officer to review evacuation routes and procedures as necessary and to inform all Benchmark-TurnKey workers of any changes.

Personnel exiting the site will gather at a designated assembly point. To determine that everyone has successfully exited the site, personnel will be accounted for at the assembly site. If any worker cannot be accounted for, notification is given to the SSHO (***Lori Riker*** or ***Bryan Mayback***) so that appropriate action can be initiated. Contractors and subcontractors on this site have coordinated their emergency response plans to ensure that these plans are compatible and that source(s) of potential emergencies are recognized, alarm systems are clearly understood, and evacuation routes are accessible to all personnel relying upon them.

7.0 EXTREME WEATHER CONDITIONS

In the event of adverse weather conditions, the Site Safety and Health Officer in conjunction with the Contractor's SSHO will determine if engineering operations can continue without sacrificing the health and safety of site personnel. Items to be considered prior to determining if work should continue include but are not limited to:

- Potential for heat/cold stress.
- Weather-related construction hazards (e.g., flooding or wet conditions producing undermining of structures or sheeting, high wind threats, etc).
- Limited visibility.
- Potential for electrical storms.
- Limited site access/egress (e.g., due to heavy snow)

8.0 EMERGENCY MEDICAL TREATMENT & FIRST AID

Personnel Exposure:

The following general guidelines will be employed in instances where health impacts threaten to occur acute exposure is realized:

- Skin Contact: Use copious amounts of soap and water. Wash/rinse affected area for at least 15 minutes. Decontaminate and provide medical attention. Eyewash stations will be provided on site. If necessary, transport to Buffalo General Hospital.
- Inhalation: Move to fresh air and, if necessary, transport to Hospital.
- Ingestion: Decontaminate and transport to Hospital.

Personal Injury:

Minor first-aid will be applied on-site as deemed necessary. In the event of a life threatening injury, the individual should be transported to Hospital via ambulance. The Site Health and Safety Officer will supply available chemical specific information to appropriate medical personnel as requested.

First aid kits will conform to Red Cross and other applicable good health standards, and shall consist of a weatherproof container with individually sealed packages for each type of item. First aid kits will be fully equipped before being sent out on each job and will be checked weekly by the SSHO to ensure that the expended items are replaced.

Directions to Mercy Hospital (see Figure 1):

The following directions describe the best route from the Site to Mercy Buffalo General Hospital:

- Travel north along Hamburg Turnpike (Route 5) (1.5 miles)
- Travel east along Ridge Road (2.5 miles)
- Turn left onto Abbott Road (1.5 miles)
- Hospital on the left (565 Abbott Road)

9.0 EMERGENCY RESPONSE CRITIQUE & RECORD KEEPING

Following an emergency, the SSHO and Project Manager shall review the effectiveness of this Emergency Response Plan (ERP) in addressing notification, control and evacuation requirements. Updates and modifications to this ERP shall be made accordingly. It shall be the responsibility of each contractor to establish and assure adequate records of the following:

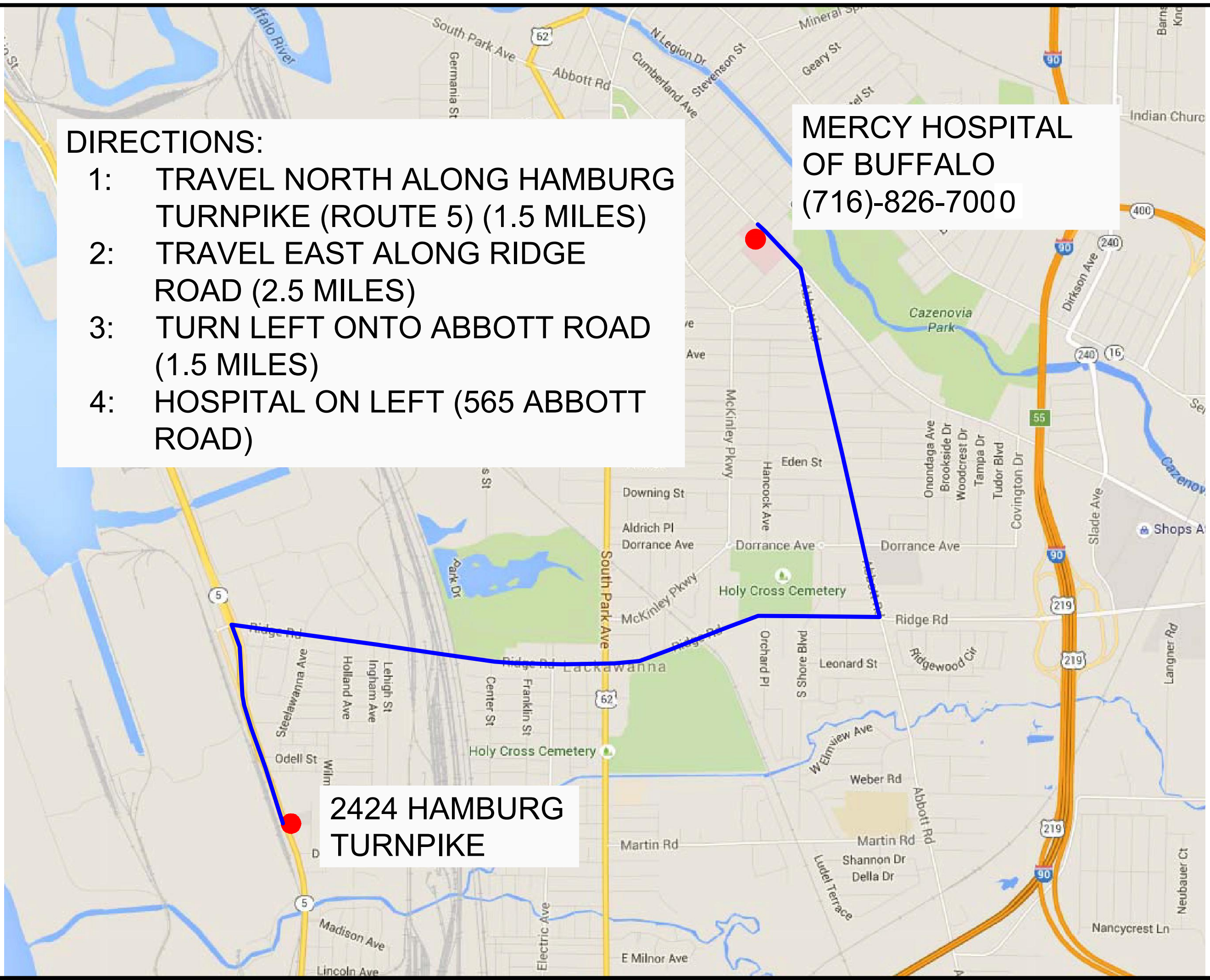
- Occupational injuries and illnesses.
- Accident investigations.
- Reports to insurance carrier or State compensation agencies.
- Reports required by the client.
- Records and reports required by local, state, federal and/or international agencies.
- Property or equipment damage.
- Third party injury or damage claims.
- Environmental testing logs.
- Explosive and hazardous substances inventories and records.
- Records of inspections and citations.
- Safety training.

10.0 EMERGENCY RESPONSE TRAINING

All persons who enter the worksite, including visitors, shall receive a site-specific briefing about anticipated emergency situations and the emergency procedures by the SSHO. Where this site relies on off-site organizations for emergency response, the training of personnel in those off-site organizations has been evaluated and is deemed adequate for response to this site.

FIGURES

F:\CAD\Benchmark\2424 Hamburg Turnpike, LLC\HASP\Figure A-1; Hospital Rout Map.dwg



DIRECTIONS:

1: TRAVEL NORTH ALONG HAMBURG TURNPIKE (ROUTE 5) (1.5 MILES)

2: TRAVEL EAST ALONG RIDGE ROAD (2.5 MILES)

3: TURN LEFT ONTO ABBOTT ROAD (1.5 MILES)

4: HOSPITAL ON LEFT (565 ABBOTT ROAD)

MERCY HOSPITAL
OF BUFFALO
(716)-826-7000

2424 HAMBURG
TURNPIKE

N

SCALE : 1" - 4000'

BENCHMARK
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SUITE 300
BUFFALO, NY 14218
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PROJECT NO.: 0345-015-001

DATE: DECEMBER 2015

DRAFTED BY: KRR

HOSPITAL ROUTE MAP

HEALTH AND SAFETY PLAN

2424 HAMBURG TURNPIKE SITE

LACKAWANNA, NEW YORK

PREPARED FOR

2424 HAMBURG TURNPIKE, LLC

FIGURE A-1

ATTACHMENT B

HOT WORK PERMIT FORM

BENCHMARK
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HOT WORK PERMIT

PART 1 - INFORMATION

Issue Date:

Date Work to be Performed: Start: Finish (permit terminated):

Performed By:

Work Area:

Object to be Worked On:

PART 2 - APPROVAL

(for 1, 2 or 3: mark Yes, No or NA)*

Will working be on or in: Finish (permit terminated):

1. Metal partition, wall, ceiling covered by combustible material? yes no
2. Pipes, in contact with combustible material? yes no
3. Explosive area? yes no

* = If any of these conditions exist (marked "yes"), a permit will not be issued without being reviewed and approved by Thomas H. Forbes (Corporate Health and Safety Director). Required Signature below.

PART 3 - REQUIRED CONDITIONS**

(Check all conditions that must be met)

PROTECTIVE ACTION		PROTECTIVE EQUIPMENT	
	Specific Risk Assessment Required		Goggles/visor/welding screen
	Fire or spark barrier		Apron/fireproof clothing
	Cover hot surfaces		Welding gloves/gauntlets/other:
	Move movable fire hazards, specifically		Wellintons/Knee pads
	Erect screen on barrier		Ear protection: Ear muffs/Ear plugs
	Restrict Access		B.A.: SCBA/Long Breather
	Wet the ground		Respirator: Type:
	Ensure adequate ventilation		Cartridge:
	Provide adequate supports		Local Exhaust Ventilation
	Cover exposed drain/floor or wall cracks		Extinguisher/Fire blanket
	Fire watch (must remain on duty during duration of permit)		Personal flammable gas monitor
	Issue additional permit(s):		

Other precautions:

** Permit will not be issued until these conditions are met.

SIGNATURES

Orginating Employee: Date:

Project Manager: Date:

Part 2 Approval: Date:

ATTACHMENT C

NYSDOH GENERIC COMMUNITY AIR MONITORING PLAN

Appendix C1
New York State Department of Health
Generic Community Air Monitoring Plan

Overview

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

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical- specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

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

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

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

VOC Monitoring, Response Levels, and Actions

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

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

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

3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

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

Particulate Monitoring, Response Levels, and Actions

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

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

3. All readings must be recorded and be available for State (DEC and NYSDOH) and County Health personnel to review.

December 2009

Appendix C2
Fugitive Dust and Particulate Monitoring

A program for suppressing fugitive dust and particulate matter monitoring at hazardous waste sites is a responsibility on the remedial party performing the work. These procedures must be incorporated into appropriate intrusive work plans. The following fugitive dust suppression and particulate monitoring program should be employed at sites during construction and other intrusive activities which warrant its use:

1. Reasonable fugitive dust suppression techniques must be employed during all site activities which may generate fugitive dust.

2. Particulate monitoring must be employed during the handling of waste or contaminated soil or when activities on site may generate fugitive dust from exposed waste or contaminated soil. Remedial activities may also include the excavation, grading, or placement of clean fill. These control measures should not be considered necessary for these activities.

3. Particulate monitoring must be performed using real-time particulate monitors and shall monitor particulate matter less than ten microns (PM10) with the following minimum performance standards:

(a) Objects to be measured: Dust, mists or aerosols;
(b) Measurement Ranges: 0.001 to 400 mg/m3 (1 to 400,000 :ug/m3);
(c) Precision (2-sigma) at constant temperature: +/- 10 :g/m3 for one second averaging; and +/- 1.5 g/m3 for sixty second averaging;
(d) Accuracy: +/- 5% of reading +/- precision (Referred to gravimetric calibration with SAE fine test dust (mmd= 2 to 3 :m, g= 2.5, as aerosolized);
(e) Resolution: 0.1% of reading or 1g/m3, whichever is larger;
(f) Particle Size Range of Maximum Response: 0.1-10;
(g) Total Number of Data Points in Memory: 10,000;
(h) Logged Data: Each data point with average concentration, time/date and data point number
(i) Run Summary: overall average, maximum concentrations, time/date of maximum, total number of logged points, start time/date, total elapsed time (run duration), STEL concentration and time/date occurrence, averaging (logging) period, calibration factor, and tag number;
(j) Alarm Averaging Time (user selectable): real-time (1-60 seconds) or STEL (15 minutes), alarms required;
(k) Operating Time: 48 hours (fully charged NiCd battery); continuously with charger;
(l) Operating Temperature: -10 to 50^{o} C (14 to 122^{o} F);
(m) Particulate levels will be monitored upwind and immediately downwind at the working site and integrated over a period not to exceed 15 minutes.

4. In order to ensure the validity of the fugitive dust measurements performed, there must be appropriate Quality Assurance/Quality Control (QA/QC). It is the responsibility of the remedial party to adequately supplement QA/QC Plans to include the following critical features: periodic instrument calibration, operator training, daily instrument performance (span) checks, and a record keeping plan.

5. The action level will be established at 150 ug/m3 (15 minutes average). While conservative,

this short-term interval will provide a real-time assessment of on-site air quality to assure both health and safety. If particulate levels are detected in excess of 150 ug/m3, the upwind background level must be confirmed immediately. If the working site particulate measurement is greater than 100 ug/m3 above the background level, additional dust suppression techniques must be implemented to reduce the generation of fugitive dust and corrective action taken to protect site personnel and reduce the potential for contaminant migration. Corrective measures may include increasing the level of personal protection for on-site personnel and implementing additional dust suppression techniques (see paragraph 7). Should the action level of 150 ug/m3 continue to be exceeded work must stop and DER must be notified as provided in the site design or remedial work plan. The notification shall include a description of the control measures implemented to prevent further exceedances.

6. It must be recognized that the generation of dust from waste or contaminated soil that migrates off-site, has the potential for transporting contaminants off-site. There may be situations when dust is being generated and leaving the site and the monitoring equipment does not measure PM10 at or above the action level. Since this situation has the potential to allow for the migration of contaminants off-site, it is unacceptable. While it is not practical to quantify total suspended particulates on a real-time basis, it is appropriate to rely on visual observation. If dust is observed leaving the working site, additional dust suppression techniques must be employed. Activities that have a high dusting potential--such as solidification and treatment involving materials like kiln dust and lime--will require the need for special measures to be considered.

7. The following techniques have been shown to be effective for the controlling of the generation and migration of dust during construction activities:

(a) Applying water on haul roads;
(b) Wetting equipment and excavation faces;
(c) Spraying water on buckets during excavation and dumping;
(d) Hauling materials in properly tarped or watertight containers;
(e) Restricting vehicle speeds to 10 mph;
(f) Covering excavated areas and material after excavation activity ceases; and
(g) Reducing the excavation size and/or number of excavations.

Experience has shown that the chance of exceeding the 150ug/m3 action level is remote when the above-mentioned techniques are used. When techniques involving water application are used, care must be taken not to use excess water, which can result in unacceptably wet conditions. Using atomizing sprays will prevent overly wet conditions, conserve water, and provide an effective means of suppressing the fugitive dust.

8. The evaluation of weather conditions is necessary for proper fugitive dust control. When extreme wind conditions make dust control ineffective, as a last resort remedial actions may need to be suspended. There may be situations that require fugitive dust suppression and particulate monitoring requirements with action levels more stringent than those provided above. Under some circumstances, the contaminant concentration and/or toxicity may require additional monitoring to protect site personnel and the public. Additional integrated sampling and chemical analysis of the dust may also be in order. This must be evaluated when a health and safety plan is developed and when appropriate suppression and monitoring requirements are established for protection of health and the environment.

APPENDIX D

PROJECT DOCUMENTATION FORMS

BENCHMARK
ENVIRONMENTAL
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INSPECTOR'S DAILY REPORT

Page ____ of ____

CONTRACTOR:	JOB NO.:
CLIENT:	DATE:

LOCATION:		DAY: Su M Tu W Th F Sa	
WEATHER:	TEMP: °F	START:	END:

WORK PERFORMED:

TEST PERFORMED:	QA PERSONNEL:
	SIGNATURE:

INSPECTOR'S DAILY REPORT

(CONTINUED)

Page ☐ of ☐

CONTRACTOR:	JOB NO.:
CLIENT:	DATE:

MEETINGS HELD & RESULTS:

CONTRACTOR'S WORK FORCE AND EQUIPMENT

DESCRIPTION	H	#	DESCRIPTION	H	#	DESCRIPTION	H	#
Field Engineer						Front Loader Ton		
Superintendent						Bulldozer		
Laborer-Foreman						DJ Dump Truck		
Laborer						Water Truck		
Operating Engineer			Equipment			Backhoe		
Carpenter			Generators			Excavator		
Ironworker			Welding Equipment			Pad foot roller		
Concrete Finisher			Roller					
			Paving Equipment					
			Air Compressor					

REMARKS:

REFERENCES TO OTHER FORMS:

SAMPLES COLLECTED:

Sample Number:

Approx. Location of Stockpile:

No. of Stockpile

Date of Collection:

Weather:

Field Observations:

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DAILY LOG	DATE			
	REPORT NO.			
	PAGE	OF		

Date:

Project:

Job No:

Location:

CQA Monitor(s):

Client:

Contractor:

Contractor's Supervisor:

PROBLEM IDENTIFICATION REPORT

WEATHER CONDITIONS:

Ambient Air Temp. - A.M.:

Ambient Air Temp. - P.M.:

Wind Direction:

Wind Speed:

Precipitation:

Problem Description:

Problem Location (reference test location, sketch on back of form as appropriate):

Problem Causes:

Suggested Corrective Measures or Variances:

Linked to Corrective Measures Report No. *or Variance Log No.*

Approvals (initial):

CQA Engineer:

Project Manager:

Signed:

CQA Representative

APPENDIX E

FIELD OPERATING PROCEDURES

(PROVIDED ELECTRONICALLY)

FIELD OPERATING PROCEDURES

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

FOP Number	Description	No. of Attachments	Total Pages	FOPs Referenced
001.1	Abandonment of Borehole Procedures	1	4	--
004.4	Soil Vapor Sample Collection Procedure	6	40	--
007.0	Calibration and Maintenance of Portable Dissolved Oxygen Meter	1	3	--
008.0	Calibration and Maintenance of Portable Field pH/Eh Meter	1	4	--
009.0	Calibration and Maintenance of Portable Field Turbidity Meter	1	7	--
011.1	Calibration and Maintenance of Portable Photoionization Detector	3	31	--
012.0	Calibration and Maintenance of Portable Specific Conductance Meter	1	5	--
015.0	Documentation Requirements for Drilling and Well Installation	6	11	--
017.0	Drill Site Selection Procedure	0	1	--
018.0	Drilling and Excavation Equipment Decontamination Procedures	0	2	--
021.0	Establishing Horizontal and Vertical Control	0	2	--
022.0	Groundwater Level Measurement	1	3	040
024.1	Groundwater Sample Collection Procedures	1	10	007, 008, 009, 011, 012, 022, 023, 031, 040, 046
026.1	Hollow Stem Auger (HSA) Drilling Procedures	2	6	001, 010, 011, 017, 018, 058
031.2	Low Flow (Minimal Drawdown) Groundwater Purging & Sampling Procedure	1	7	007, 008, 009, 011, 012, 022, 024, 040, 046
032.1	Management of Investigation-Derived Waste (IDW)	2	5	--
033.0	Monitoring Well Construction for Hollow Stem Auger Boreholes	2	6	015, 026, 032, 036
036.0	Monitoring Well Development Procedures	1	3	015, 040
046.0	Sample Labeling, Storage and Shipment Procedures	5	9	--
047.0	Screening of Soil Samples for Organic Vapors During Drilling Activities	2	4	010, 011, 015, 058
054.2	Soil Description Procedures Using The Visual-Manual Method	5	22	010, 011, 015, 025, 032, 046, 047, 058, 065
057.0	Soil Sample Collection for VOC Analysis - EnCore Sampling	1	6	046
063.2	Surface and Subsurface Soil Sampling Procedures	3	7	006, 010, 011, 040, 046, 073
073.2	Real-Time Air Monitoring During Intrusive Activities	1	12	006, 010, 011, 084
078.0	Geoprobe Drilling Procedures	2	6	001, 017, 018, 054, 077
084.0	Calibration and Maintenance of Portable Particulate Meter	0	8	--
090.0	Outdoor Ambient Air VOC Sample Collection Procedure	1	6	--

Notes:

1. FOPs are identified by the sequential FOP number and revision number. For example, FOP number 097.3 indicates FOP 97, revision 3.

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FIELD OPERATING PROCEDURES

Abandonment of Borehole Procedures

FOP 001.1

ABANDONMENT OF BOREHOLE PROCEDURE

PURPOSE

Soil borings that are not completed as monitoring wells will be plugged by filling the holes with a cement/bentonite grout. Field staff will calculate the borehole volume and compare it to the final installed volume of grout to evaluate whether bridging or loss to the formation has occurred. These calculations and the actual volume placed will be noted on the Boring Log.

PROCEDURE

1. Determine most suitable seal materials. Grout specifications generally have mixture ratios as follows:

   Grout Slurry Composition (% Weight)

   1.5 to 3.0% - Bentonite (Quick Gel)
   40 to 60 % - Cement (Portland Type I)
   40 to 60 % - Potable Water

2. Calculate the volume of the borehole base on the bit or auger head diameter plus 10% and determine the volume of grout to be emplaced. Generally, the total mixed volume is the borehole volume plus 20%.

3. Identify the equipment to be used for the preparation and mixing of the grout. Ensure the volume of the tanks to be used for mixing has been measured adequately. Document these volumes on the Well Abandonment/Decommissioning Log (sample attached).

4. Identify the source of the water to be used for the grout and determine its suitability for use. In particular, water with high sulfate, or chloride levels or heated water should not be used. These types of waters can cause operational difficulties or modify the set-up for the grout.

5. Identify the equipment to be used for emplacing the grout. Ensure that the pump to be used has adequate pressure to enable complete return to surface.

6. Identify the volumes to be pumped at each stage or in total if only one stage is to be used.

7. Prepare the borehole abandonment plan and discuss the plan and activities with the drilling contractor prior to beginning any mixing activities.

8. Begin mixing the grout to be emplaced.

9. Record the type and amount of materials used during the mixing operation. Ensure the ratios are within specifications tolerance.

10. Begin pumping the grout through the return line bypass system to confirm all pump and surface fittings are secure.

11. Initiate downhole pumping from the bottom of the borehole. Record the times and volumes emplaced on the Well Abandonment/Decommissioning Log (sample attached).

12. Document the return circulation of grout. This may be facilitated by using a colored dye or other tagging method if a mudded borehole condition exists prior to grout injection.

13. Identify what procedures will be used for grouting in the upper 3 feet. When casing exists in the borehole, decisions are required as to the timing for removal and final disposition of the casing. Generally, it will not be removed prior to grouting because of the potential for difficult access and loss of circulation in the upper soil or rock layers. Accordingly, when cement return is achieved at surface, the casing is commonly removed and the borehole is topped off with grout or soils. If casing removal is not possible or not desired, the casing left in place should be cut off at a depth of 5 feet or greater below ground surface. If casing is not present during grouting, the grout level in the borehole is topped off after the rods or tremie pipe is removed.

14. Clear and clean the surface near the borehole.

15. The uppermost five feet of the borehole at the land surface should be filled with material physically similar to the natural soils. The surface of the borehole should be restored to the condition of the area surrounding the borehole. For example, concrete or asphalt will be patched with concrete or asphalt of the same type and thickness, grassed areas will be seeded, and topsoil will be used in other areas. All solid waste materials generated during the decommissioning process must be disposed of properly.

16. A follow-up check at each site should be made within one week to 10 days of completion. It should be noted that on occasion, the grout and/or surface material may settle over several days. If settling occurs, additional material physically similar to surrounding materials (i.e., asphalt, concrete, or soil) must be used to match the existing grade.

17. Document borehole and/or well/piezometer decommissioning activities on a Well Abandonment/Decommissioning Log (sample attached).

ATTACHMENTS

Well Abandonment/Decommissioning Log (sample)

REFERENCES

ASTM D 5299: *Guide for Decommissioning of Ground Water Wells, Vadose Zone Monitoring Devices, Boreholes, and Other Devices for Environmental Activities.*

NYSDEC, July 1988, *Drilling and Monitoring Well Installation Guidance Manual.*

NYSDEC, November 2009, *CP-43: Groundwater Monitoring Well Decommissioning Policy.*

Driscoll, F.G., 1987, *Groundwater and Wells*, Johnson Division, St. Paul, Minnesota, 1089 p.

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WELL ABANDONMENT/ DECOMMISSIONING LOG

PROJECT INFORMATION	WELL INFORMATION
Project Name:	WELL I.D.:
Client:	Stick-up (fags):
Project Job Number:	Total Depth (fbgs):
Date:	Screen Interval (fbgs):
Weather:	Well Material:
	Diameter (inches):
BM/TK Personnel:	
Drilling Company:	Drilling Company Personnel:
Drill Rig Type:	

DECOMMISSIONING PROCEDURES

Time	Description of Field Activities

PREPARED BY: DATE:

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FIELD OPERATING PROCEDURES

Ambient Air/Subslab Vapor Sample Collection Procedure

FOP 004.3

AMBIENT AIR/SUBSLAB VAPOR SAMPLE COLLECTION PROCEDURE

BACKGROUND

In October 2006, the New York State Department of Health (NYSDOH) finalized their vapor intrusion guidance document entitled "Guidance for Evaluating Soil Vapor Intrusion in the State of New York." (www.health.state.ny.us/nysdoh/gas/svi_guidance/), which has been guiding NYSDOH and New York State Department of Environmental Conservation (NYSDEC) decisions concerning the need for subslab vapor mitigation at sites undergoing investigation, cleanup and monitoring under formal NY Sate remedial programs (e.g., Brownfield Cleanup Program sites, Inactive Hazardous Waste Site Remediation Program sites, etc.). The guidance presents two soil vapor/indoor air matrices to assist in interpreting subslab and ambient air data (i.e., "Matrix 1" and "Matrix 2"). As of June 2007, six compounds have been assigned to these two matrices as follows:

Volatile Chemical	Soil Vapor / Indoor Air Matrix
Carbon tetrachloride	Matrix 1
1,1-Dichloroethene	Matrix 2
cis-1,2-Dichloroethene	Matrix 2
Tetrachloroethene	Matrix 2
1,1,1-Trichloroethane	Matrix 2
Trichloroethene	Matrix 1
Vinyl chloride	Matrix 1

Additional matrices will be developed when a chemical's toxicological properties, background concentrations, or analytical capabilities suggest that major revisions are needed. Both matrices are attached as Figures 1 and 2.

PURPOSE

This procedure delineates the scope of additional investigation at a building on the project site to determine if volatile organic compounds (VOCs) detected in groundwater and/or soil near the building are intruding into the building airspace or have the potential, in sufficient concentrations, to adversely impact indoor air quality. This ambient air/subslab vapor monitoring procedure follows the NYSDOH Final Soil Vapor Intrusion Guidance (October 2006) as well as USEPA Methods TO-14 and TO-15, for volatile organic compounds (VOCs) using Summa passive canisters.

SURVEYS AND PRE-SAMPLING BUILDING PREPARATION

A pre-sampling inspection should be performed prior to each sampling event to identify and minimize conditions that may interfere with the proposed testing. The inspection should evaluate the type of structure, floor layout, airflows and physical conditions of the building(s) being studied. This information, along with information on sources of potential indoor air contamination, should be identified on a building inventory form. An example of the building inventory form is attached. Items to be included in the building inventory include the following:

- Construction characteristics, including foundation cracks and utility penetrations or other openings that may serve as preferential pathways for vapor intrusion;

- Presence of an attached garage;

- Recent renovations or maintenance to the building (e.g., fresh paint, new carpet or furniture);

- Mechanical equipment that can affect pressure gradients (e.g., heating systems, clothes dryers or exhaust fans);

- Use or storage of petroleum products (e.g., fuel containers, gasoline operated equipment and unvented kerosene heaters); and

- Recent use of petroleum-based finishes or products containing volatile chemicals.

Each room on the floor of the building being tested and on lower floors, if possible, should be inspected. This is important because even products stored in another area of a building can affect the air of the room being tested.

The presence and description of odors (e.g., solvent, moldy) and portable vapor monitoring equipment readings (e.g., PIDs, ppb RAE, Jerome Mercury Vapor Analyzer, etc.) should be noted and used to help evaluate potential sources. This includes taking readings near products stored or used in the building.

Potential interference from products or activities releasing volatile chemicals may need to be controlled. Removing the source from the indoor environment prior to testing is the most effective means of reducing interference. Ensuring that containers are tightly sealed may be acceptable. When testing for volatile organic compounds, containers should be tested with portable vapor monitoring equipment to determine whether compounds are leaking. The inability to eliminate potential interference may be justification for not testing, especially when testing for similar compounds at low levels. The investigator should consider the possibility that chemicals may adsorb onto porous materials and may take time to dissipate.

In some cases, the goal of the testing is to evaluate the impact from products used or stored in the building (e.g., pesticide misapplications, school renovation projects). If the goal of the testing is to determine whether products are an indoor volatile chemical contaminant source, the removing these sources does not apply.

Once interfering conditions are corrected (if applicable), ventilation may be needed prior to sampling to eliminate residual contamination in the indoor air. If ventilation is appropriate, it should be completed 24 hours or more prior to the scheduled sampling time. Where applicable, ventilation can be accomplished by operating the building's HVAC system to maximize outside air intake. Opening windows and doors, and operating exhaust fans may also help or may be needed if the building has no HVAC system.

Air samples are sometimes designed to represent typical exposure in a mechanically ventilated building and the operation of HVAC systems during sampling should be noted on the building inventory form (see attached sample). In general, the building's HVAC system should be operating under normal conditions. Unnecessary building ventilation should be avoided within 24 hours prior to and during sampling. During colder months, heating systems should be operating to maintain normal indoor air temperatures (i.e., 65 – 75 °F) for at least 24 hours prior to and during the scheduled sampling time.

Depending upon the goal of the indoor air sampling, some situations may warrant deviation from the above protocol regarding building ventilation. In such cases, building conditions and sampling efforts should be understood and noted within the framework and scope of the investigation.

To avoid potential interferences and dilution effects, every effort should be made to avoid the following for 24 hours prior to sampling:

- Opening any windows, fireplace dampers, openings or vents;
- Operating ventilation fans unless special arrangements are made;
- Smoking in the building;
- Painting;
- Using a wood stove, fireplace or other auxiliary heating equipment (e.g., kerosene heater);
- Operating or storing automobile in an attached garage;

- Allowing containers of gasoline or oil to remain within the house or garage area, except for fuel oil tanks;
- Cleaning, waxing or polishing furniture, floors or other woodwork with petroleum- or oil-based products;
- Using air fresheners, scented candles or odor eliminators;
- Engaging in any hobbies that use materials containing volatile chemicals;
- Using cosmetics including hairspray, nail polish, nail polish removers, perfume/cologne, etc.;
- Lawn mowing, paving with asphalt, or snow blowing;
- Applying pesticides; and
- Using building repair or maintenance products, such as caulk or roofing tar.

PRODUCT INVENTORY

The primary objective of the product inventory is to identify potential air sampling interference by characterizing the occurrence and use of chemicals and products throughout the building, keeping in mind the goal of the investigation and site-specific contaminants of concern. For example, it is not necessary to provide detailed information for each individual container of like items. However, it is necessary to indicate that "20 bottles of perfume" or "12 cans of latex paint" were present with containers in good condition. This information is used to help formulate an indoor environment profile.

An inventory should be provided for each room on the floor of the building being tested and on lower floors, if possible. This is important because even products stored in another area of a building can affect the air of the room being tested.

The presence and description of odors (e.g., solvent, moldy) and portable vapor monitoring equipment readings (e.g., PIDs, ppb RAE, Jerome Mercury Vapor Analyzer, etc.) should be noted and used to help evaluate potential sources. This includes taking readings near products stored or used in the building. Products in buildings should be inventoried every time air is tested to provide an accurate assessment of the potential contribution of volatile chemicals. If available, chemical ingredients of interest (e.g., analyte list) should be recorded for each product. If the ingredients are not listed on the label, record the product's exact and full name, and the manufacturer's name, address and telephone number, if available. In some cases, Material Safety Data Sheets (MSDS) may be useful for identifying confounding sources of volatile chemicals in air. Adequately documented photographs of the products and their labeled ingredients can supplement the inventory and facilitate recording the information.

SAMPLE LOCATIONS

The following are types of samples that are collected to investigate the soil vapor intrusion pathway:

- Subsurface vapor samples:
  - *Soil vapor* samples (i.e., soil vapor samples not beneath the foundation or slab of a building) and
  - *Sub-slab vapor* samples (i.e., soil vapor samples immediately beneath the foundation or slab of a building);
- Indoor air samples; and
- Outdoor air samples.

The types of samples that should be collected depend upon the specific objective(s) of the sampling, as described below.

- Soil vapor

  Soil vapor samples are collected to determine whether this environmental medium is contaminated, characterize the nature and extent of contamination, and identify possible sources of the contamination. Soil vapor sampling results are used when evaluating the following:
  - The potential for *current* human exposures;

- The potential for *future* human exposures (e.g., should a building be constructed); and
- The effectiveness of measures implemented to remediate contaminated subsurface vapors.

- <u>Sub-slab vapor</u>

  Sub-slab vapor samples are collected to characterize the nature and extent of soil vapor contamination immediately beneath a building with a basement foundation and/or a slab-on-grade. Sub-slab vapor sampling results are used when evaluating the following:
  - *Current* human exposures;
  - The potential for *future* human exposures (e.g., if the structural integrity of the building changes or the use of the building changes); and
  - Site-specific attenuation factors (i.e., the ratio of indoor air to sub-slab vapor concentrations).

  Sub-slab vapor samples are collected after soil vapor characterization and/or other environmental sampling (e.g., soil and groundwater characterization) indicate a need. Subslab samples are typically collected concurrently with indoor and outdoor air samples. However, outside of the heating season, sub-slab vapor samples may be collected independently depending on the sampling objective (e.g., characterize the extent of subsurface vapor contamination outside of the heating season to develop a more comprehensive, focused investigation plan for the heating season).

- <u>Indoor air</u>

  Indoor air samples are collected to characterize exposures to air within a building, including those with earthen floors and crawlspaces. Indoor air sampling results are used when evaluating the following:
  - *Current* human exposures;
  - The potential for *future* exposures (e.g., if a currently vacant building should become occupied); and
  - Site-specific attenuation factors (e.g., the ratio of indoor air to sub-slab vapor concentrations).

Indoor air samples are collected after subsurface vapor characterization and other environmental sampling (e.g., soil and groundwater characterization) indicate a need. When indoor air samples are collected, concurrent sub-slab vapor and outdoor air samples are collected to evaluate the indoor air results appropriately. However, indoor air and outdoor air samples, without sub-slab vapor samples, may be collected when confirming the effectiveness of a mitigation system.

In addition, site-specific situations may warrant collecting indoor air samples prior to characterizing subsurface vapors and/or without concurrent sub-slab sampling due to a need to examine immediate inhalation hazards. Examples of such situations may include, but are not limited to, the following:

- In response to a spill event when there is a need to qualitatively and/or quantitatively characterize the contamination;
- If high readings are obtained in a building when screening with field equipment (e.g., a photoionization detector (PID), an organic vapor analyzer, or an explosimeter) and the source is unknown;
- If significant odors are present and the source needs to be characterized; or
- If groundwater beneath the building is contaminated, the building is prone to groundwater intrusion or flooding (e.g., sump pit overflows), and subsurface vapor sampling is not feasible.

- Outdoor air

  Outdoor air samples are collected to characterize site-specific background outdoor air conditions. These samples must be collected simultaneously with indoor air samples. They may also be collected concurrently with soil vapor samples. Outdoor air sampling results are primarily used when evaluating the extent to which outdoor sources may be influencing indoor air quality. They may also be used in the evaluation of soil vapor results (i.e., to identify potential outdoor air interferences associated with the infiltration of outdoor air into the sampling apparatus while the soil vapor sample was collected).

SOIL VAPOR SAMPLE COLLECTION

Soil vapor probe installations (see Figure 3 attached) may be permanent, semi-permanent or temporary. In general, permanent installations are preferred for data consistency reasons. Soil implants or probes should be constructed in the same manner at all sampling locations to minimize possible discrepancies. The following procedures should be included in any construction protocol:

- Soil vapor probes should be installed using direct push technology or, if necessary to attain the desired depth, using an auger;
- Porous backfill material (e.g., glass beads or coarse sand) should be used to create a sampling zone 1 to 2 feet in length;
- Soil vapor probes should be fitted with inert tubing (e.g., polyethylene, stainless steel, or Teflon®) of the appropriate size (typically 1/8 inch to 1/4 inch diameter) and of laboratory or food grade quality to the surface;
- Soil vapor probes should be sealed above the sampling zone with a bentonite slurry for a minimum distance of 3 feet to prevent outdoor air infiltration and the remainder of the borehole backfilled with clean material;
- For multiple probe depths, the borehole should be grouted with bentonite between probes to create discrete sampling zones; and
- For permanent installations, a protective casing should be set around the top of the probe tubing and grouted in place to the top of bentonite to minimize infiltration of water or outdoor air, as well as to prevent accidental damage.

Soil vapor samples should be collected in the same manner at all locations to minimize possible discrepancies. The following procedures should be included in any sampling protocol:

- At least 24 hours after the installation of permanent probes and shortly after the installation of temporary probes, one to three implant volumes (i.e., the volume of the sample probe and tube) must be purged prior to collecting the samples to ensure samples collected are representative;

- Flow rates for both purging and collecting must not exceed 0.2 liters per minute to minimize outdoor air infiltration during sampling;

- Samples must be collected, using conventional sampling methods, in an appropriate container — one which meets the objectives of the sampling (e.g., investigation of areas where low or high concentrations of volatile chemicals are expected; to minimize losses of volatile chemicals that are susceptible to photodegradation), meets the requirements of the sampling and analytical methods (e.g., low flow rate; Summa® canisters if analyzing by using EPA Method TO-15), and is certified clean by the laboratory;

- Sample size depends upon the volume of sample required to achieve minimum reporting limit requirements; and

- A tracer gas (e.g., helium, butane, or sulfur hexafluoride) must be used when collecting soil vapor samples to verify that adequate sampling techniques are being implemented (i.e., to verify infiltration of outdoor air is not occurring) (discussed later in this procedure). Once verified, continued use of the tracer gas may be reconsidered.

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

- If sampling near a commercial or industrial building, uses of volatile chemicals during normal operations of the facility should be identified;

- Outdoor plot sketches should be drawn that include the site, area streets, neighboring commercial or industrial facilities (with estimated distance to the site), outdoor ambient air sample locations (if applicable), and compass orientation (north);

- Weather conditions (e.g., precipitation, outdoor temperature, barometric pressure, wind speed and direction) should be noted for the past 24 to 48 hours; and

- Any pertinent observations should be recorded, such as odors and readings from field instrumentation.

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

- Sample identification,
- Date and time of sample collection,
- Sampling depth,
- Identity of samplers,
- Sampling methods and devices,
- Purge volumes,
- Volume of soil vapor extracted,
- If canisters used, the vacuum 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.

SUB-SLAB VAPOR SAMPLE COLLECTION

During colder months, heating systems should be operating to maintain normal indoor air temperatures (i.e., 65 – 75 °F) for at least 24 hours prior to and during the scheduled sampling time. 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.

Sub-slab vapor probe installations (see Figure 4 attached) may be permanent, semi-permanent or temporary. Sub-slab implants or probes should be constructed in the same manner at all sampling locations to minimize possible discrepancies. The following procedures should be included in any construction protocol:

- Permanent recessed probes must be constructed with brass or stainless steel tubing and fittings;
- Temporary probes must be constructed with polyethylene or Teflon® tubing of laboratory or food grade quality;
- Tubing should not extend further than 2 inches into the sub-slab material;
- Coarse sand or glass beads should be added to cover about 1 inch of the probe tip for permanent installations; and
- The soil vapor probe should be sealed to the surface with permagum grout, melted beeswax, putty or other non-VOC-containing and non-shrinking products for temporary installations or cement for permanent installations.

Sub-slab vapor samples should be collected in the following manner:

- After installation of the probes, one to three volumes (i.e., the volume of the sample probe and tube) must be purged prior to collecting the samples to ensure samples collected are representative;
- Flow rates for both purging and collecting must not exceed 0.2 liters per minute to minimize outdoor air infiltration during sampling; and
- Samples must be collected, using conventional sampling methods, in an appropriate container — one which meets the objectives of the sampling (e.g., investigation of areas where low or high concentrations of volatile chemicals are expected; to minimize losses of volatile chemicals that are susceptible to photodegradation), meets the requirements of the sampling and analytical methods (e.g., low flow rate; Summa® canisters if analyzing by using EPA Method TO-15), and is certified clean by the laboratory;
- Sample size depends upon the volume of sample required to achieve minimum reporting limit requirements [Section 2.9 of the Guidance], the flow rate, and the sampling duration; and
- Ideally, samples should be collected over the same period of time as concurrent indoor and outdoor air samples.

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:

- If sampling within a commercial or industrial building, uses of volatile chemicals in commercial or industrial processes and/or during building maintenance, should be identified;
- 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 sample 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), and any other pertinent information should be completed;
- If possible, photographs should accompany floor plan sketches;
- Outdoor plot sketches should be drawn that include the building site, area streets, outdoor air sample locations (if applicable), compass orientation (north), footings that create separate foundation sections, and paved areas;
- Weather conditions (e.g., precipitation, indoor and outdoor temperature, and barometric pressure) and ventilation conditions (e.g., heating system active and windows closed) should be reported;
- Smoke tubes or other devices should be used to confirm pressure relationships and air flow patterns, especially between floor levels and between suspected contaminant sources and other areas; and
- Any pertinent observations, such as spills, floor stains, smoke tube results, odors and readings from field instrumentation (e.g., vapors via PID, ppb RAE, Jerome Mercury Vapor Analyzer, etc.), should be recorded.

The field sampling team must 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, the vacuum 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.

The following describes the subslab air sampling procedure:

1. Canisters will be supplied by the laboratory that will be conducting the analysis.

2. Sampling will take place in accordance with the project work plan sufficiently spaced to allow locations to be modified, if necessary.

3. The number of Summa canisters required as well as the flow rate of the constant differential low volume flow controllers will be supplied by the laboratory in accordance with the project work plan.

4. The sampling program will consist of concurrently collecting and analyzing one sub-slab vapor sample and one indoor ambient air sample (discussed in the next section). Sample locations should be selected based on the likelihood for potential continuous human occupancy during the workday (i.e., due to the size of the areas and available infrastructure), and to account for the possibility of varying foundation depths in different areas of the building. In addition, sample locations typically are based upon the results of a subsurface investigation (i.e., soil gas survey or boring advancement) conducted prior to air sample collection activities. Canisters are typically placed in areas where the highest concentrations of soil gas were observed. Indoor air sample locations preferably should be selected near the middle of the sampled room, well away from the edges where dilution is more likely to occur.

5. Collect at least one outdoor ambient air sample from a location on the building roof or designated background area of the site positioned away from building ventilation system equipment on the highest portion of the building roof or site. See the Outdoor Ambient Air Sampling Procedure section in this procedure.

6. Field personnel should assure conservative sampling conditions prior to and throughout the sampling event. The building should be closed (windows and doors shut) and existing building ventilation systems should be turned off 12

to 24 hours before the air sampling is scheduled to begin as well as during sample collection. Any air-handling units that may induce large pressure gradients (i.e., exhaust fans, HVAC units etc.) should also be turned off.

7. Any activity being conducted by current building tenants involving volatile organic compounds, such as the use of lacquer thinner and cleaning solvents, prior to and/or during air sampling activities should be noted in the Project Field Book. These activities have the potential to bias the analytical results.

8. At each location, drill an approximately ¾-inch diameter hole through the concrete slab (typically 6-8 inches thick) using a hand-held hammer drill.

9. Measure and record the concrete thickness in the Project Field Book.

10. Insert polyethylene or Teflon® tubing of laboratory or food grade quality into the drilled hole and no further than 2 inches into the subslab material.

11. Seal the tubing with an appropriately sized volatile organic compound-free stopper (i.e., permagum grout, melted beeswax, putty, or other non-VOC-containing and non-shrinking product) into the concrete core hole and secure in-place making sure the fit is very snug. Supplement any visible gaps between the stopper and concrete slab with a VOC-free sealant, such as beeswax or bentonite slurry.

12. Run the tubing assembly through a shroud (plastic pail, cardboard box, or garbage bag) creating a tight seal with the surface making sure not to disturb the seal around the tubing penetration.

13. Enrich the atmosphere of the shroud with helium. Measure and record the helium concentration within the shroud.

14. Purge approximately 1 to 3 tubing volumes (i.e., the volume of the sample probe and tube) using a hand pump (or similar approved device) to ensure the collection of a representative sample.

15. Flow rates for both purging and sample collection must not exceed 0.2 liters per minute to minimize outdoor air infiltration during sampling.

16. Use a portable monitoring device to analyze a sample of soil vapor for the tracer **prior to and after** sampling for the compounds of concern. Note that the tracer gas samples can be collected via syringe, Tedlar bag etc. They need not be collected in Summa® canisters or minicans.

17. If concentrations greater than 10% of tracer gas are observed either prior to and/or after sampling, the probe seal should be enhanced to reduce the infiltration of outdoor air. Following enhancement of the seal, repeat steps 14 through 17 above until purged concentrations are less than 10% of the tracer gas within the shroud.

18. Following tubing purge and adequate seal integrity testing via helium tracer gas, immediately attach a 6-liter Summa Canister fitted with a 24-hour regulator (or approved other duration) to the opposite end of the tubing. Concurrent with each subslab sample location, prepare an indoor ambient air sample by staging a second Summa Canister on a ladder (approximately 2 to 5-feet above the floor) adjacent to the sub-slab sample location.

19. All Summa Canister valves should remain closed until all subslab borings are complete and all of the canisters in their respective positions.

20. Open the valves to all of the canisters for the required collection period (i.e., 24-hours).

21. Following sample collection, close and cap each canister valve.

22. Collect all Summa Canisters and ship, under chain-of-custody command to an approved analytical laboratory for VOC analysis in accordance with USEPA Method TO-14 or TO-15.

23. Repair all concrete openings with a cement patch.

24. Analytical results submitted by the laboratory should be reported as concentrations of each VOC at each location, typically in parts per billion by volume (ppbv).

INDOOR AIR SAMPLE COLLECTION

During colder months, heating systems should be operating to maintain normal indoor air temperatures (i.e., 65 – 75 °F) for at least 24 hours prior to and during the scheduled sampling time. If possible, prior to collecting indoor samples, a pre-sampling inspection, discussed earlier in this procedure, should be performed to evaluate the physical layout and conditions of the building being investigated, to identify conditions that may affect or interfere with the proposed sampling, and to prepare the building for sampling.

In general, indoor air samples should be collected in the following manner:

- Sampling duration should reflect the exposure scenario being evaluated without compromising the detection limit or sample collection flow rate (e.g., an 8 hour sample from a workplace with a single shift versus a 24 hour sample from a workplace with multiple shifts). To ensure that air is representative of the locations sampled and to avoid undue influence from sampling personnel, samples should be collected for at least 1 hour. If the goal of the sampling is to represent average concentrations over longer periods, then longer duration sampling periods may be appropriate. Typically, 24 hour samples are collected from residential settings;

- Personnel should avoid lingering in the immediate area of the sampling device while samples are being collected;

- Sample flow rates must conform to the specifications in the sample collection method and, if possible, should be consistent with the flow rates for concurrent outdoor air and sub-slab samples; and

- Samples must be collected, using conventional sampling methods, in an appropriate container — one which meets the objectives of the sampling (e.g., investigation of areas where low or high concentrations of volatile chemicals are expected; to minimize losses of volatile chemicals that are susceptible to photodegradation), meets the requirements of the sampling and analytical methods (e.g., low flow rate; Summa® canisters if analyzing by using EPA Method TO-15), and is certified clean by the laboratory.

At sites with tetrachloroethene contamination, passive air monitors that are specifically analyzed for tetrachloroethene (i.e., "perc badges") are commonly used to collect indoor and outdoor air samples. If site characterization activities indicate that degradation products of tetrachloroethene also represent a vapor intrusion concern, perc badges may be used to indicate the likelihood of vapor intrusion (i.e., by using tetrachloroethene as a surrogate) followed, as needed, by more comprehensive sampling and laboratory analyses to quantify both tetrachloroethene and its degradation products. Perc badge samples ideally should be collected over a twenty-four hour period, but for no less than eight hours.

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

- A product inventory survey must be completed (discussed earlier);
- 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 sample 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), and any other pertinent information should be completed;
- If possible, photographs should accompany floor plan sketches;
- Outdoor plot sketches should be drawn that include the building site, area streets, outdoor air sample locations (if applicable), compass orientation (north), footings that create separate foundation sections, and paved areas;

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

- Smoke tubes or other devices should be used to confirm pressure relationships and air flow patterns, especially between floor levels and between suspected contaminant sources and other areas; and

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

The field sampling team must 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,
- Depending upon the method, volume of air sampled,
- If canisters used, the vacuum before and after samples collected,
- Chain of custody protocols and records used to track samples from sampling point to analysis.

The following describes the indoor air sampling procedure:

1. Canisters will be supplied by the laboratory that will be conducting the analysis.

2. Sampling will take place in accordance with the project work plan sufficiently spaced to allow locations to be modified, if necessary.

3. The number of Summa canisters required as well as the flow rate of the constant differential low volume flow controllers will be supplied by the

laboratory in accordance with the project work plan. Indoor air sampling typically requires the continuous collection of samples over a 24-hour period.

4. The sampling program will consist of concurrently collecting and analyzing one sub-slab vapor sample and one indoor ambient air sample. Sample locations should be selected based on the likelihood for potential continuous human occupancy during the workday (i.e., due to the size of the areas and available infrastructure), and to account for the possibility of varying foundation depths in different areas of the building. In addition, sample locations typically are based upon the results of a subsurface investigation (i.e., soil gas survey or boring advancement) conducted prior to air sample collection activities. Canisters are typically placed in areas where the highest concentrations of soil gas were observed. Indoor air sample locations preferably should be selected near the middle of the sampled room, well away from the edges where dilution is more likely to occur.

5. Collect at least one outdoor ambient air sample from a location on the building roof or designated background area of the site positioned away from building ventilation system equipment on the highest portion of the building roof or site. See the Outdoor Ambient Air Sampling Procedure presented in this procedure.

6. Field personnel should assure conservative sampling conditions prior to and throughout the sampling event. The building should be closed (windows and doors shut) and existing building ventilation systems should be turned off 12 to 24 hours before the air sampling is scheduled to begin as well as during sample collection. Any air-handling units that may induce large pressure gradients (i.e., exhaust fans, HVAC units etc.) should also be turned off.

7. Any activity being conducted by current building tenants involving volatile organic compounds, such as the use of lacquer thinner and cleaning solvents, prior to and/or during air sampling activities should be noted in the Project Field Book. These activities have the potential to bias the analytical results.

8. Concurrent with each subslab sample location, prepare an indoor ambient air sample by staging a second Summa Canister on a ladder (approximately 2 to 5-feet above the floor) adjacent to the sub-slab sample location.

9. All Summa Canister valves should remain closed until all subslab borings are complete and all of the canisters in their respective positions.

10. Open the valves to all of the canisters for the required collection period (i.e., 24-hours).

11. Following sample collection, close and cap each canister valve.

12. Collect all Summa Canisters and ship, under chain-of-custody command to an approved analytical laboratory for VOC analysis in accordance with USEPA Method TO-14 or TO-15.

13. Analytical results submitted by the laboratory should be reported as concentrations of each VOC at each location, typically in parts per billion by volume (ppbv).

OUTDOOR AIR SAMPLE COLLECTION

Outdoor air samples must be collected simultaneously with indoor air samples and may be collected concurrently with subsurface vapor samples. Outdoor air samples must be collected in the same manner as indoor samples.

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

- Outdoor plot sketches should be drawn that include the building site, area streets, outdoor air sample locations (if applicable), the location of potential interferences (e.g., gasoline stations, factories, lawn movers, etc.), compass orientation (north), footings that create separate foundation sections, and paved areas;

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

- Any pertinent observations, such as odors, readings from field instrumentation, and significant activities in the vicinity (e.g., operation of heavy equipment or dry cleaners) should be recorded.

The following describes the outdoor air sampling procedure:

1. Canisters will be supplied by the laboratory that will be conducting the analysis.

2. Sampling will take place in accordance with the project work plan sufficiently spaced to allow locations to be modified, if necessary.

3. The number of Summa canisters required as well as the flow rate of the constant differential low volume flow controllers will be supplied by the laboratory in accordance with the project work plan.

4. Sample locations typically are collected upwind of the facility.

5. Place canisters on the ground, with a clear plastic sheet beneath to prevent contamination. Locate the sampling inlet approximately 18-inches above the ground surface.

6. Sample collection should take place on warm, dry days. If rain or high humidity conditions develop during sampling, the sampling event should be suspended. Temperature, barometric pressure and wind speed should be monitored during the sampling event, for use in analysis of the results.

7. The combination of sampling location, height and meteorological conditions will assure that sampling will measure VOCs at their highest concentrations.

8. Air samples will be analyzed by Gas Chromatography/Mass Spectroscopy (GC/MS) in accordance with EPA Method TO-14 or TO-15.

9. Analytical results will be reported as concentrations of each VOC at each location during each sampling event, typically in parts per billion by volume (ppbv).

TRACER GAS

When collecting soil vapor samples as part of a vapor intrusion evaluation, a tracer gas serves as a quality assurance/quality control device to verify the integrity of the soil vapor probe seal. Without the use of a tracer, there is no way to verify that a soil vapor sample has not been diluted by surface air.

Depending on the nature of the contaminants of concern, a number of different compounds can be used as a tracer. Typically, sulfur hexafluoride (SF6) or helium are used as tracers because they are readily available, have low toxicity, and can be monitored with portable measurement devices. Butane and propane (or other gases) could also be used as a tracer in some situations. The protocol for using a tracer gas is straightforward: simply enrich the atmosphere in the immediate vicinity of the area where the probe intersects the ground surface with the tracer gas, and measure a vapor sample from the probe for the presence of high concentrations (> 10%) of the tracer. A cardboard box, a plastic pail, or even a garbage bag can serve to keep the tracer gas in contact with the probe during the testing.

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

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

The advantage of the second approach is that the real time tracer sampling results can be used to confirm the integrity of the probe seals prior to formal sample collection. Figure 5 (attached) depicts common methods for using tracer gas. In each of the examples, a, b and c, the tracer gas is released in the enclosure prior to initially purging the sample point. Care should be taken to avoid excessive purging prior to sample collection. Care should also be taken to prevent pressure build-up in the enclosure during introduction of the tracer gas. Inspection of the installed sample probe, specifically noting the integrity of the surface seal and the porosity of the soil in which the probe is installed, will help to determine the tracer gas setup. Figure 5(a) may be most effective at preventing tracer gas infiltration, however, it may not be required in some situations depending on site-specific conditions. Figures 5(b) and 5(c) may be sufficient for probes installed in tight soils with well-constructed surface seals. In all cases, the same tracer gas application should be used for all probes at any given site.

Because minor leakage around the probe seal should not materially affect the usability of the soil vapor sampling results, the mere presence of the tracer gas in the sample should not be a cause for alarm. Consequently, portable field monitoring devices with detection limits in the low ppm range are more than adequate for screening samples for the tracer. If high concentrations (> 10%) of tracer gas are observed in a sample, the probe seal should be enhanced to reduce the infiltration of ambient air.

During the initial stages of a soil vapor sampling program, tracer gas samples should be collected at each of the sampling probes. If the results of the initial samples indicate that the probe seals are adequate, the project manager can consider reducing the number of locations at which tracer gas samples are employed. At a minimum, at least 10% of the subsequent samples should be supported with tracer gas analyses. When using permanent soil vapor probes as part of a long-term monitoring program, annual testing of the probe integrity is recommended.

QUALITY ASSURANCE / QUALITY CONTROL (QA/QC)

Extreme care should be taken during all aspects of sample collection to ensure that sampling error is minimized and high quality data are obtained. The sampling team members should avoid actions (e.g., fueling vehicles, using permanent marking pens, and wearing freshly dry-cleaned clothing or personal fragrances), which can cause sample interference in the field. Appropriate QA/QC protocols must be followed for sample collection and laboratory analysis, such as use of certified clean sample devices, meeting sample holding times and temperatures, sample accession, chain of custody, etc. Samples should be delivered to the analytical laboratory as soon as possible after collection. In addition, laboratory accession procedures must be followed including field documentation (sample collection information and locations), chain of custody, field blanks, field sample duplicates and laboratory duplicates, as appropriate.

Some methods require collecting samples in duplicate (e.g., indoor air sampling using passive sampling devices for tetrachloroethene) to assess errors. Duplicate and/or split samples should be collected in accordance with the requirements of the sampling and analytical methods being implemented.

For certain regulatory programs, a Data Usability Summary Report (DUSR) may be required to determine whether or not the data, as presented, meets the site or project specific criteria for data quality and data use. This requirement may dictate the level of QC and the category of data deliverable to request from the laboratory. Guidance on preparing a DUSR is available by contacting the NYSDEC's Division of Environmental Remediation.

New York State Public Health Law requires laboratories analyzing environmental samples collected from within New York State to have current Environmental Laboratory Approval Program (ELAP) certification for the appropriate analyte and environmental matrix combinations. If ELAP certification is not currently required for an analyte (e.g., trichloroethene), the analysis should be performed by a laboratory that has ELAP certification for similar compounds in air and uses analytical methods with detection limits similar to background (e.g., tetrachloroethene via EPA Method TO-15).

The work plan must state that all samples that will be used to make decisions on appropriate actions to address exposures and environmental contamination will be analyzed by an ELAP-certified laboratory. If known, the name of the laboratory should also be provided. Similarly, the name of the laboratory that was used must be included in the report of the sampling results. For samples collected and tested in the field for screening purposes by using field testing technology, the qualifications of the field technician must be documented in the work plan.

DECISION MATRICES (FIGURES 1 AND 2)

The considerations in assigning a chemical to a matrix include the following:

- Human health risks, including such factors as a chemical's ability to cause cancer, reproductive, developmental, liver, kidney, nervous system, immune system or other effects, in animals and humans and the doses that may cause those effects;
- The data gaps in its toxicologic database;
- Background concentrations of volatile chemicals in indoor air [Section 3.2.4]; and
- Analytical capabilities currently available.

To use the matrices accurately as a tool in the decision-making process, the following must be noted:

- The matrices are generic. As such, it may be necessary to modify recommended actions to accommodate building-specific conditions (e.g., dirt floor in basement, crawl spaces, etc.) and/or site-specific conditions (e.g., proximity of building to identified subsurface contamination) for the protection of public health. Additionally, actions more conservative than those specified within the matrix may be implemented at any time. For example, the decision to implement more conservative actions may be based on a comparison of the costs associated with resampling or monitoring to the costs associated with installation and monitoring of a mitigation system.

- Indoor air concentrations detected in samples collected from the building's basement or, if the building has a slab-on-grade foundation, from the building's lowest occupied living space should be used.
- Actions provided in the matrix are specific to addressing human exposures. Implementation of these actions does not preclude the need to investigate possible sources of vapor contamination, nor does it preclude the need to remediate contaminated soil vapors or the source of soil vapor contamination.
- When current exposures are attributed to sources other than vapor intrusion, the agencies must be provided documentation (e.g., applicable environmental data, completed indoor air sampling questionnaire, digital photographs, etc.) to support a proposed action other than that provided in the matrix and to support assessment and follow-up by the agencies.

RECOMMENDED ACTIONS

Actions recommended in the matrix are based on the relationship between sub-slab vapor concentrations and corresponding indoor air concentrations. They are intended to address both potential and current human exposures and include the following:

- *No further action*
  When the volatile chemical is not detected in the indoor air sample and the concentration detected in the corresponding sub-slab vapor sample is not expected to substantially affect indoor air quality.

- *Take reasonable and practical actions to identify source(s) and reduce exposures*
  The concentration detected in the indoor air sample is likely due to indoor and/or outdoor sources rather than soil vapor intrusion given the concentration detected in the sub-slab vapor sample. Therefore, steps should be taken to identify potential source(s) and to reduce exposures accordingly (e.g., by keeping containers tightly capped or by storing volatile chemical-containing products in places where people do not spend much time, such as a garage or shed).

- *Monitor*
  Monitoring, including sub-slab vapor, basement air, lowest occupied living space air, and outdoor air sampling, is needed to determine whether concentrations in the indoor air or sub-slab vapor have changed. Monitoring may also be needed to determine whether existing building conditions (e.g., positive pressure HVAC systems) are maintaining the desired mitigation endpoint and to determine whether changes are needed. The type and frequency of monitoring is determined on a site-specific and building specific basis, taking into account applicable environmental data and building operating conditions.

- *Mitigate*
  Mitigation is needed to minimize current or potential exposures associated with soil vapor intrusion. Methods to mitigate exposures related to soil vapor intrusion are described in Section 4 of the Guidance.

TIME OF YEAR

Sub-slab vapor samples and, unless there is an immediate need for sampling, indoor air samples are typically collected during the heating season because soil vapor intrusion is more likely to occur when a building's heating system is in operation and air is being drawn into the building. In general, heating systems are expected to be operating routinely from November 15th to March 31st throughout the state. However, this timeframe may vary depending on factors, such as the location of the site (e.g., upstate versus downstate) and the weather conditions for a particular year.

A vapor intrusion investigation may also be conducted outside of the heating season. However, the results may not be used to rule out exposures. For example, results indicating "no further action" or "monitoring required" must be verified during the heating season to ensure these actions are protective during the heating season as well.

SAMPLING ROUNDS

Investigating a soil vapor intrusion pathway usually requires more than one round of subsurface vapor, indoor air and/or outdoor air sampling, for reasons such as the following:

- To characterize the nature and extent of subsurface vapor contamination (similar to the delineation of groundwater contamination) and to address corresponding exposure concerns;

- To evaluate fluctuations in concentrations due to
  - Different weather conditions (e.g., seasonal effects),
  - Changes in building conditions (e.g., various operating conditions of a building's HVAC system),
  - Changes in source strength, or
  - Vapor migration or contaminant biodegradation processes (particularly when degradation products may be more toxic than the parent compounds); or
- To confirm sampling results or the effectiveness of mitigation or remedial systems.

Overall, successive rounds of sampling are conducted until the following questions can be answered:

- Are subsurface vapors contaminated? If so, what are the nature and extent of contamination? What is/are the source(s) of the contamination?
- What are the current and potential exposures to contaminated subsurface vapors?
- What actions, if any, are needed to prevent or mitigate exposures and to remediate subsurface vapor contamination?

Toward this end, multiple rounds of sampling may be required to characterize the nature and extent of subsurface vapor contamination such that

- Both potential and current exposures are adequately addressed;
- Measures can be designed to remediate subsurface vapor contamination, either directly (e.g., SVE system) or indirectly (e.g., soil excavation or groundwater remediation), given that monitoring and mitigation are considered temporary measures implemented to address exposures related to vapor intrusion until contaminated environmental media are remediated; and
- The effectiveness of remedial measures can be monitored and confirmed (e.g., endpoint sampling).

ATTACHMENTS

Figure 1	*Soil Vapor/Indoor Air Matrix 1*
Figure 2	*Soil Vapor/Indoor Air Matrix 2*
Figure 3	*Schematics of a permanent soil vapor probe and permanent nested soil vapor probes*
Figure 4	*Schematic of a sub-slab vapor probe*
Figure 5	*Schematics of tracer gas applications*

Indoor Air Quality Questionnaire and Building Inventory

REFERENCES

New York State Department of Health, *Guidance for Evaluating Soil Vapor Intrusion in the State of New York*, February 2005.

New York State Department of Health, *Indoor Air Sampling & Analysis Guidance.* (February 1, 2005).

Office of Solid Waste and Emergency Response (OSWER). *Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance).* November 2002.

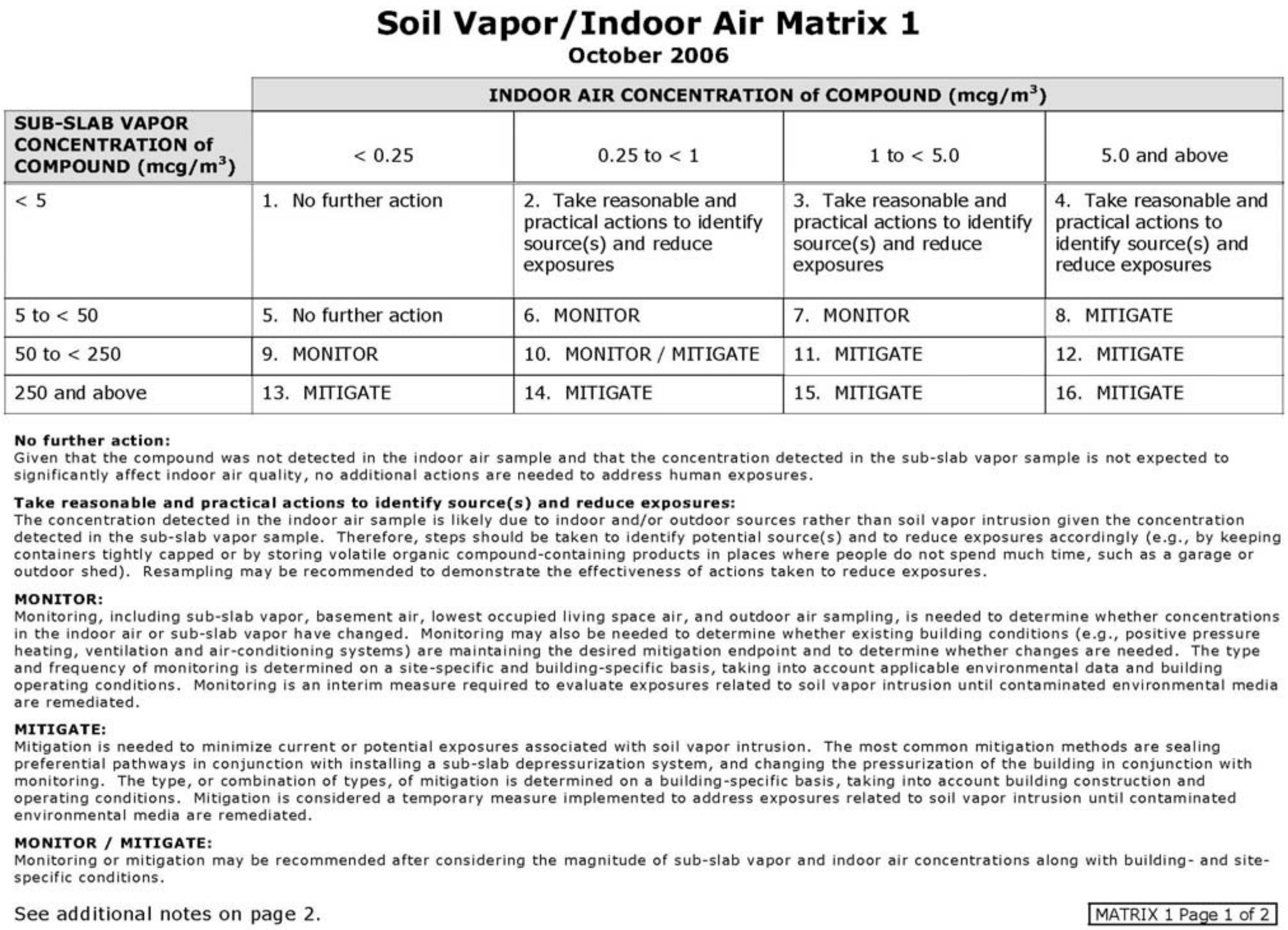
United States Environmental Protection Agency. *EPA Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air*. 1988

- Method TO-15, Determination of Volatile Organic Compounds (VOCs) in Air Collected in Specially Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry (GC/MS). Pp. 15-1 through 15-62.

- Method TO-17, Determination of Volatile Organic Compounds in Ambient Air using Active Sampling on Sorbent Tubes. Pp. 17-1 through 17-49.

- Compendium of Methods for the Determination of Air Pollutants in Indoor Air, EPA/600/4-90-010.

FIGURE 1



Soil Vapor/Indoor Air Matrix 1

October 2006

SUB-SLAB VAPOR CONCENTRATION of COMPOUND (mcg/m³)	INDOOR AIR CONCENTRATION of COMPOUND (mcg/m³)			
	< 0.25	0.25 to < 1	1 to < 5.0	5.0 and above
< 5	1. No further action	2. Take reasonable and practical actions to identify source(s) and reduce exposures	3. Take reasonable and practical actions to identify source(s) and reduce exposures	4. Take reasonable and practical actions to identify source(s) and reduce exposures
5 to < 50	5. No further action	6. MONITOR	7. MONITOR	8. MITIGATE
50 to < 250	9. MONITOR	10. MONITOR / MITIGATE	11. MITIGATE	12. MITIGATE
250 and above	13. MITIGATE	14. MITIGATE	15. MITIGATE	16. MITIGATE

No further action:
Given that the compound was not detected in the indoor air sample and that the concentration detected in the sub-slab vapor sample is not expected to significantly affect indoor air quality, no additional actions are needed to address human exposures.

Take reasonable and practical actions to identify source(s) and reduce exposures:
The concentration detected in the indoor air sample is likely due to indoor and/or outdoor sources rather than soil vapor intrusion given the concentration detected in the sub-slab vapor sample. Therefore, steps should be taken to identify potential source(s) and to reduce exposures accordingly (e.g., by keeping containers tightly capped or by storing volatile organic compound-containing products in places where people do not spend much time, such as a garage or outdoor shed). Resampling may be recommended to demonstrate the effectiveness of actions taken to reduce exposures.

MONITOR:
Monitoring, including sub-slab vapor, basement air, lowest occupied living space air, and outdoor air sampling, is needed to determine whether concentrations in the indoor air or sub-slab vapor have changed. Monitoring may also be needed to determine whether existing building conditions (e.g., positive pressure heating, ventilation and air-conditioning systems) are maintaining the desired mitigation endpoint and to determine whether changes are needed. The type and frequency of monitoring is determined on a site-specific and building-specific basis, taking into account applicable environmental data and building operating conditions. Monitoring is an interim measure required to evaluate exposures related to soil vapor intrusion until contaminated environmental media are remediated.

MITIGATE:
Mitigation is needed to minimize current or potential exposures associated with soil vapor intrusion. The most common mitigation methods are sealing preferential pathways in conjunction with installing a sub-slab depressurization system, and changing the pressurization of the building in conjunction with monitoring. The type, or combination of types, of mitigation is determined on a building-specific basis, taking into account building construction and operating conditions. Mitigation is considered a temporary measure implemented to address exposures related to soil vapor intrusion until contaminated environmental media are remediated.

MONITOR / MITIGATE:
Monitoring or mitigation may be recommended after considering the magnitude of sub-slab vapor and indoor air concentrations along with building- and site-specific conditions.

See additional notes on page 2.

MATRIX 1 Page 1 of 2

ADDITIONAL NOTES FOR MATRIX 1

This matrix summarizes the minimum actions recommended to address current and potential exposures related to soil vapor intrusion. To use the matrix appropriately as a tool in the decision-making process, the following should be noted:

[1] The matrix is generic. As such, it may be appropriate to modify a recommended action to accommodate building-specific conditions (e.g., dirt floor in basement, crawl spaces, etc.) and/or factors provided in Section 3.2 of the guidance (e.g., current land use, environmental conditions, etc.). For example, resampling may be recommended when the matrix indicates "no further action" for a particular building, but the results of adjacent buildings (especially sub-slab vapor results) indicate a need to take actions to address exposures related to soil vapor intrusion. Additionally, actions more protective of public health than those specified within the matrix may be proposed at any time. For example, the party implementing the actions may decide to install sub-slab depressurization systems on buildings where the matrix indicates "no further action" or "monitoring." Such an action is usually undertaken for reasons other than public health (e.g., seeking community acceptance, reducing excessive costs, etc.).

[2] Actions provided in the matrix are specific to addressing human exposures. Implementation of these actions does not preclude investigating possible sources of vapor contamination, nor does it preclude remediating contaminated soil vapors or the source of soil vapor contamination.

[3] Appropriate care should be taken during all aspects of sample collection to ensure that high quality data are obtained. Since the data are being used in the decision-making process, the laboratory analyzing the environmental samples must have current Environmental Laboratory Approval Program (ELAP) certification for the appropriate analyte and environmental matrix combinations. Furthermore, samples should be analyzed by methods that can achieve a minimum reporting limit of 0.25 microgram per cubic meter for indoor and outdoor air samples. For sub-slab vapor samples, a minimum reporting limit of 5 micrograms per cubic meter is recommended for buildings with full slab foundations, and 1 microgram per cubic meter for buildings with less than a full slab foundation.

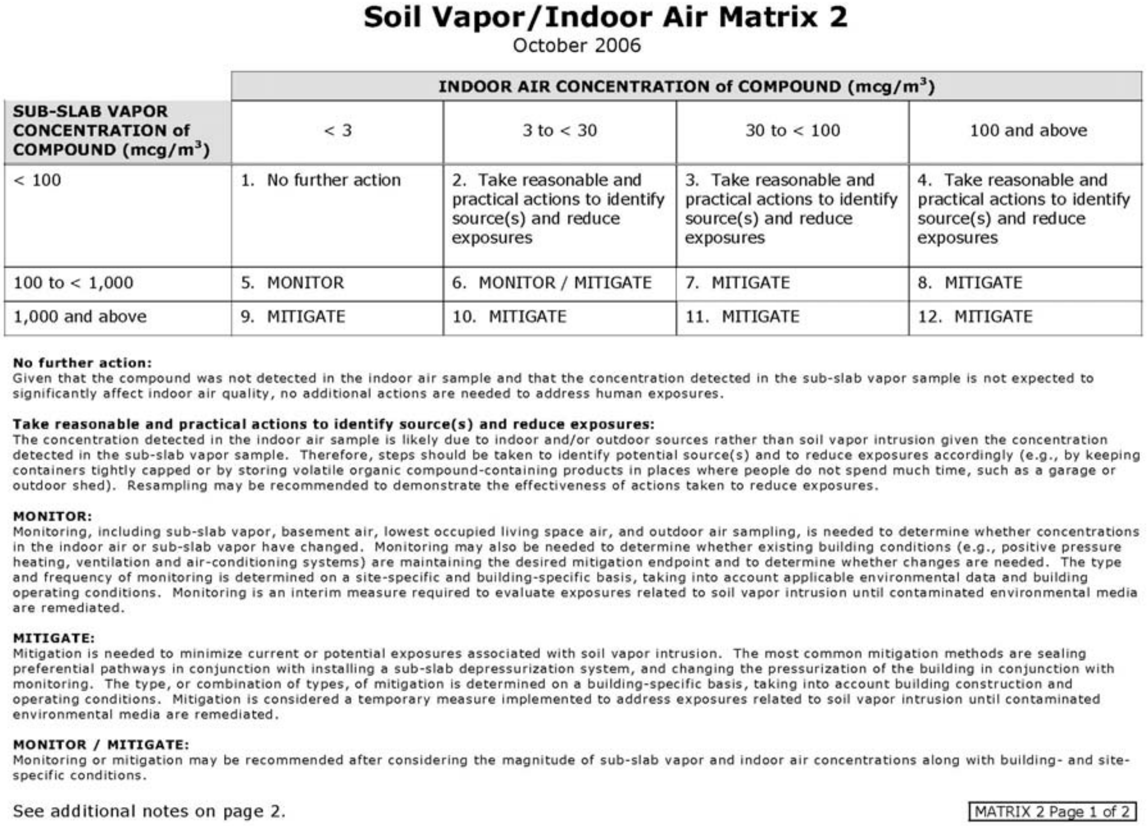
[4] Sub-slab vapor and indoor air samples are typically collected when the likelihood of soil vapor intrusion to occur is considered to be the greatest (i.e., worst-case conditions). If samples are collected at other times (typically, samples collected outside of the heating season), then resampling during worst-case conditions may be appropriate to verify that actions taken to address exposures related to soil vapor intrusion are protective of human health.

[5] When current exposures are attributed to sources other than soil vapor intrusion, the agencies should be given documentation (e.g., applicable environmental data, completed indoor air sampling questionnaire, digital photographs, etc.) to support a proposed action other than that provided in the matrix box and to support agency assessment and follow-up.

[6] The party responsible for implementing the recommended actions will differ depending upon several factors, including the identified source of the volatile chemicals, the environmental remediation program, and site-specific and building-specific conditions. For example, to the extent that all site data and site conditions demonstrate that soil vapor intrusion is not occurring and that the potential for soil vapor intrusion to occur is not likely, the soil vapor intrusion investigation would be considered complete. In general, if indoor exposures represent a concern due to indoor sources, then the State will provide guidance to the property owner and/or tenant on ways to reduce their exposure. If indoor exposures represent a concern due to outdoor sources, then the NYSDEC will decide who is responsible for further investigation and any necessary remediation. Depending upon the outdoor source, this responsibility may or may not fall upon the party conducting the soil vapor intrusion investigation.

MATRIX 1 Page 2 of 2

FIGURE 2



Soil Vapor/Indoor Air Matrix 2

October 2006

SUB-SLAB VAPOR CONCENTRATION of COMPOUND (mcg/m^3)	INDOOR AIR CONCENTRATION of COMPOUND (mcg/m^3)			
	< 3	3 to < 30	30 to < 100	100 and above
< 100	1. No further action	2. Take reasonable and practical actions to identify source(s) and reduce exposures	3. Take reasonable and practical actions to identify source(s) and reduce exposures	4. Take reasonable and practical actions to identify source(s) and reduce exposures
100 to < 1,000	5. MONITOR	6. MONITOR / MITIGATE	7. MITIGATE	8. MITIGATE
1,000 and above	9. MITIGATE	10. MITIGATE	11. MITIGATE	12. MITIGATE

No further action:
Given that the compound was not detected in the indoor air sample and that the concentration detected in the sub-slab vapor sample is not expected to significantly affect indoor air quality, no additional actions are needed to address human exposures.

Take reasonable and practical actions to identify source(s) and reduce exposures:
The concentration detected in the indoor air sample is likely due to indoor and/or outdoor sources rather than soil vapor intrusion given the concentration detected in the sub-slab vapor sample. Therefore, steps should be taken to identify potential source(s) and to reduce exposures accordingly (e.g., by keeping containers tightly capped or by storing volatile organic compound-containing products in places where people do not spend much time, such as a garage or outdoor shed). Resampling may be recommended to demonstrate the effectiveness of actions taken to reduce exposures.

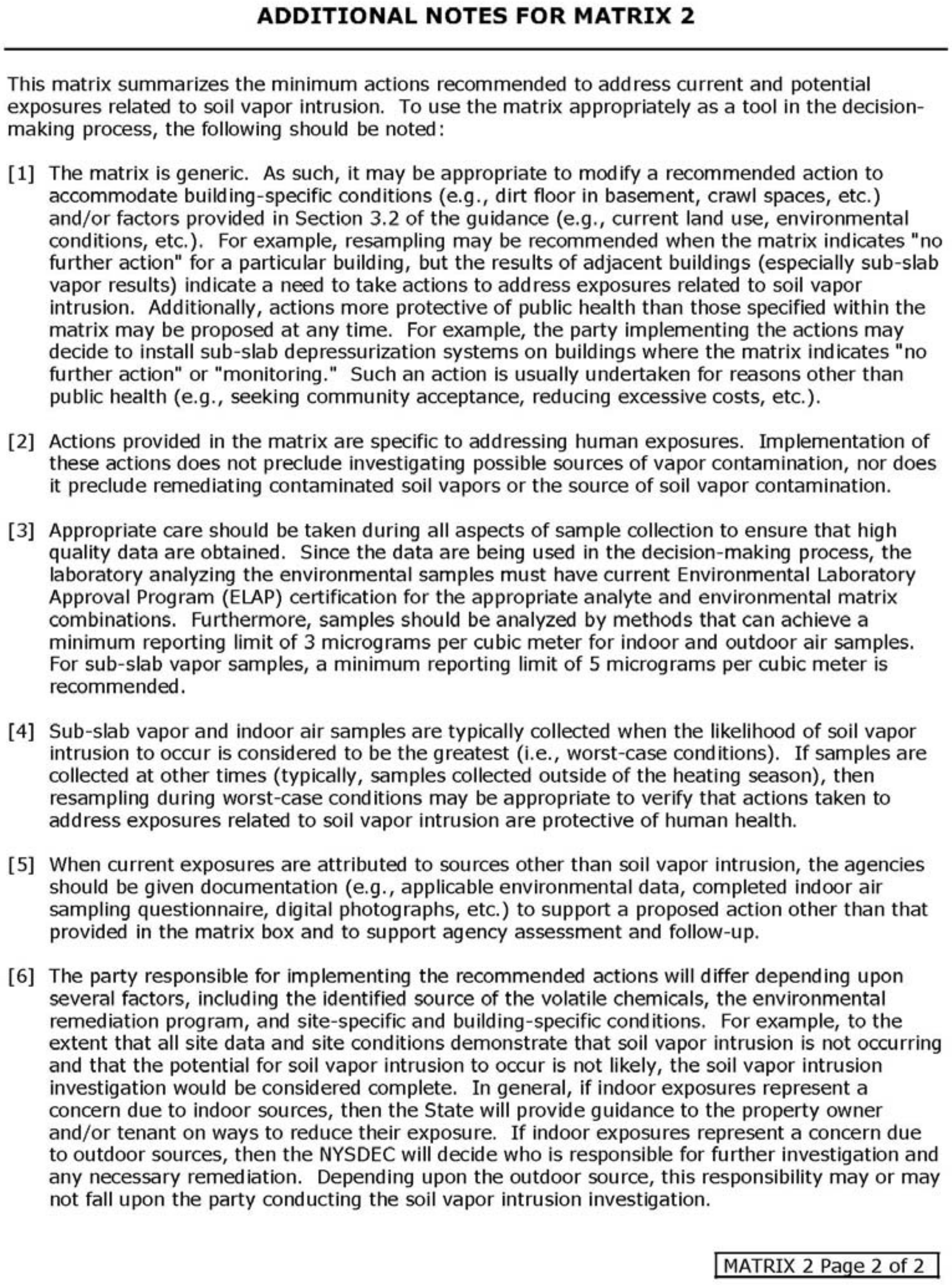
MONITOR:
Monitoring, including sub-slab vapor, basement air, lowest occupied living space air, and outdoor air sampling, is needed to determine whether concentrations in the indoor air or sub-slab vapor have changed. Monitoring may also be needed to determine whether existing building conditions (e.g., positive pressure heating, ventilation and air-conditioning systems) are maintaining the desired mitigation endpoint and to determine whether changes are needed. The type and frequency of monitoring is determined on a site-specific and building-specific basis, taking into account applicable environmental data and building operating conditions. Monitoring is an interim measure required to evaluate exposures related to soil vapor intrusion until contaminated environmental media are remediated.

MITIGATE:
Mitigation is needed to minimize current or potential exposures associated with soil vapor intrusion. The most common mitigation methods are sealing preferential pathways in conjunction with installing a sub-slab depressurization system, and changing the pressurization of the building in conjunction with monitoring. The type, or combination of types, of mitigation is determined on a building-specific basis, taking into account building construction and operating conditions. Mitigation is considered a temporary measure implemented to address exposures related to soil vapor intrusion until contaminated environmental media are remediated.

MONITOR / MITIGATE:
Monitoring or mitigation may be recommended after considering the magnitude of sub-slab vapor and indoor air concentrations along with building- and site-specific conditions.

See additional notes on page 2.

MATRIX 2 Page 1 of 2



ADDITIONAL NOTES FOR MATRIX 2

This matrix summarizes the minimum actions recommended to address current and potential exposures related to soil vapor intrusion. To use the matrix appropriately as a tool in the decision-making process, the following should be noted:

[1] The matrix is generic. As such, it may be appropriate to modify a recommended action to accommodate building-specific conditions (e.g., dirt floor in basement, crawl spaces, etc.) and/or factors provided in Section 3.2 of the guidance (e.g., current land use, environmental conditions, etc.). For example, resampling may be recommended when the matrix indicates "no further action" for a particular building, but the results of adjacent buildings (especially sub-slab vapor results) indicate a need to take actions to address exposures related to soil vapor intrusion. Additionally, actions more protective of public health than those specified within the matrix may be proposed at any time. For example, the party implementing the actions may decide to install sub-slab depressurization systems on buildings where the matrix indicates "no further action" or "monitoring." Such an action is usually undertaken for reasons other than public health (e.g., seeking community acceptance, reducing excessive costs, etc.).

[2] Actions provided in the matrix are specific to addressing human exposures. Implementation of these actions does not preclude investigating possible sources of vapor contamination, nor does it preclude remediating contaminated soil vapors or the source of soil vapor contamination.

[3] Appropriate care should be taken during all aspects of sample collection to ensure that high quality data are obtained. Since the data are being used in the decision-making process, the laboratory analyzing the environmental samples must have current Environmental Laboratory Approval Program (ELAP) certification for the appropriate analyte and environmental matrix combinations. Furthermore, samples should be analyzed by methods that can achieve a minimum reporting limit of 3 micrograms per cubic meter for indoor and outdoor air samples. For sub-slab vapor samples, a minimum reporting limit of 5 micrograms per cubic meter is recommended.

[4] Sub-slab vapor and indoor air samples are typically collected when the likelihood of soil vapor intrusion to occur is considered to be the greatest (i.e., worst-case conditions). If samples are collected at other times (typically, samples collected outside of the heating season), then resampling during worst-case conditions may be appropriate to verify that actions taken to address exposures related to soil vapor intrusion are protective of human health.

[5] When current exposures are attributed to sources other than soil vapor intrusion, the agencies should be given documentation (e.g., applicable environmental data, completed indoor air sampling questionnaire, digital photographs, etc.) to support a proposed action other than that provided in the matrix box and to support agency assessment and follow-up.

[6] The party responsible for implementing the recommended actions will differ depending upon several factors, including the identified source of the volatile chemicals, the environmental remediation program, and site-specific and building-specific conditions. For example, to the extent that all site data and site conditions demonstrate that soil vapor intrusion is not occurring and that the potential for soil vapor intrusion to occur is not likely, the soil vapor intrusion investigation would be considered complete. In general, if indoor exposures represent a concern due to indoor sources, then the State will provide guidance to the property owner and/or tenant on ways to reduce their exposure. If indoor exposures represent a concern due to outdoor sources, then the NYSDEC will decide who is responsible for further investigation and any necessary remediation. Depending upon the outdoor source, this responsibility may or may not fall upon the party conducting the soil vapor intrusion investigation.

MATRIX 2 Page 2 of 2

FIGURE 3

Schematics of a permanent soil vapor probe and permanent nested soil vapor probes

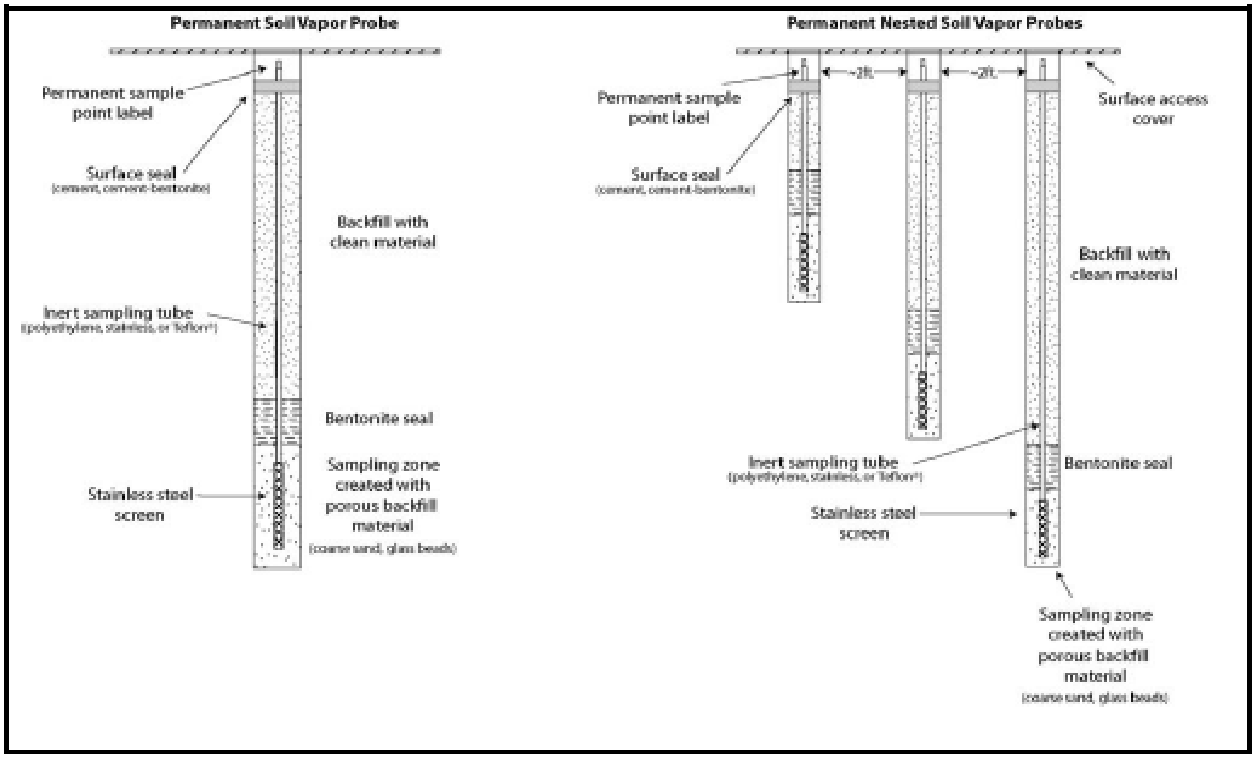


FIGURE 4

Schematic of a sub-slab vapor probe

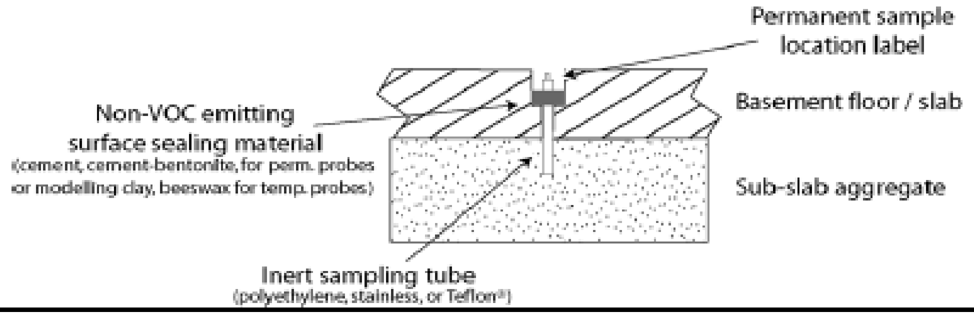
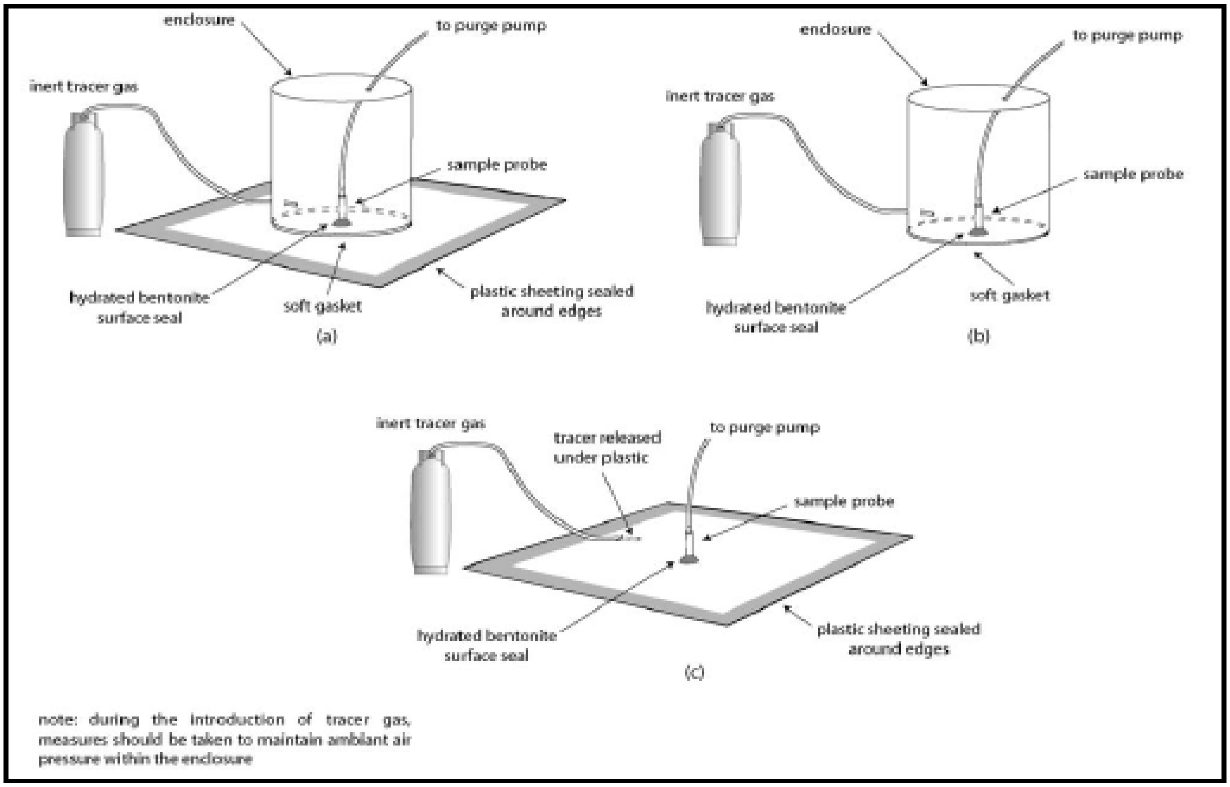


FIGURE 5

Schematics of tracer gas applications



note: during the introduction of tracer gas, measures should be taken to maintain ambiant air pressure within the enclosure

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INDOOR AIR QUALITY QUESTIONNAIRE & BUILDING INVENTORY

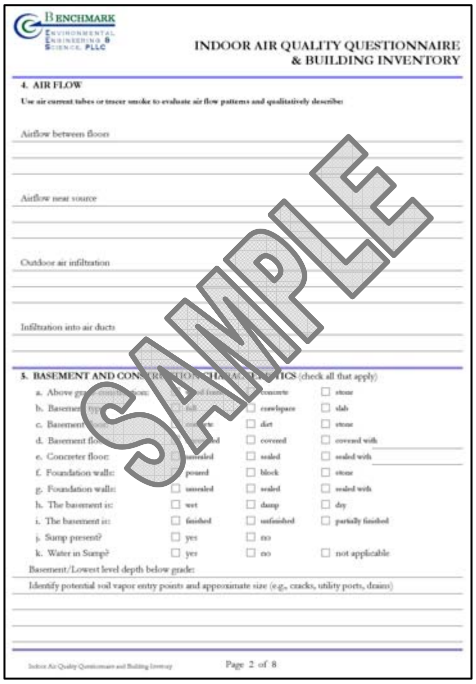
Project Name: Project No.
Project Location: Client:
Preparer's Name: Date/Time:
Preparer's Affiliation: Phone No:
Purpose of Investigation:

1. OCCUPANT:
Interviewed: yes no
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: yes no
Last Name: First Name:
Address:
County:
Home Phone: Office Phone:

3. BUILDING CHARACTERISTICS
Type of Building: (check appropriate response)
☐ Residential ☐ School ☐ Commercial/Multi-use
☐ Industrial ☐ Church ☐ Other:
If the property is residential, type? (check appropriate response)
☐ Ranch ☐ 2-Family ☐ 3-Family
☐ Raised Ranch ☐ Split Level ☐ Colonial
☐ Cape Cod ☐ Contemporary ☐ Mobile Home
☐ Duplex ☐ Apartment House ☐ Townhouse/Condo
☐ 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)? yes no If yes, how many?
Other Characteristics:
Number of floors Builing age
Is the building insulated? yes no How air tight? tight average not tight

Indoor Air Quality Questionnaire and Building Inventory Page 1 of 8



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INDOOR AIR QUALITY QUESTIONNAIRE & BUILDING INVENTORY

4. AIR FLOW
Use air current tubes or tracer smoke to evaluate air flow patterns and qualitatively describe:

Airflow between floors

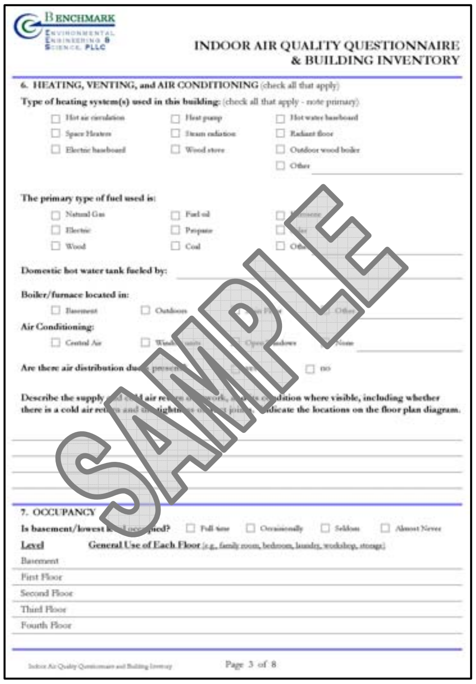
Airflow near source

Outdoor air infiltration

Infiltration into air ducts

5. BASEMENT AND CONSTRUCTION CHARACTERISTICS (check all that apply)
a. Above grade construction: ☐ wood frame ☐ concrete ☐ stone
b. Basement type: ☐ full ☐ crawlspace ☐ slab
c. Basement floor: ☐ concrete ☐ dirt ☐ stone
d. Basement floor: ☐ uncovered ☐ covered ☐ covered with
e. Concrete floor: ☐ unsealed ☐ sealed ☐ sealed with
f. Foundation walls: ☐ poured ☐ block ☐ stone
g. Foundation walls: ☐ unsealed ☐ sealed ☐ sealed with
h. The basement is: ☐ wet ☐ damp ☐ dry
i. The basement is: ☐ finished ☐ unfinished ☐ partially finished
j. Sump present? ☐ yes ☐ no
k. Water in Sump? ☐ yes ☐ no ☐ not applicable
Basement/Lowest level depth below grade:
Identify potential soil vapor entry points and approximate size (e.g., cracks, utility ports, drains)

Indoor Air Quality Questionnaire and Building Inventory Page 2 of 8



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INDOOR AIR QUALITY QUESTIONNAIRE & BUILDING INVENTORY

6. HEATING, VENTING, and AIR CONDITIONING (check all that apply)
Type of heating system(s) used in this building: (check all that apply - note primary)
☐ Hot air circulation ☐ Heat pump ☐ Hot water baseboard
☐ Space Heaters ☐ Steam 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 ☐ Other

Domestic hot water tank fueled by:

Boiler/furnace located in:
☐ Basement ☐ Outdoors ☐ Main Floor ☐ Other

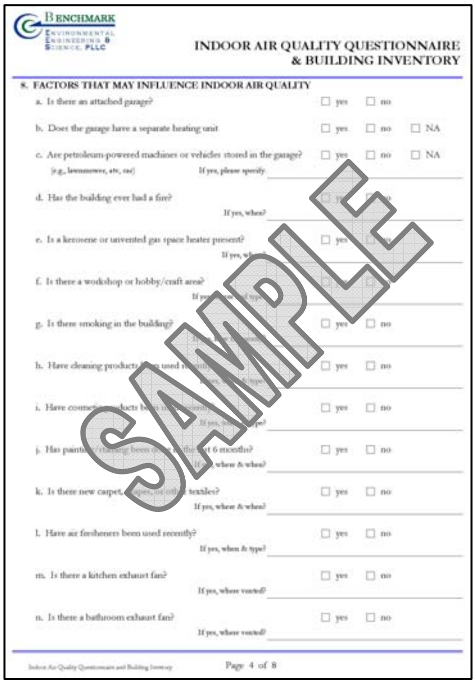
Air Conditioning:
☐ Central Air ☐ Window units ☐ Open Windows ☐ None

Are there air distribution ducts present? ☐ yes ☐ no

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., family room, bedroom, laundry, workshop, storage)
Basement
First Floor
Second Floor
Third Floor
Fourth Floor

Indoor Air Quality Questionnaire and Building Inventory Page 3 of 8



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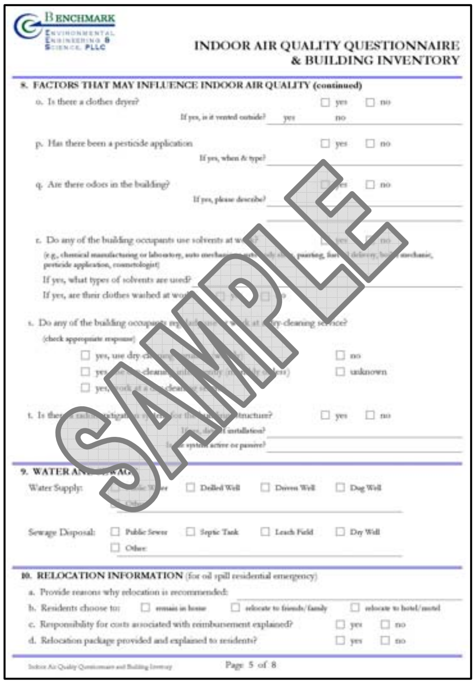
INDOOR AIR QUALITY QUESTIONNAIRE & BUILDING INVENTORY

8. FACTORS THAT MAY INFLUENCE INDOOR AIR QUALITY
a. Is there an attached garage? ☐ yes ☐ no
b. Does the garage have a separate heating unit ☐ yes ☐ no ☐ NA
c. Are petroleum-powered machines or vehicles stored in the garage? ☐ yes ☐ no ☐ NA
(e.g., lawnmower, atv, car) If yes, please specify
d. Has the building ever had a fire? ☐ yes ☐ no
If yes, when?
e. Is a kerosene or unvented gas space heater present? ☐ yes ☐ no
If yes, where?
f. Is there a workshop or hobby/craft area? ☐ yes ☐ no
If yes, where & type?
g. Is there smoking in the building? ☐ yes ☐ no
If yes, how frequently?
h. Have cleaning products been used recently? ☐ yes ☐ no
If yes, when & type?
i. Have cosmetic products been used recently? ☐ yes ☐ no
If yes, when & type?
j. Has painting/staining been done in the last 6 months? ☐ yes ☐ no
If yes, where & when?
k. Is there new carpet, drapes, or other textiles? ☐ yes ☐ no
If yes, where & when?
l. Have air fresheners been used recently? ☐ yes ☐ no
If yes, when & type?
m. Is there a kitchen exhaust fan? ☐ yes ☐ no
If yes, where vented?
n. Is there a bathroom exhaust fan? ☐ yes ☐ no
If yes, where vented?

Indoor Air Quality Questionnaire and Building Inventory Page 4 of 8



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INDOOR AIR QUALITY QUESTIONNAIRE
& BUILDING INVENTORY

8. FACTORS THAT MAY INFLUENCE INDOOR AIR QUALITY (continued)

o. Is there a clothes dryer? ☐ yes ☐ no
If yes, is it vented outside? yes no

p. Has there been a pesticide application ☐ yes ☐ no
If yes, when & type?

q. Are there odors in the building? ☐ yes ☐ no
If yes, please describe?

r. Do any of the building occupants use solvents at work? ☐ yes ☐ no
(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? ☐ yes ☐ no

s. Do any of the building occupants regularly use or work at a dry-cleaning service?
(check 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

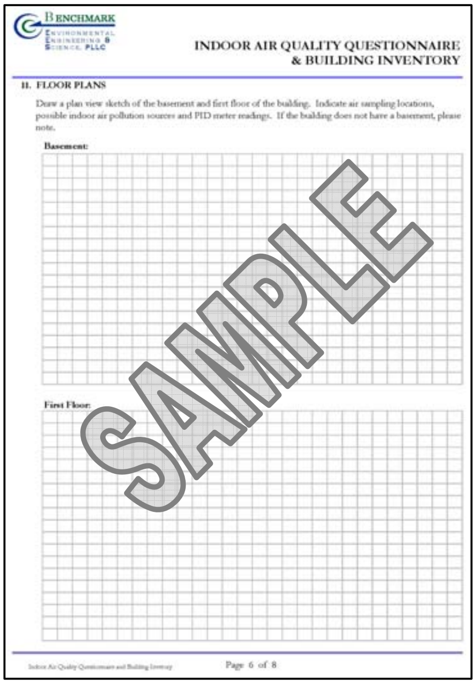
t. Is there a radon mitigation system for the building/structure? ☐ yes ☐ no
If yes, date of installation?
Is the system active or passive?

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? ☐ yes ☐ no
d. Relocation package provided and explained to residents? ☐ yes ☐ no

Indoor Air Quality Questionnaire and Building Inventory Page 5 of 8



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INDOOR AIR QUALITY QUESTIONNAIRE
& BUILDING INVENTORY

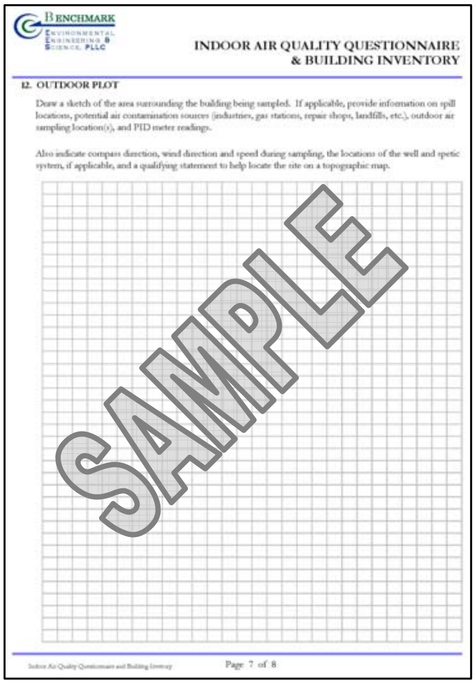
11. FLOOR PLANS

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:

Indoor Air Quality Questionnaire and Building Inventory Page 6 of 8



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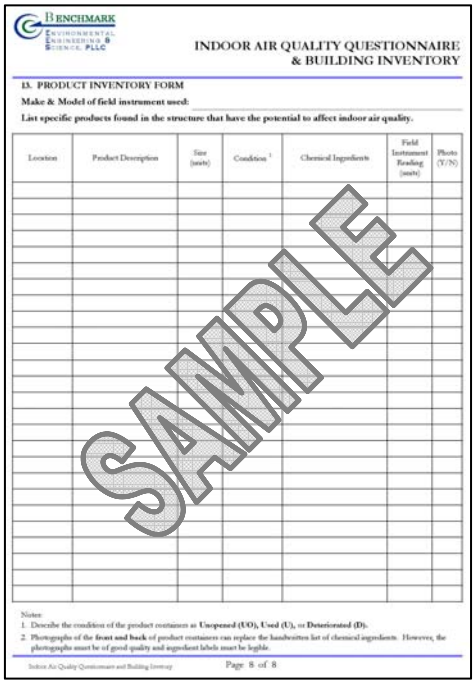
INDOOR AIR QUALITY QUESTIONNAIRE
& BUILDING INVENTORY

12. OUTDOOR PLOT

Draw a sketch of the area surrounding the building being sampled. If applicable, provide infoemation 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.

Indoor Air Quality Questionnaire and Building Inventory Page 7 of 8



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INDOOR AIR QUALITY QUESTIONNAIRE
& BUILDING INVENTORY

13. PRODUCT INVENTORY FORM

Make & Model of field instrument used:

List specific products found in the structure that have the potential to affect indoor air quality.

Location	Product Description	Size (units)	Condition [1]	Chemical Ingredients	Field Instrument Reading (units)	Photo (Y/N)

Notes:
1. Describe the condition of the product containers as **Unopened (UO), Used (U),** or **Deteriorated (D).**
2. 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.

Indoor Air Quality Questionnaire and Building Inventory Page 8 of 8

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FIELD OPERATING PROCEDURES

Calibration and Maintenance of Portable Dissolved Oxygen Meter

FOP 007.0

CALIBRATION AND MAINTENANCE OF PORTABLE DISSOLVED OXYGEN METER

PURPOSE

This guideline describes a method for calibration of a portable dissolved oxygen meter. This meter measures the concentration of dissolved oxygen within a water sample. This parameter is of interest both as a general indicator of water quality, and because of its pertinence to fate and transport of organics and inorganics. This guideline presents a method for calibration of this meter, which is performed to verify instrument accuracy and function. All field instruments will be calibrated, verified and recalibrated at frequencies required by their respective operating manuals or manufacturer's specifications, but not less than once each day that the instrument is in use. Field personnel should have access to all operating manuals for the instruments used for the field measurements. This procedure also documents critical maintenance activities for this meter.

ACCURACY

The calibrated accuracy of the dissolved oxygen meter will be within ± 1% of full-scale over the temperature range of 23° to 113° F (-5° to +45° C).

PROCEDURE

1. Calibrate the dissolved oxygen meter to ambient air based on probe temperature and true local atmospheric pressure conditions (or feet above sea level). Because procedures vary with different brands and models of meters, refer to the manufacturer's recommended calibration procedures.

2. In the event of a failure to adequately calibrate, follow the corrective action directed by the manufacturer.
3. If calibration cannot be achieved or maintained, obtain a replacement instrument (rental instruments) and/or order necessary repairs/adjustment.

4. Document the calibration results and related information in the Project Field Book and on an **Equipment Calibration Log** (see attached sample). Information will include, at a minimum:
    - Time, date, and initials of the field team member performing the calibration
    - The unique identifier for the meter, including manufacturer, model, and serial number
    - The brand and expiration dates of calibration solutions
    - The calibration readings
    - The instrument settings (if applicable)
    - The approximate response time
    - The overall adequacy of calibration including the Pass or fail designation in accordance with the accuracy specifications presented above
    - Corrective action taken (see Step 5 above) in the event of failure to adequately calibrate

MAINTENANCE

- When not in use or between measurements, the dissolved oxygen probe will be kept immersed in or moist with deionized water.

- The meter batteries will be checked prior to each meter's use and will be replaced when the meter cannot be redline adjusted.

- The meter response time and stability will be tracked to determine the need for instrument maintenance. When response time becomes greater than two minutes, probe service is indicated.

ATTACHMENTS

Equipment Calibration Log (sample)

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EQUIPMENT CALIBRATION

PROJECT INFORMATION:

Project Name: Date:

Project No.:

Client: Instrument Source: ☐ BM ☐ Rental

METER TYPE	UNITS	TIME	MAKE/MODEL	SERIAL NUMBER	CAL. BY	STANDARD	READING	SETTI
☐ pH meter	units		Myron L Company Ultra Meter 6P	606987		4.00		
						7.00		
						10.01		
☐ Turbidity meter	NTU		Hach 2100P Turbidimeter	970600014560		< 0.4		
						20		
						100		
						800		
☐ Sp. conductance meter	uS/mS		Myron L Company Ultra Meter 6P	606987		µS @ 25 °C		
☐ PID	ppm		Photovac 2020 PID	[illegible]		open air zero		MIBK re factor =
						_____ ppm Iso. Gas		
☐ Particulate meter	mg/m^3					zero air		
☐ Oxygen	%					open air		
☐ Hydrogen sulfide	ppm					open air		
☐ Carbon monoxide	ppm					open air		
☐ LEL	%					open air		
☐ Radiation Meter	uR/H					background area		
☐								

ADDITIONAL REMARKS:

PREPARED BY: **DATE:**

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FIELD OPERATING PROCEDURES

Calibration and Maintenance of Portable Field pH/Eh Meter

FOP 008.0

CALIBRATION AND MAINTENANCE OF PORTABLE FIELD pH/Eh METER

PURPOSE

This guideline describes a method for calibration of a portable pH/Eh meter. The pH/Eh meter measures the hydrogen ion concentration or acidity of a water sample (pH function), and the oxidation/reduction potential of a water sample (Eh function). Calibration is performed to verify instrument accuracy and function. All field instruments will be calibrated, verified and recalibrated at frequencies required by their respective operating manuals or manufacturer's specifications, but not less than once each day that the instrument is in use. Field personnel should have access to all operating manuals for the instruments used for the field measurements. This procedure also documents critical maintenance activities for this meter.

ACCURACY

The calibrated accuracy of the pH/Eh meter will be:

pH	± 0.2 pH unit, over the temperature range of ± 0.2 C.
Eh	± 0.2 millivolts (mV) over the range of ± 399.9 mV, otherwise ± 2 mV.

PROCEDURE

Note: Meters produced by different manufacturers may have different calibration procedures. These instructions will take precedence over the procedure provided herein. This procedure is intended to be used as a general guideline, or in the absence of available manufacturer's instructions.

1. Obtain and active the meter to be used. As stated above, initial calibrations will be performed at the beginning of each sampling day.

2. Immerse the sensing probe in a container of certified pH 7.0 buffer solution traceable to the National Bureau of Standards.

3. Measure the temperature of the buffer solution, and adjust the temperature setting accordingly.

4. Compare the meter reading to the known value of the buffer solution while stirring. If the reading obtained by the meter does not agree with the known value of the buffer solution, recalibrate the meter according to the manufacturer's instructions until the desired reading is obtained. This typically involves accessing and turning a dial or adjustment screw while measuring the pH of the buffer solution. The meter is adjusted until the output agrees with the known solution pH.

5. Repeat Steps 2 through 5 with a pH 4.0 and 10.0 buffer solution to provide a three-point calibration. Standards used to calibrate the pH meter will be of concentrations that bracket the expected values of the samples to be analyzed, especially for two-point calibrations (see note below).

Note: Some pH meters only allow two-point calibrations. Two-point calibrations should be within the suspected range of the groundwater to be analyzed. For example, if the groundwater pH is expected to be approximately 8, the two-point calibration should bracket that value. Buffer solutions of 7 and 10 should then be used for the two-point calibration.

6. Document the calibration results and related information in the Project Field Book and on an **Equipment Calibration Log** (see attached sample). Information will include, at a minimum:

    - Time, date, and initials of the field team member performing the calibration
    - The unique identifier for the meter, including manufacturer, model, and serial number
    - The brand and expiration dates of buffer solutions
    - The instrument readings
    - The instrument settings (if applicable)

- Pass or fail designation in accordance with the accuracy specifications presented above
- Corrective action taken (see Maintenance below) in the event of failure to adequately calibrate

MAINTENANCE

- When not in use, or between measurements, keep the pH/Eh probe immersed in or moist with buffer solutions.

- Check the meter batteries at the end of each day and recharge or replace as needed.

- Replace the pH/Eh probe any time that the meter response time becomes greater than two minutes or the meeting system consistently fails to retain its calibrated accuracy for a minimum of ten sample measurements.

- If a replacement of the pH/Eh probe fails to resolve instrument response time and stability problems, obtain a replacement instrument (rental instruments) and/or order necessary repairs/adjustment.

ATTACHMENTS

Equipment Calibration Log (sample)

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EQUIPMENT CALIBRATION

PROJECT INFORMATION:

Project Name: Date:
Project No.:
Client: Instrument Source: ☐ BM ☐ Rental

METER TYPE	UNITS	TIME	MAKE/MODEL	SERIAL NUMBER	CAL. BY	STANDARD	READING	SETTI
☐ pH meter	units		Myron L Company Ultra Meter 6P	606987		4.00		
						7.00		
						10.01		
☐ Turbidity meter	NTU		Hach 2100P Turbidimeter	970600014560		< 0.4		
						20		
						100		
						800		
☐ Sp. conductance meter	uS/mS		Myron L Company Ultra Meter 6P	606987		[illegible] μS @ 25 °C		
☐ PID	ppm		Photovac 2020 PID	[illegible]		open air zero		MIBK re factor
						_____ ppm Iso. Gas		
☐ Particulate meter	mg/m^3					zero air		
☐ Oxygen	%					open air		
☐ Hydrogen sulfide	ppm					open air		
☐ Carbon monoxide	ppm					open air		
☐ LEL	%					open air		
☐ Radiation Meter	uR/[illegible]					background area		
☐								

ADDITIONAL REMARKS:

PREPARED BY: **DATE:**

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FIELD OPERATING PROCEDURES

Calibration and Maintenance of Portable Field Turbidity Meter

FOP 009.0

CALIBRATION AND MAINTENANCE OF PORTABLE FIELD TURBIDITY METER

PURPOSE

This guideline describes the method for calibration of the HACH 2100P portable field turbidity meter. Turbidity is one water quality parameter measured during purging and development of wells. Turbidity is measured as a function of the samples ability to transmit light, expressed as Nephelometric Turbidity Units (NTUs). The turbidity meter is factory calibrated and must be checked daily prior to using the meter in the field. Calibration is performed to verify instrument accuracy and function. This procedure also documents critical maintenance activities for this meter.

ACCURACY

Accuracy shall be ± 2% of reading below 499 NTU or ± 3% of reading above 500 NTU with resolution to 0.01 NTU in the lowest range. The range key provides for automatic or manual range selection for ranges of 0.00 to 9.99, 0.0 to 99.9 and 0 to 1000 NTU. Another key provides for selecting automatic signal averaging. Pressing the key shall toggle signal averaging on or off.

PROCEDURE

Calibration of the 2100P Turbidimeter is based on formazin, the primary standard for turbidity. The instrument's electronic and optical design provides long-term stability and minimizes the need for frequent calibration. The two-detector ratioing system compensates for most fluctuations in lamp output. **A formazin recalibration should be performed at least once every three months,** more often if experience indicates the need. During calibration, use a primary standard such as StablCal™ Stabilized Standards or formazin standards.

Note: Meters produced by different manufacturers may have different calibration check procedures. These manufacturers' instructions will take precedence over the procedure provided here. This procedure is intended to be used as a general guideline, or in the absence of available manufacturer's instructions.

Note: Because the turbidity meter measures light transmission, it is critical that the meter and standards be cared for as precision optical instruments. Scratches, dirt, dust, etc. can all temporarily or permanently affect the accuracy of meter readings.

Preparing StablCal Stabilized Standards in Sealed Vials

Sealed vials that have been sitting undisturbed for longer than a month must be shaken to break the condensed suspension into its original particle size. Start at *step 1* for these standards. If the standards are used on at least a weekly interval, start at *step 3*.

Note: These instructions do not apply to < 0.1 NTU StablCal Standards; < 0.1 NTU StablCal Standards should not be shaken or inverted.

1. Shake the standard vigorously for 2-3 minutes to re-suspend any particles.
2. Allow the standard to stand undisturbed for 5 minutes.
3. Gently invert the vial of StablCal 5 to 7 times.
4. Prepare the vial for measurement using traditional preparation techniques. This usually consists of oiling the vial (see *Section 2.3.2 on page 11 of the manual*)

and marking the vial to maintain the same orientation in the sample cell compartment (see *Section 2.3.3 on page 12 of the manual*). This step will eliminate any optical variations in the sample vial.

5. Let the vial stand for one minute. The standard is now ready for use in the calibration procedure.

Calibration Procedure

1. Turn the meter on.
2. Shake pre-mixed formazin primary standards in accordance with the above procedure.
3. Wipe the outside of the < 0.1 NTU standard and insert the sample cell in the cell compartment by aligning the orientation mark on the cell with the mark on the front of the cell compartment.
4. Close the lid and press **I/O**.
5. Press the **CAL** button. The **CAL** and **S0** icons will be displayed and the 0 will flash. The four-digit display will show the value of the **S0** standard for the previous calibration. If the blank value was forced to 0.0, the display will be blank. Press the right arrow key (→) to get a numerical display.
6. Press **READ**. The instrument will count from 60 to 0, read the blank and use it to calculate a correction factor for the 20 NTU standard measurement. If the dilution water is ≥ 0.5 NTU, E 1 will appear when the calibration is calculated (*see Section 3.6.2.3 on page 31 of the manual*). The display will automatically increment to the next standard. Remove the sample cell from the cell compartment

Note: The turbidity of the dilution water can be "forced" to zero by pressing → rather than reading the dilution water. The display will show "S0 NTU" and the ↑ key must be pressed to continue with the next standard.

7. Repeat steps 1 through 7 for the 20, 100 and 800 standards.

8. Following the 800 NTU standard calibration, the display will increment back to the **S0** display. Remove the sample cell from the cell compartment.

9. Press **CAL** to accept the calibration. The instrument will return to measurement mode automatically.

10. Document the calibration results and related information in the Project Field Book and on an **Equipment Calibration Log** (see attached sample). Information will include, at a minimum:
    - Time, date, and initials of the field team member performing the calibration
    - The unique identifier for the meter, including manufacturer, model, and serial number
    - The brand of calibration standards
    - The instrument readings
    - The instrument settings (if applicable)
    - Pass or fail designation in accordance with the accuracy specifications presented above
    - Corrective action taken (see Maintenance below) in the event of failure to adequately calibrate.

Note: Pressing CAL completes the calculation of the calibration coefficients. If calibration errors occurred during calibration, error messages will appear after CAL is pressed. If E 1 or E 2 appear, check the standard preparation and review the calibration; repeat the calibration if necessary. If "CAL?" appears, an error may have

occurred during calibration. If "CAL?" is flashing, the instrument is using the default calibration.

NOTES

- If the **I/O** key is pressed during calibration, the new calibration data is lost and the old calibration will be used for measurements. Once in calibration mode, only the **READ, I/O,** ↑ , and →keys function. Signal averaging and range mode must be selected before entering the calibration mode.

- If **E 1** or **E 2** are displayed, an error occurred during calibration. Check the standard preparation and review the calibration; repeat the calibration if necessary. Press **DIAG** to cancel the error message (**E 1** or **E 2)**. To continue without repeating the calibration, press **I/O** twice to restore the previous calibration. If "**CAL?"** is displayed, an error may have occurred during calibration. The previous calibration may not be restored. Either recalibrate or use the calibration as is.

- To review a calibration, press **CAL** and then ↑ to view the calibration standard values. As long as **READ** is never pressed and **CAL** is not flashing, the calibration will not be updated. Press **CAL** again to return to the measurement mode.

MAINTENANCE

- **Cleaning**: Keep the turbidimeter and accessories as clean as possible and store the instrument in the carrying case when not in use. Avoid prolonged exposure to sunlight and ultraviolet light. Wipe spills up promptly. Wash sample cells with non-abrasive laboratory detergent, rinse with distilled or demineralized water, and air dry. Avoid scratching the cells and wipe all moisture and fingerprints off the cells before inserting them into the instrument. Failure to do so can give inaccurate readings. See *Section 2.3.1 on page 11of the manual* for more information about sample cell care.

- **Battery Replacement**: AA alkaline cells typically last for about 300 tests with the signal-averaging mode off, about 180 tests if signal averaging is used. The "battery" icon flashes when battery replacement is needed. Refer to *Section 1.4.2 on page 5 of the manual* for battery installation instructions. If the batteries are changed within 30 seconds, the instrument retains the latest range and signal average selections. If it takes more than 30 seconds, the instrument uses the default settings. If, after changing batteries, the instrument will not turn off or on and the batteries are good, remove the batteries and reinstall them. If the instrument still won't function, contact Hach Service or the nearest authorized dealer.

- **Lamp Replacement**: The procedure in *Section 4.0 on page 49 of the manual* explains lamp installation and electrical connections. Use a small screwdriver to remove and install the lamp leads in the terminal block. The instrument requires calibration after lamp replacement.

ATTACHMENTS

Equipment Calibration Log (sample)

BENCHMARK
ENVIRONMENTAL
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EQUIPMENT CALIBRATION

PROJECT INFORMATION:

Project Name: Date:

Project No.:

Client: Instrument Source: ☐ BM ☐ Rental

METER TYPE	UNITS	TIME	MAKE/MODEL	SERIAL NUMBER	CAL. BY	STANDARD	READING	SETTI
☐ pH meter	units		Myron L Company Ultra Meter 6P	606987		4.00		
						7.00		
						10.01		
☐ Turbidity meter	NTU		Hach 2100P Turbidimeter	970600014560		< 0.4		
						20		
						100		
						800		
☐ Sp. conductance meter	uS/mS		Myron L Company Ultra Meter 6P	606987		µS @ 25 °C		
☐ PID	ppm		Photovac 2020 PID	[illegible]		open air zero		MIBK re factor =
						_____ ppm Iso. Gas		
☐ Particulate meter	mg/m^3					zero air		
☐ Oxygen	%					open air		
☐ Hydrogen sulfide	ppm					open air		
☐ Carbon monoxide	ppm					open air		
☐ LEL	%					open air		
☐ Radiation Meter	uR/					background area		
☐								

ADDITIONAL REMARKS:

PREPARED BY: **DATE:**

BENCHMARK
ENVIRONMENTAL
ENGINEERING &
SCIENCE, PLLC

FIELD OPERATING PROCEDURES

Calibration and Maintenance of Portable Photoionization Detector (PID)

FOP 011.0

CALIBRATION AND MAINTENANCE OF PORTABLE PHOTOIONIZATION DETECTOR

PURPOSE

This procedure describes a general method for the calibration and maintenance of a portable photoionization detector (PID). The PID detects and initially quantifies a reading of the volatile organic compound (VOC) concentration in air. The PID is used as a field-screening tool for initial evaluation of soil samples and for ambient air monitoring of compounds with ionization potentials (IP) less than the PID lamp electron voltage (eV) rating. The IP is the amount of energy required to move an electron to an infinite distance from the nucleus thus creating a positive ion plus an electron. It should be noted that all of the major components of air (i.e., carbon dioxide, methane, nitrogen, oxygen etc.) have IP's above 12 eV. As a result, they will not be ionized by the 9.5, 10.2, 10.6 or 11.7 eV lamps typically utilized in field PIDs. The response of the PID will then be the sum of the organic and inorganic compounds in air that are ionized by the appropriate lamp (i.e., 9.5, 10.2, 10.6 or 11.7 eV). Attached to this FOP is a table summarizing common organic compounds and their respective IPs.

Calibration is performed to verify instrument accuracy and function. All field instruments will be calibrated, verified and recalibrated at frequencies required by their respective operating manuals or manufacturer's specifications, but not less than once each day that the instrument is in use. Field personnel should have access to all operating manuals for the instruments used for the field measurements. This procedure also documents critical maintenance activities for this meter.

Note: The information included below is equipment manufacturer- and model-specific, however, accuracy, calibration, and maintenance procedures for this type of portable equipment are typically similar. The information below pertains to the Photovac 2020 photoionization detector equipped with a 10.6 eV lamp. The actual equipment to be used in the field will be equivalent or similar. The previously mentioned attached table indicates the compounds that cannot be detected by a standard 10.6 eV lamp.

Note: The PID indicates total VOC concentration readings that are normalized to an isobutylene standard, so actual quantification of individual compounds is not provided. In addition, the PID response to compounds is highly variable, dependent on ionization potential of the compound, and the presence or absence of other compounds.

ACCURACY

The Photovac 2020 is temperature compensated so that a 20 ºC change in temperature corresponds to a change in reading of less than two percent full-scale at maximum sensitivity. The useful range of the instrument is from 0.5 – 2000 ppm isobutylene with an accuracy of ± 10% or ± 2 ppm. Response time is less than three seconds to 90 percent of full-scale. The operating temperature range is 0 to 40º C and the operating humidity range is 0 to 100 % relative humidity (non-condensing).

PROCEDURE

1. Calibrate all field test equipment at the beginning of each sampling day. Check and recalibrate the PID according to the manufacture's specifications.
2. Calibrate the PID meter using a compressed gas cylinder containing a 100-ppm isobutylene standard, a flow regulator, and a tubing assembly. In

addition, a compressed gas cylinder containing zero air ("clean" air) may be required if ambient air conditions do not permit calibration to "clean air".

3. Fill two Tedlar bags equipped with a one-way valve with zero-air (if applicable) and 100-ppm isobutylene gas.

4. Assemble the calibration equipment and actuate the PID in its calibration mode. Connect the PID probe to the zero air calibration bag (or calibrate to ambient air if conditions permit) and wait for a stable indication.

5. Change the response factor of the PID to the Methyl Isobutyl Ketone (MIBK) setting, which is a response factor of 1.0 for the Photovac 2020.

6. Connect the PID probe to the 100-ppm isobutylene standard calibration bag. Measure an initial reading of the isobutylene standard and wait for a stable indication.

7. Keep the PID probe connected to the 100-ppm isobutylene standard calibration bag, calibrate to 100-ppm with the isobutylene standard and wait for a stable indication.

8. Document the calibration results and related information in the Project Field Book and on an **Equipment Calibration Log** (see attached sample), indicating the meter readings before and after the instrument has been adjusted. This is important, not only for data validation, but also to establish maintenance schedules and component replacement. Information will include, at a minimum:
    - Time, date and initials of the field team member performing the calibration
    - The unique identifier for the meter, including manufacturer, model, and serial number
    - The brand and expiration date of the isobutylene gas
    - The instrument readings: before and after calibration
    - The instrument settings (if applicable)

- Pass or fail designation in accordance with the accuracy specifications presented above
- Corrective action taken (see Maintenance below) in the event of failure to adequately calibrate.

MAINTENANCE

- The probe and dust filter of the PID should be checked before and after every use for cleanliness. Should instrument response become unstable, recalibration should be performed. If this does not resolve the problem, access the photoionization bulb and clean with the manufacturer-supplied abrasive compound, then recalibrate.

- The PID battery must be recharged after each use. Store the PID in its carrying case when not in use. Additional maintenance details related to individual components of the PID are provided in the equipment manufacturer's instruction manual. If calibration or instrument performance is not in accordance with specifications, send the instrument to the equipment manufacturer for repair.

- Maintain a log for each monitoring instrument. Record all maintenance performed on the instrument on this log with date and name of the organization performing the maintenance.

ATTACHMENTS

Table 1; Summary of Ionization Potentials
Equipment Calibration Log (sample)

TABLE 1

SUMMARY OF IONIZATION POTENTIALS

Chemical Name	Ionization Potential (eV)	Cannot be Read by 10.6 eV PID
A		
2-Amino pyridine	8	
Acetaldehyde	10.21	
Acetamide	9.77	
Acetic acid	10.69	X
Acetic anhydride	10	
Acetone	9.69	
Acetonitrile	12.2	X
Acetophenone	9.27	
Acetyl bromide	10.55	
Acetyl chloride	11.02	X
Acetylene	11.41	X
Acrolein	10.1	
Acrylamide	9.5	
Acrylonitrile	10.91	X
Allyl alcohol	9.67	
Allyl chloride	9.9	
Ammonia	10.2	
Aniline	7.7	
Anisidine	7.44	
Anisole	8.22	
Arsine	9.89	
B		
1,3-Butadiene (butadiene)	9.07	
1-Bromo-2-chloroethane	10.63	X
1-Bromo-2-methylpropane	10.09	
1-Bromo-4-fluorobenzene	8.99	
1-Bromobutane	10.13	
1-Bromopentane	10.1	
1-Bromopropane	10.18	
1-Bromopropene	9.3	
1-Butanethiol	9.14	
1-Butene	9.58	
1-Butyne	10.18	
2,3-Butadione	9.23	
2-Bromo-2-methylpropane	9.89	
2-Bromobutane	9.98	
2-Bromopropane	10.08	

TABLE 1

SUMMARY OF IONIZATION POTENTIALS

Chemical Name	Ionization Potential (eV)	Cannot be Read by 10.6 eV PID
2-Bromothiophene	8.63	
2-Butanone (MEK)	9.54	
3-Bromopropene	9.7	
3-Butene nitrile	10.39	
Benzaldehyde	9.53	
Benzene	9.25	
Benzenethiol	8.33	
Benzonitrile	9.71	
Benzotrifluoride	9.68	
Biphenyl	8.27	
Boron oxide	13.5	X
Boron trifluoride	15.56	X
Bromine	10.54	
Bromobenzene	8.98	
Bromochloromethane	10.77	X
Bromoform	10.48	
Butane	10.63	X
Butyl mercaptan	9.15	
cis-2-Butene	9.13	
m-Bromotoluene	8.81	
n-Butyl acetate	10.01	
n-Butyl alcohol	10.04	
n-Butyl amine	8.71	
n-Butyl benzene	8.69	
n-Butyl formate	10.5	
n-Butyraldehyde	9.86	
n-Butyric acid	10.16	
n-Butyronitrile	11.67	X
o-Bromotoluene	8.79	
p-Bromotoluene	8.67	
p-tert-Butyltoluene	8.28	
s-Butyl amine	8.7	
s-Butyl benzene	8.68	
sec-Butyl acetate	9.91	
t-Butyl amine	8.64	
t-Butyl benzene	8.68	
trans-2-Butene	9.13	
C		

TABLE 1

SUMMARY OF IONIZATION POTENTIALS

Chemical Name	Ionization Potential (eV)	Cannot be Read by 10.6 eV PID
1-Chloro-2-methylpropane	10.66	X
1-Chloro-3-fluorobenzene	9.21	
1-Chlorobutane	10.67	X
1-Chloropropane	10.82	X
2-Chloro-2-methylpropane	10.61	X
2-Chlorobutane	10.65	X
2-Chloropropane	10.78	X
2-Chlorothiophene	8.68	
3-Chloropropene	10.04	
Camphor	8.76	
Carbon dioxide	13.79	X
Carbon disulfide	10.07	
Carbon monoxide	14.01	X
Carbon tetrachloride	11.47	X
Chlorine	11.48	X
Chlorine dioxide	10.36	
Chlorine trifluoride	12.65	X
Chloroacetaldehyde	10.61	X
α -Chloroacetophenone	9.44	
Chlorobenzene	9.07	
Chlorobromomethane	10.77	X
Chlorofluoromethane (Freon 22)	12.45	X
Chloroform	11.37	X
Chlorotrifluoromethane (Freon 13)	12.91	X
Chrysene	7.59	
Cresol	8.14	
Crotonaldehyde	9.73	
Cumene (isopropyl benzene)	8.75	
Cyanogen	13.8	X
Cyclohexane	9.8	
Cyclohexanol	9.75	
Cyclohexanone	9.14	
Cyclohexene	8.95	
Cyclo-octatetraene	7.99	
Cyclopentadiene	8.56	
Cyclopentane	10.53	
Cyclopentanone	9.26	
Cyclopentene	9.01	

TABLE 1

SUMMARY OF IONIZATION POTENTIALS

Chemical Name	Ionization Potential (eV)	Cannot be Read by 10.6 eV PID
Cyclopropane	10.06	
m-Chlorotoluene	8.83	
o-Chlorotoluene	8.83	
p-Chlorotoluene	8.7	
D		
1,1-Dibromoethane	10.19	
1,1-Dichloroethane	11.12	X
1,1-Dimethoxyethane	9.65	
1,1-Dimethylhydrazine	7.28	
1,2-Dibromoethene	9.45	
1,2-Dichloro-1,1,2,2-tetrafluoroethane (Freon 114)	12.2	X
1,2-Dichloroethane	11.12	X
1,2-Dichloropropane	10.87	X
1,3-Dibromopropane	10.07	
1,3-Dichloropropane	10.85	X
2,2-Dimethyl butane	10.06	
2,2-Dimethyl propane	10.35	
2,3-Dichloropropene	9.82	
2,3-Dimethyl butane	10.02	
3,3-Dimethyl butanone	9.17	
cis-Dichloroethene	9.65	
Decaborane	9.88	
Diazomethane	9	
Diborane	12	X
Dibromochloromethane	10.59	
Dibromodifluoromethane	11.07	X
Dibromomethane	10.49	
Dibutylamine	7.69	
Dichlorodifluoromethane (Freon 12)	12.31	X
Dichlorofluoromethane	12.39	X
Dichloromethane	11.35	X
Diethoxymethane	9.7	
Diethyl amine	8.01	
Diethyl ether	9.53	
Diethyl ketone	9.32	
Diethyl sulfide	8.43	
Diethyl sulfite	9.68	
Difluorodibromomethane	11.07	X

TABLE 1

SUMMARY OF IONIZATION POTENTIALS

Chemical Name	Ionization Potential (eV)	Cannot be Read by 10.6 eV PID
Dihydropyran	8.34	
Diiodomethane	9.34	
Diisopropylamine	7.73	
Dimethoxymethane (methylal)	10	
Dimethyl amine	8.24	
Dimethyl ether	10	
Dimethyl sulfide	8.69	
Dimethylaniline	7.13	
Dimethylformamide	9.18	
Dimethylphthalate	9.64	
Dinitrobenzene	10.71	X
Dioxane	9.19	
Diphenyl	7.95	
Dipropyl amine	7.84	
Dipropyl sulfide	8.3	
Durene	8.03	
m-Dichlorobenzene	9.12	
N,N-Diethyl acetamide	8.6	
N,N-Diethyl formamide	8.89	
N,N-Dimethyl acetamide	8.81	
N,N-Dimethyl formamide	9.12	
o-Dichlorobenzene	9.06	
p-Dichlorobenzene	8.95	
p-Dioxane	9.13	
trans-Dichloroethene	9.66	
E		
Epichlorohydrin	10.2	
Ethane	11.65	X
Ethanethiol (ethyl mercaptan)	9.29	
Ethanolamine	8.96	
Ethene	10.52	
Ethyl acetate	10.11	
Ethyl alcohol	10.48	
Ethyl amine	8.86	
Ethyl benzene	8.76	
Ethyl bromide	10.29	
Ethyl chloride (chloroethane)	10.98	X
Ethyl disulfide	8.27	

TABLE 1

SUMMARY OF IONIZATION POTENTIALS

Chemical Name	Ionization Potential (eV)	Cannot be Read by 10.6 eV PID
Ethyl ether	9.51	
Ethyl formate	10.61	X
Ethyl iodide	9.33	
Ethyl isothiocyanate	9.14	
Ethyl mercaptan	9.29	
Ethyl methyl sulfide	8.55	
Ethyl nitrate	11.22	X
Ethyl propionate	10	
Ethyl thiocyanate	9.89	
Ethylene chlorohydrin	10.52	
Ethylene diamine	8.6	
Ethylene dibromide	10.37	
Ethylene dichloride	11.05	X
Ethylene oxide	10.57	
Ethylenelmine	9.2	
Ethynylbenzene	8.82	
F		
2-Furaldehyde	9.21	
Fluorine	15.7	X
Fluorobenzene	9.2	
Formaldehyde	10.87	X
Formamide	10.25	
Formic acid	11.05	X
Freon 11 (trichlorofluoromethane)	11.77	X
Freon 112 (1,1,2,2-tetrachloro-1,2-difluoroethane)	11.3	X
Freon 113 (1,1,2-trichloro-1,2,2-trifluororethane)	11.78	X
Freon 114 (1,2-dichloro-1,1,2,2-tetrafluoroethane)	12.2	X
Freon 12 (dichlorodifluoromethane)	12.31	X
Freon 13 (chlorotrifluoromethane)	12.91	X
Freon 22 (chlorofluoromethane)	12.45	X
Furan	8.89	
Furfural	9.21	
m-Fluorotoluene	8.92	
o-Fluorophenol	8.66	
o-Fluorotoluene	8.92	
p-Fluorotoluene	8.79	
H		
1-Hexene	9.46	

TABLE 1

SUMMARY OF IONIZATION POTENTIALS

Chemical Name	Ionization Potential (eV)	Cannot be Read by 10.6 eV PID
2-Heptanone	9.33	
2-Hexanone	9.35	
Heptane	10.08	
Hexachloroethane	11.1	X
Hexane	10.18	
Hydrazine	8.1	
Hydrogen	15.43	X
Hydrogen bromide	11.62	X
Hydrogen chloride	12.74	X
Hydrogen cyanide	13.91	X
Hydrogen fluoride	15.77	X
Hydrogen iodide	10.38	
Hydrogen selenide	9.88	
Hydrogen sulfide	10.46	
Hydrogen telluride	9.14	
Hydroquinone	7.95	
I		
1-Iodo-2-methylpropane	9.18	
1-Iodobutane	9.21	
1-Iodopentane	9.19	
1-Iodopropane	9.26	
2-Iodobutane	9.09	
2-Iodopropane	9.17	
Iodine	9.28	
Iodobenzene	8.73	
Isobutane	10.57	
Isobutyl acetate	9.97	
Isobutyl alcohol	10.12	
Isobutyl amine	8.7	
Isobutyl formate	10.46	
Isobutyraldehyde	9.74	
Isobutyric acid	10.02	
Isopentane	10.32	
Isophorone	9.07	
Isoprene	8.85	
Isopropyl acetate	9.99	
Isopropyl alcohol	10.16	
Isopropyl amine	8.72	

TABLE 1

SUMMARY OF IONIZATION POTENTIALS

Chemical Name	Ionization Potential (eV)	Cannot be Read by 10.6 eV PID
Isopropyl benzene	8.69	
Isopropyl ether	9.2	
Isovaleraldehyde	9.71	
m-Iodotoluene	8.61	
o-Iodotoluene	8.62	
p-Iodotoluene	8.5	
K		
Ketene	9.61	
L		
2,3-Lutidine	8.85	
2,4-Lutidine	8.85	
2,6-Lutidine	8.85	
M		
2-Methyl furan	8.39	
2-Methyl napthalene	7.96	
1-Methyl napthalene	7.96	
2-Methyl propene	9.23	
2-Methyl-1-butene	9.12	
2-Methylpentane	10.12	
3-Methyl-1-butene	9.51	
3-Methyl-2-butene	8.67	
3-Methylpentane	10.08	
4-Methylcyclohexene	8.91	
Maleic anhydride	10.8	X
Mesityl oxide	9.08	
Mesitylene	8.4	
Methane	12.98	X
Methanethiol (methyl mercaptan)	9.44	
Methyl acetate	10.27	
Methyl acetylene	10.37	
Methyl acrylate	9.9	
Methyl alcohol	10.85	X
Methyl amine	8.97	
Methyl bromide	10.54	
Methyl butyl ketone	9.34	
Methyl butyrate	10.07	
Methyl cellosolve	9.6	
Methyl chloride	11.28	X

TABLE 1

SUMMARY OF IONIZATION POTENTIALS

Chemical Name	Ionization Potential (eV)	Cannot be Read by 10.6 eV PID
Methyl chloroform (1,1,1-trichloroethane)	11	X
Methyl disulfide	8.46	
Methyl ethyl ketone	9.53	
Methyl formate	10.82	X
Methyl iodide	9.54	
Methyl isobutyl ketone	9.3	
Methyl isobutyrate	9.98	
Methyl isocyanate	10.67	X
Methyl isopropyl ketone	9.32	
Methyl isothiocyanate	9.25	
Methyl mercaptan	9.44	
Methyl methacrylate	9.7	
Methyl propionate	10.15	
Methyl propyl ketone	9.39	
α -Methyl styrene	8.35	
Methyl thiocyanate	10.07	
Methylal (dimethoxymethane)	10	
Methylcyclohexane	9.85	
Methylene chloride	11.32	X
Methyl-n-amyl ketone	9.3	
Monomethyl aniline	7.32	
Monomethyl hydrazine	7.67	
Morpholine	8.2	
n-Methyl acetamide	8.9	
N		
1-Nitropropane	10.88	X
2-Nitropropane	10.71	X
Naphthalene	8.12	
Nickel carbonyl	8.27	
Nitric oxide, (NO)	9.25	
Nitrobenzene	9.92	
Nitroethane	10.88	X
Nitrogen	15.58	X
Nitrogen dioxide	9.78	
Nitrogen trifluoride	12.97	X
Nitromethane	11.08	X
Nitrotoluene	9.45	
p-Nitrochloro benzene	9.96	

TABLE 1

SUMMARY OF IONIZATION POTENTIALS

Chemical Name	Ionization Potential (eV)	Cannot be Read by 10.6 eV PID
O		
Octane	9.82	
Oxygen	12.08	X
Ozone	12.08	X
P		
1-Pentene	9.5	
1-Propanethiol	9.2	
2,4-Pentanedione	8.87	
2-Pentanone	9.38	
2-Picoline	9.02	
3-Picoline	9.02	
4-Picoline	9.04	
n-Propyl nitrate	11.07	X
Pentaborane	10.4	
Pentane	10.35	
Perchloroethylene	9.32	
Pheneloic	8.18	
Phenol	8.5	
Phenyl ether (diphenyl oxide)	8.82	
Phenyl hydrazine	7.64	
Phenyl isocyanate	8.77	
Phenyl isothiocyanate	8.52	
Phenylene diamine	6.89	
Phosgene	11.77	X
Phosphine	9.87	
Phosphorus trichloride	9.91	
Phthalic anhydride	10	
Propane	11.07	X
Propargyl alcohol	10.51	
Propiolactone	9.7	
Propionaldehyde	9.98	
Propionic acid	10.24	
Propionitrile	11.84	X
Propyl acetate	10.04	
Propyl alcohol	10.2	
Propyl amine	8.78	
Propyl benzene	8.72	
Propyl ether	9.27	

TABLE 1

SUMMARY OF IONIZATION POTENTIALS

Chemical Name	Ionization Potential (eV)	Cannot be Read by 10.6 eV PID
Propyl formate	10.54	
Propylene	9.73	
Propylene dichloride	10.87	X
Propylene imine	9	
Propylene oxide	10.22	
Propyne	10.36	
Pyridine	9.32	
Pyrrole	8.2	
Q		
Quinone	10.04	
S		
Stibine	9.51	
Styrene	8.47	
Sulfur dioxide	12.3	X
Sulfur hexafluoride	15.33	X
Sulfur monochloride	9.66	
Sulfuryl fluoride	13	X
T		
o-Terphenyls	7.78	
1,1,2,2-Tetrachloro-1,2-difluoroethane (Freon 112)	11.3	X
1,1,1-Trichloroethane	11	X
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	11.78	X
2,2,4-Trimethyl pentane	9.86	
o-Toluidine	7.44	
Tetrachloroethane	11.62	X
Tetrachloroethene	9.32	
Tetrachloromethane	11.47	X
Tetrahydrofuran	9.54	
Tetrahydropyran	9.25	
Thiolacetic acid	10	
Thiophene	8.86	
Toluene	8.82	
Tribromoethene	9.27	
Tribromofluoromethane	10.67	X
Tribromomethane	10.51	
Trichloroethene	9.45	
Trichloroethylene	9.47	
Trichlorofluoromethane (Freon 11)	11.77	X

TABLE 1

SUMMARY OF IONIZATION POTENTIALS

Chemical Name	Ionization Potential (eV)	Cannot be Read by 10.6 eV PID
Trichloromethane	11.42	X
Triethylamine	7.5	
Trifluoromonobromo-methane	11.4	X
Trimethyl amine	7.82	
Tripropyl amine	7.23	
V		
o-Vinyl toluene	8.2	
Valeraldehyde	9.82	
Valeric acid	10.12	
Vinyl acetate	9.19	
Vinyl bromide	9.8	
Vinyl chloride	10	
Vinyl methyl ether	8.93	
W		
Water	12.59	X
X		
2,4-Xylidine	7.65	
m-Xylene	8.56	
o-Xylene	8.56	
p-Xylene	8.45	

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EQUIPMENT CALIBRATION

PROJECT INFORMATION:

Project Name:

Date:

Project No.:

Client:

Instrument Source: ☐ BM ☐ Rental

METER TYPE	UNITS	TIME	MAKE/MODEL	SERIAL NUMBER	CAL. BY	STANDARD	READING	SETTI
☐ pH meter	units		Myron L Company Ultra Meter 6P	606987		4.00		
						7.00		
						10.01		
☐ Turbidity meter	NTU		Hach 2100P Turbidimeter	970600014560		< 0.4		
						20		
						100		
						800		
☐ Sp. conductance meter	uS/mS		Myron L Company Ultra Meter 6P	606987		μS @ 25 °C		
☐ PID	ppm		Photovac 2020 PID	[illegible]		open air zero		MIBK re factor =
						_____ ppm Iso. Gas		
☐ Particulate meter	mg/m^3					zero air		
☐ Oxygen	%					open air		
☐ Hydrogen sulfide	ppm					open air		
☐ Carbon monoxide	ppm					open air		
☐ LEL	%					open air		
☐ Radiation Meter	uR/[illegible]					background area		
☐								

ADDITIONAL REMARKS:

PREPARED BY: **DATE:**

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FIELD OPERATING PROCEDURES

Calibration and Maintenance of Portable Specific Conductance Meter

FOP 012.0

CALIBRATION AND MAINTENANCE OF PORTABLE SPECIFIC CONDUCTANCE METER

PURPOSE

This guideline describes a method for calibration of a portable specific conductance meter. This meter measures the ability of a water sample to conduct electricity, which is largely a function of the dissolved solids within the water. The instrument has been calibrated by the manufacturer according to factory specifications. This guideline presents a method for checking the factory calibration of a portable specific conductance meter. A calibration check is performed to verify instrument accuracy and function. All field test equipment will be checked at the beginning of each sampling day. This procedure also documents critical maintenance activities for this meter.

ACCURACY

The calibrated accuracy of the specific conductance meter will be within ± 1 percent of full-scale, with repeatability of ± 1 percent. The built-in cell will be automatically temperature compensated from at least 32° to 160° F (0° to 71°C).

PROCEDURE

Note: The information included below is equipment manufacturer- and model-specific, however, accuracy, calibration, and maintenance procedures for this type of portable equipment are typically similar. The information below pertains to the Myron L Company Ultrameter Model 6P. The actual equipment to be used in the field will be equivalent or similar.

1. Calibrate all field test equipment at the beginning of each sampling day. Check and recalibrate the specific conductance meter according to the manufacture's specifications.

2. Use a calibration solution of known specific conductivity and salinity. For maximum accuracy, use a Standard Solution Value closest to the samples to be tested.

3. Rinse conductivity cell three times with proper standard.

4. Re-fill conductivity cell with same standard.

5. Press **COND** or **TDS**, then press **CAL/MCLR**. The "CAL" icon will appear on the display.

6. Press the **↑/MS** or **MR/↓** key to step the displayed value toward the standard's value or hold a key down to cause rapid scrolling of the reading.

7. Press CAL/MCLR once to confirm new value and end the calibration sequence for this particular solution type.

8. Repeat steps 1 through 7 with additional new solutions, as necessary.

9. Document the calibration results and related information in the Project Field Book and on an **Equipment Calibration Log** (see attached sample), indicating the meter readings before and after the instrument has been adjusted. This is important, not only for data validation, but also to establish maintenance schedules and component replacement. Information will include, at a minimum:
   - Time, date and initials of the field team member performing the calibration
   - The unique identifier for the meter, including manufacturer, model, and serial number
   - The brand and expiration date of the calibration standards
   - The instrument readings: before and after calibration

- The instrument settings (if applicable)
- The overall adequacy of calibration including the Pass or fail designation in accordance with the accuracy specifications presented above.
- Corrective action taken (see Maintenance below) in the event of failure to adequately calibrate.

MAINTENANCE

NOTE: Ultrameters should be rinsed with clean water after use. Solvents should be avoided. Shock damage from a fall may cause instrument failure.

Temperature Extremes

Solutions in excess of 160°F/71°C should not be placed in the cell cup area; this may cause damage. Care should be exercised not to exceed rated operating temperature. Leaving the Ultrameter in a vehicle or storage shed on a hot day can easily subject the instrument to over 150°F voiding the warranty.

Battery Replacement

Dry Instrument THOROUGHLY. Remove the four bottom screws. Open instrument carefully; it may be necessary to rock the bottom slightly side to side to release it from the RS-232 connector. Carefully detach battery from circuit board. Replace with 9-volt alkaline battery. Replace bottom, ensuring the sealing gasket is installed in the groove of the top half of case. Re-install screws, tighten evenly and securely.

NOTE: Because of nonvolatile EEPROM circuitry, all data stored in memory and all calibration settings are protected even during power loss or battery replacement.

Cleaning Sensors

The conductivity cell cup should be kept as clean as possible. Flushing with clean water following use will prevent buildup on electrodes. However, if very dirty samples — particularly scaling types — are allowed to dry in the cell cup, a film will form. This film reduces accuracy. When there are visible films of oil, dirt, or scale in the cell cup or on the electrodes, use a foaming non-abrasive household cleaner. Rinse out the cleaner and your Ultrameter is ready for accurate measurements.

NOTE: Maintain a log for each monitoring instrument. Record all maintenance performed on the instrument on this log with date and name of the organization performing the maintenance.

ATTACHMENTS

Equipment Calibration Log (sample)

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EQUIPMENT CALIBRATION

PROJECT INFORMATION:

Project Name:

Date:

Project No.:

Client:

Instrument Source: ☐ BM ☐ Rental

METER TYPE	UNITS	TIME	MAKE/MODEL	SERIAL NUMBER	CAL. BY	STANDARD	READING	SETTI
☐ pH meter	units		Myron L Company Ultra Meter 6P	606987		4.00		
						7.00		
						10.01		
☐ Turbidity meter	NTU		Hach 2100P Turbidimeter	970600014560		< 0.4		
						20		
						100		
						800		
☐ Sp. conductance meter	uS/mS		Myron L Company Ultra Meter 6P	606987		μS @ 25 °C		
☐ PID	ppm		Photovac 2020 PID	[illegible]		open air zero		MIBK re factor =
						_____ ppm Iso. Gas		
☐ Particulate meter	mg/m^3					zero air		
☐ Oxygen	%					open air		
☐ Hydrogen sulfide	ppm					open air		
☐ Carbon monoxide	ppm					open air		
☐ LEL	%					open air		
☐ Radiation Meter	uR/[illegible]					background area		
☐								

ADDITIONAL REMARKS:

PREPARED BY: **DATE:**

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FIELD OPERATING PROCEDURES

Documentation Requirements for Drilling and Well Installation

FOP 015.0

DOCUMENTATION REQUIREMENTS FOR DRILLING AND WELL INSTALLATION

PURPOSE

The purpose of these documentation requirements is to document the procedures used for drilling and installing wells in order to ensure the quality of the data obtained from these operations. Benchmark field technical personnel will be responsible for developing and maintaining documentation for quality control of field operations. At least one field professional will monitor each major operation (e.g. one person per drilling rig) to document and record field procedures for quality control. These procedures provide a description of the format and information for this documentation.

PROCEDURE

Project Field Book

Personnel assigned by the Benchmark Field Team Leader or Project Manager will maintain a Project Field Book for all site activities. These Field Books will be started upon initiation of any site activities to document the field investigation process. The Field Books will meet the following criteria:

- Permanently bound, with nominal 8.5-inch by 11-inch gridded pages.
- Water resistant paper.
- Pages must be pre-numbered or numbered in the field, front and back.

Notations in the field book will be in black or blue ink that will not smudge when wet. Information that may be recorded in the Field Book includes:

- Time and date of all entries.

- Name and location of project site and project job number.
- Listing of key project, client and agency personnel and telephone numbers.
- Date and time of daily arrivals and departures, name of person keeping the log, names and affiliation of persons on site, purpose of visit (if applicable), weather conditions, outline of project activities to be completed.
- Details of any variations to the procedures/protocols (i.e., as presented in the Work Plan or Field Operating Procedures) and the basis for the change.
- Field-generated data relating to implementation of the field program, including sample locations, sample descriptions, field measurements, instrument calibration, etc.
- Record of all photographs taken in the field, including date, time, photographer, site location and orientation, sequential number of photograph, and roll number.

Upon completion of the site activities, all Field Books will be photocopied and both the original and photocopied versions placed in the project files. In addition, all field notes except those presented on specific field forms will be neatly transcribed into Field Activity Daily Log (FADL) forms (sample attached).

Field Borehole/Monitoring Well Installation Log Form

Examples of the Field Borehole Log and Field Borehole/Monitoring Well Installation Log forms are attached to this Field Operating Procedure. One form will be completed for every boring by the Benchmark field person overseeing the drilling. At a minimum, these forms will include:

- Project name, location, and number.
- Boring number.

- Rig type and drilling method.
- Drilling dates.
- Sampling method.
- Sample descriptions, to meet the requirements of the Unified Soil Classification System (USCS) for soils and the Unified Rock Classification System (URCS) for rock.
- Results of photoionization evaluations (scan and/or headspace determinations).
- Blow counts for sampler penetration (Standard Penetration Test, N-Value).
- Drilling rate, rig chatter, and other drilling-related information, as necessary.

All depths recorded on Boring/Monitoring Well Installation Log forms will be expressed in increments tenths of feet, and not in inches.

Well Completion Detail Form

An example of this form is attached to this Field Operating Procedure. One form will be completed for every boring by the Benchmark field person overseeing the well installation. At a minimum, these forms will include:

- Project name, location, and number.
- Well number.
- Installation dates.
- Dimensions and depths of the various well components illustrated in the Well Completion Detail (attached). These include the screened interval, bottom caps or plugs, centralizers, and the tops and bottoms of the various annular materials.

- Drilling rate, rig chatter, and other drilling related information.

All depths recorded on Field Borehole/Monitoring Well Installation Logs will be expressed in tenths of feet, and not in inches.

Daily Drilling Report Form

An example of this form is attached to this Field Operating Procedure. This form should be used to summarize all drilling activities. One form should be completed for each rig for each day. These forms will include summaries of:

- Footage drilled, broken down by diameter (e.g. 200 feet of 6-inch diameter hole, 50 feet of 10-inch diameter hole).
- Footage of well and screen installed, broken down by diameter.
- Quantities of materials used, including sand, cement, bentonite, centralizers, protective casings, traffic covers, etc. recorded by well or boring location.
- Active time (hours), and activity (drilling, decontamination, development, well installation, surface completions, etc.)
- Down-time (hours) and reason.
- Mobilizations and other events.
- Other quantities that will be the basis for drilling invoices.

The form should be signed daily by both the Benchmark field supervisor and the driller's representative, and provided to the Benchmark Field Team Leader.

Other Project Field Forms

Well purging/well development forms, test pit logs, environmental sampling field data sheets, water level monitoring forms, and well testing (slug test or pumping test) forms. Refer to specific guidelines for form descriptions.

ATTACHMENTS

Field Activity Daily Log (FADL) (sample)
Field Borehole Log (sample)
Field Borehole/Monitoring Well Installation Log (sample)
Stick-up Well/Piezometer Completion Detail (sample)
Flush-mount Well/Piezometer Completion Detail (sample)
Daily Drilling Report (sample)

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DAILY LOG
DATE
NO.
SHEET OF

FIELD ACTIVITY DAILY LOG

PROJECT NAME:
PROJECT NO.
PROJECT LOCATION:
CLIENT:
FIELD ACTIVITY SUBJECT:

DESCRIPTION OF DAILY ACTIVITIES AND EVENTS:

TIME	DESCRIPTION

VISITORS ON SITE:

CHANGES FROM PLANS AND SPECIFICATIONS, AND OTHER SPECIAL ORDERS AND IMPORTANT DECISIONS:

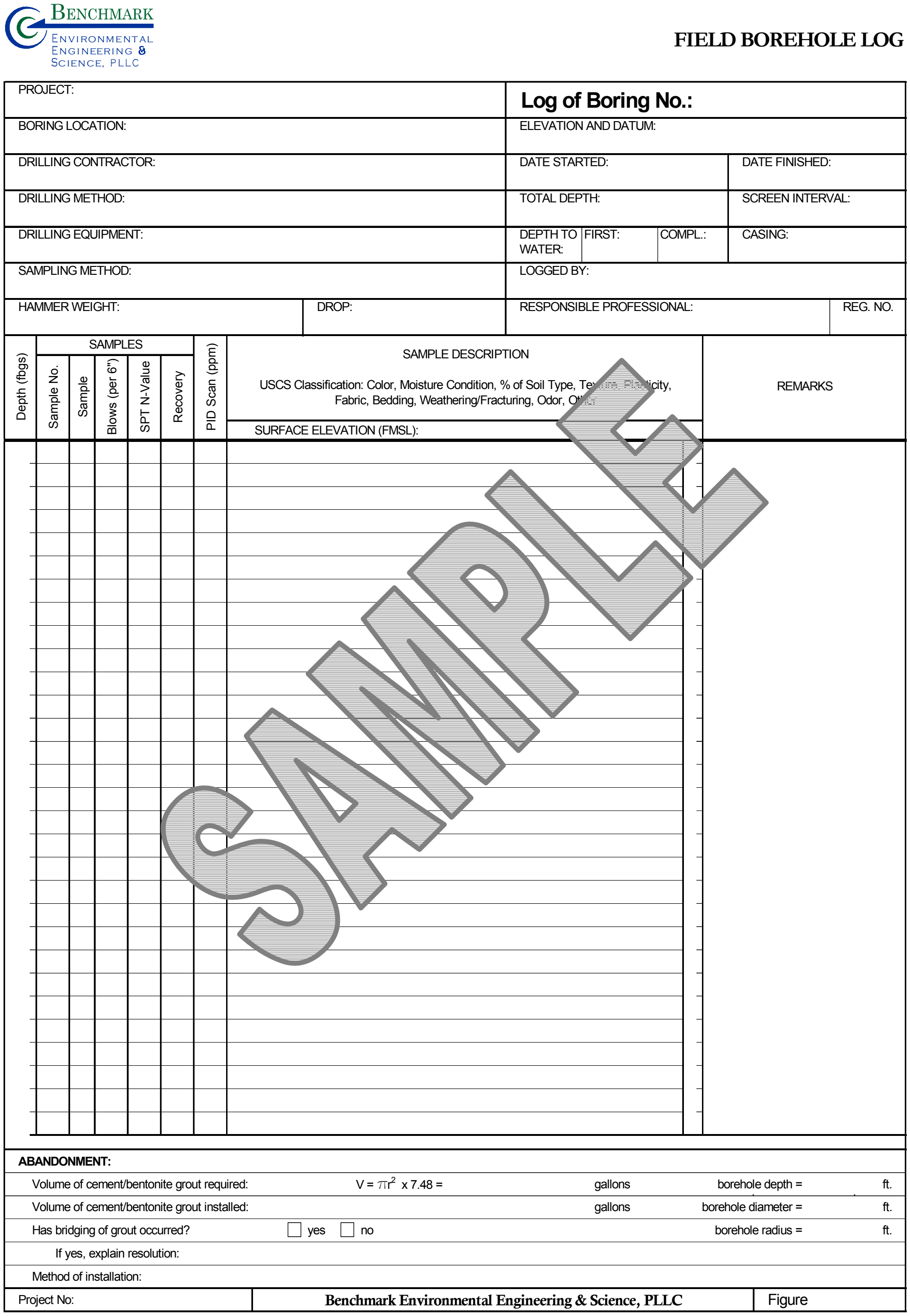
WEATHER CONDITIONS:
A.M.:
P.M.:

IMPORTANT TELEPHONE CALLS:

BM/TK PERSONNEL ON SITE:

SIGNATURE
DATE:

(CONTINUED)



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FIELD BOREHOLE LOG

PROJECT:		**Log of Boring No.:**	
BORING LOCATION:		ELEVATION AND DATUM:	
DRILLING CONTRACTOR:		DATE STARTED:	DATE FINISHED:
DRILLING METHOD:		TOTAL DEPTH:	SCREEN INTERVAL:
DRILLING EQUIPMENT:		DEPTH TO WATER: FIRST: COMPL.:	CASING:
SAMPLING METHOD:		LOGGED BY:	
HAMMER WEIGHT:	DROP:	RESPONSIBLE PROFESSIONAL:	REG. NO.

Depth (fbgs)	SAMPLES Sample No.	 Sample	 Blows (per 6")	 SPT N-Value	 Recovery	PID Scan (ppm)	SAMPLE DESCRIPTION USCS Classification: Color, Moisture Condition, % of Soil Type, Texture, Plasticity, Fabric, Bedding, Weathering/Fracturing, Odor, Other SURFACE ELEVATION (FMSL):	REMARKS

ABANDONMENT:

Volume of cement/bentonite grout required: V = πr^2 x 7.48 = gallons borehole depth = ft.

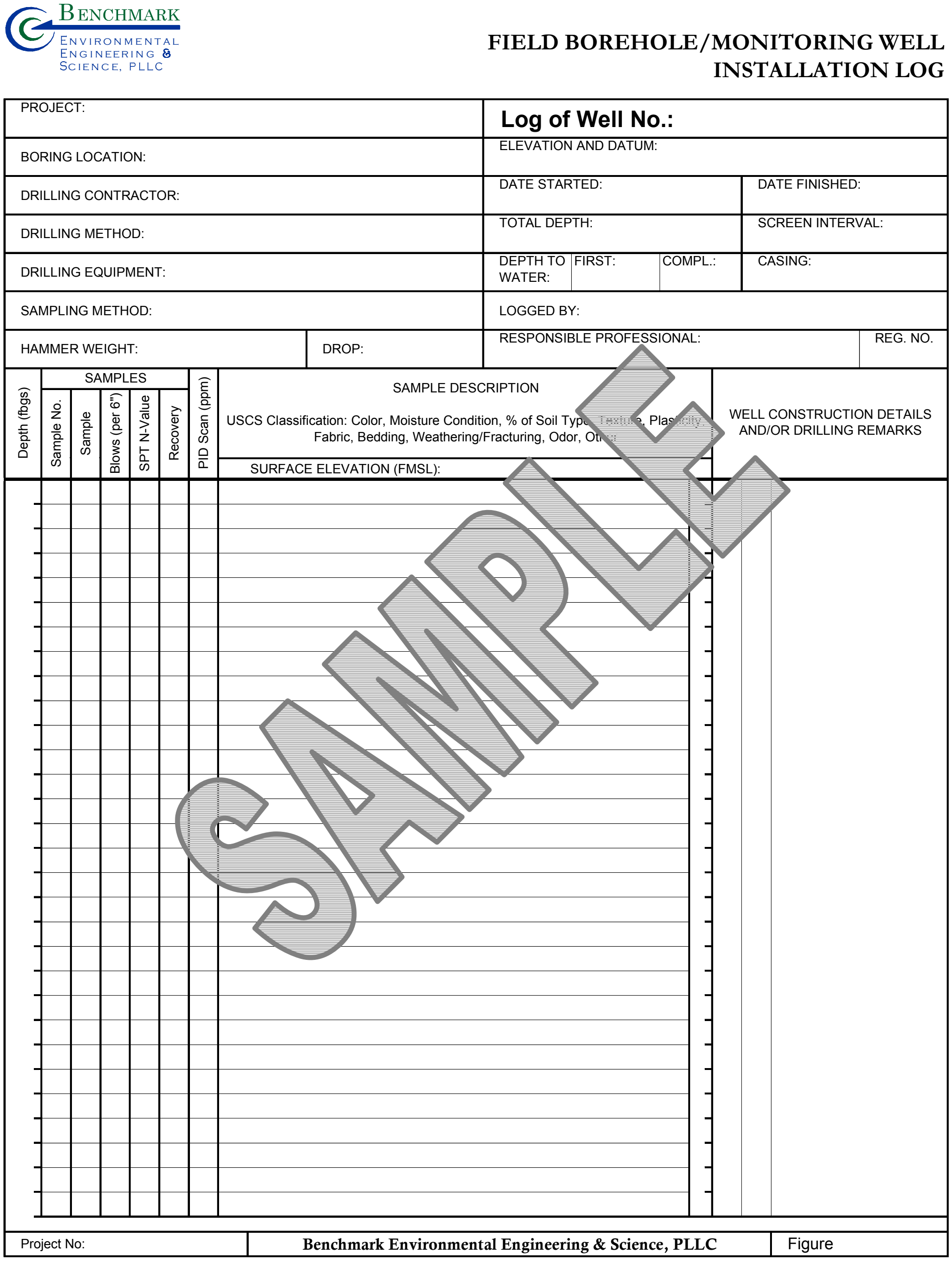
Volume of cement/bentonite grout installed: gallons borehole diameter = ft.

Has bridging of grout occurred? ☐ yes ☐ no borehole radius = ft.

If yes, explain resolution:

Method of installation:

Project No: | **Benchmark Environmental Engineering & Science, PLLC** | Figure



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FIELD BOREHOLE/MONITORING WELL INSTALLATION LOG

PROJECT:

Log of Well No.:

BORING LOCATION:

ELEVATION AND DATUM:

DRILLING CONTRACTOR:

DATE STARTED:

DATE FINISHED:

DRILLING METHOD:

TOTAL DEPTH:

SCREEN INTERVAL:

DRILLING EQUIPMENT:

DEPTH TO WATER: FIRST: COMPL.:

CASING:

SAMPLING METHOD:

LOGGED BY:

HAMMER WEIGHT:

DROP:

RESPONSIBLE PROFESSIONAL:

REG. NO.

Depth (fbgs)	SAMPLES					PID Scan (ppm)	SAMPLE DESCRIPTION USCS Classification: Color, Moisture Condition, % of Soil Type, Texture, Plasticity Fabric, Bedding, Weathering/Fracturing, Odor, Other SURFACE ELEVATION (FMSL):	WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS
	Sample No.	Sample	Blows (per 6")	SPT N-Value	Recovery			

Project No:

Benchmark Environmental Engineering & Science, PLLC

Figure

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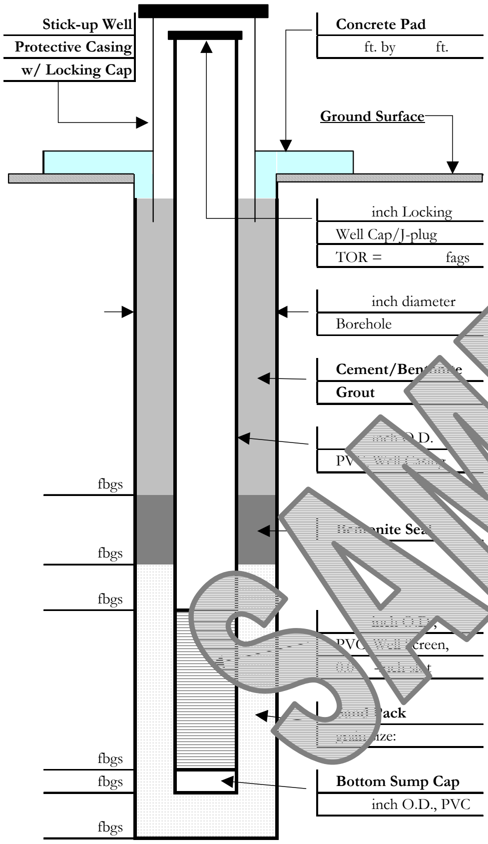
STICK-UP WELL/PIEZOMETER
COMPLETION DETAIL

Project Name: WELL NUMBER:
Client: Date Installed:
Boring Location: Project Number:



Driller Information
Company:
Driller:
Helper:
Permit Number:
Drill Rig Type:

Well Information
Land Surface Elevation: fmsl (approximate)
Drilling Method:
Soil Sample Collection Method:
Drilling Fluid:
Fluid Loss During Drilling: gallons (approximate)

Material of Well Construction
Casing:
Screen:
Sump:
Sand Pack:
Annular Seal:

Well Development
Well Purpose:
Techneque(s):
Date Completed:
BM/TK Personnel:
Total Volume Purge: gallons
Static Water Level: fbTOR
Pump Depth:
Purge Duration: minutes
Yeild: gpm
Specific Capacity: gpm/ft

Comments:

PREPARED BY: DATE:

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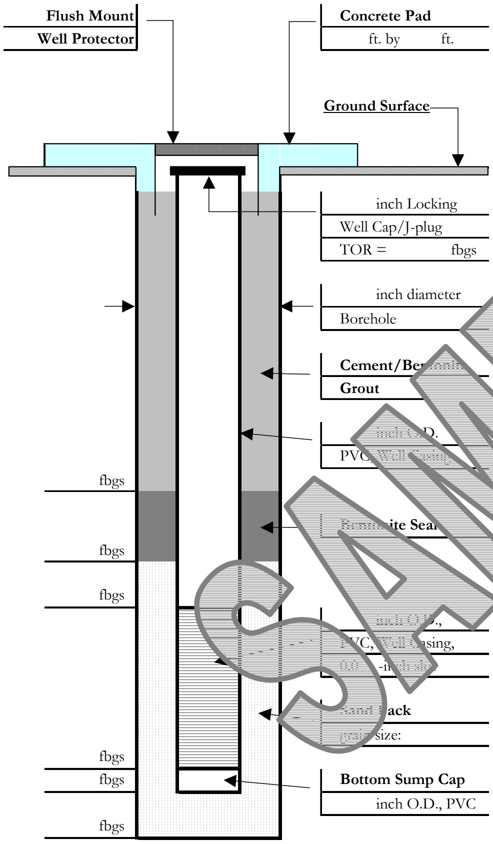
FLUSHMOUNT WELL/PIEZOMETER COMPLETION DETAIL

Project Name:	WELL NUMBER:
Client:	Date Installed:
Boring Location:	Project Number:



Driller Information

Company:
Driller:
Helper:
Permit Number:
Drill Rig Type:

Well Information

Land Surface Elevation: fmsl (approximate)
Drilling Method:
Soil Sample Collection Method:
Drilling Fluid:
Fluid Loss During Drilling: gallons (approximate)

Material of Well Construction

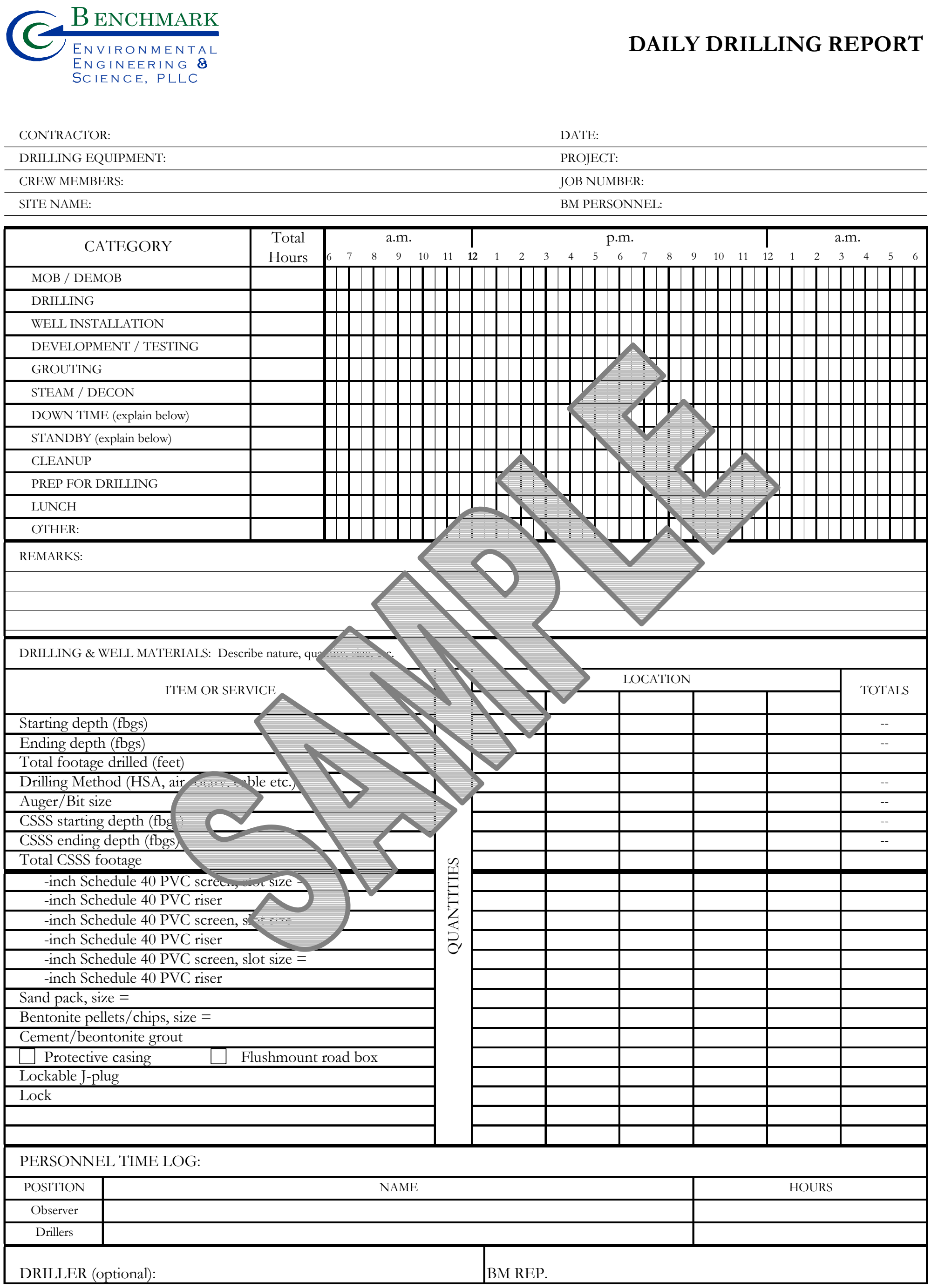
Casing:
Screen:
Sump:
Sand Pack:
Annular Seal:

Well Development

Well Purpose:
Techneque(s):
Date Completed:
BM/TK Personnel:
Total Volume Purge: gallons
Static Water Level: fbTOR
Pump Depth:
Purge Duration: minutes
Yeild: gpm
Specific Capacity: gpm/ft

Comments:

PREAPRED BY: DATE:



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DAILY DRILLING REPORT

CONTRACTOR:
DATE:
DRILLING EQUIPMENT:
PROJECT:
CREW MEMBERS:
JOB NUMBER:
SITE NAME:
BM PERSONNEL:

CATEGORY	Total Hours	a.m.						p.m.												a.m.						
		6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6
MOB / DEMOB																										
DRILLING																										
WELL INSTALLATION																										
DEVELOPMENT / TESTING																										
GROUTING																										
STEAM / DECON																										
DOWN TIME (explain below)																										
STANDBY (explain below)																										
CLEANUP																										
PREP FOR DRILLING																										
LUNCH																										
OTHER:																										

REMARKS:

DRILLING & WELL MATERIALS: Describe nature, quantity, size, etc.

ITEM OR SERVICE	QUANTITIES	LOCATION					TOTALS
Starting depth (fbgs)							--
Ending depth (fbgs)							--
Total footage drilled (feet)							
Drilling Method (HSA, air rotary, cable etc.)							--
Auger/Bit size							--
CSSS starting depth (fbgs)							--
CSSS ending depth (fbgs)							--
Total CSSS footage							
-inch Schedule 40 PVC screen, slot size =							
-inch Schedule 40 PVC riser							
-inch Schedule 40 PVC screen, slot size =							
-inch Schedule 40 PVC riser							
-inch Schedule 40 PVC screen, slot size =							
-inch Schedule 40 PVC riser							
Sand pack, size =							
Bentonite pellets/chips, size =							
Cement/beontonite grout							
☐ Protective casing ☐ Flushmount road box							
Lockable J-plug							
Lock							

PERSONNEL TIME LOG:

POSITION	NAME	HOURS
Observer		
Drillers		

DRILLER (optional):
BM REP.

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FIELD OPERATING PROCEDURES

Drill Site Selection Procedure

FOP 017.0

DRILL SITE SELECTION PROCEDURE

PURPOSE

This procedure presents a method for selecting a site location for drilling. Drill site selection should be based on the project objectives, ease of site access, freedom from obstructions and buried metallic objects (drums) and site safety (appropriate set backs from overhead and buried services).

PROCEDURE

The following procedure outlines procedures prior to drilling activities:

1. Review project objectives and tentatively select drilling locations that provide necessary information for achieving objectives (i.e., Work Plan).

2. Clear locations with property owner/operator to ensure that drilling activities will not interfere with site operations and select appropriate access routes.

3. Stake locations in the field, measure distance from locations to recognizable landmarks, such as building or fence lines and plot locations on site plan. Ensure location is relatively flat, free of overhead wires and readily accessible. Survey location if property ownership is in doubt.

4. Obtain clearances from appropriate utilities and if buried waste/metallic objects are suspected, screen location with appropriate geophysical method.

5. Establish a secure central staging area for storage of drilling supplies and for equipment decontamination. Locate a secure storage area for drilling samples, as necessary.

ATTACHMENTS

none

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FIELD OPERATING PROCEDURES

Drilling and Excavation Equipment Decontamination Procedures

FOP 018.0

DRILLING AND EXCAVATION EQUIPMENT DECONTAMINATION PROCEDURES

PURPOSE

This procedure is to be used for the decontamination of drilling and excavation equipment (i.e., drill rigs, backhoes, augers, drill bits, drill rods, buckets, and associated equipment) used during a subsurface investigation. The purpose of this procedure is to remove chemical constituents associated with a particular drilling or excavation location from this equipment. This prevents these constituents from being transferred between drilling or excavation locations, or being transported out of controlled areas.

PROCEDURE

The following procedure will be utilized prior to the use of drilling or excavation equipment at each location, and prior to the demobilization of such equipment from the site:

1. Remove all loose soil and other particulate materials from the equipment at the survey site.

2. Wrap augers, tools, plywood, and other reusable items with a plastic cover prior to transport from the site of use to the decontamination facility.

3. Transport equipment to the decontamination facility. All equipment must be decontaminated at an established decontamination facility. This facility will be placed within a controlled area, and will be equipped with necessary features to contain and collect wash water and entrained materials.

4. Wash equipment thoroughly with pressurized low-volume water or steam, supplied by a pressure washer or steam cleaner.

5. If necessary, use a brush or scraper to remove visible soils adhering to the equipment, and a non-phosphate detergent to remove any oils, grease, and/or hydraulic fluids adhering to the equipment. Continue pressure washing until all visible contaminants are removed.

6. Allow equipment to air dry.

7. Store equipment in a clean area or wrap the equipment in new plastic sheeting as necessary to ensure cleanliness until ready for use.

8. Manage all wash waters and entrained solids as described in the Benchmark Field Operating Procedure for Management of Investigation-Derived Waste.

ATTACHMENTS

none

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FIELD OPERATING PROCEDURES

Establishing Horizontal and Vertical Control

FOP 021.0

ESTABLISHING HORIZONTAL AND VERTICAL CONTROL

PURPOSE

This guideline presents a method for establishing horizontal and vertical controls at a project site. It is imperative that this procedure be performed accurately, as all topographic and site maps, monitoring well locations and test pit locations will be based on these controls.

PROCEDURE

A. Establishing Horizontal Primary and Project Control

1. Research the State Plan Coordinate, USGS or project site applicable horizontal control monuments.
2. At the project site, recover the above-mentioned monuments, two markers minimum being recovered.
3. Establish control points on the project site by bringing in the primary control points recovered in the field.
4. All control points will be tied into a closed traverse to assure the error of closure.
5. Compute closures for obtaining degree of accuracy to adjust traverse points.

B. Establishing Vertical Primary and Project Control

1. Research project or USGS datum for recovering monument(s) for vertical control if different than those previously found.
2. Recover the monuments in the field, two markers minimum being found.
3. Set the projects benchmarks.
4. Run a level line from the monuments to the set project benchmarks and back, setting turning points on all benchmarks set on site.

5. Reduce field notes and compute error of closure to adjust benchmarks set on site.

6. Prepare the recovery sketches and tabulate a list for horizontal and vertical control throughout project site.

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FIELD OPERATING PROCEDURES

Groundwater Level Measurement

FOP 022.0

GROUNDWATER LEVEL MEASUREMENT

PURPOSE

This procedure describes the methods used to obtain accurate and consistent water level measurements in monitoring wells, piezometers and well points. Water levels will be measured at monitoring wells and, if practicable, in supply wells to estimate purge volumes associated with sampling, and to develop a potentiometric surface of the groundwater in order to estimate the direction and velocity of flow in the aquifer. Water levels in monitoring wells will be measured using an electronic water level indicator (e-line) that has been checked for operation prior to mobilization.

PROCEDURE

1. Decontaminate the e-line probe and a lower portion of cable following the procedures referenced in the Benchmark Field Operating Procedure for Non-Disposable and Non-Dedicated Sampling Equipment Decontamination. Store the e-line in a protected area until use. This may include wrapping the e-line in clean plastic until the time of use.

2. Unlock and remove the well protective cap or cover and place on clean plastic.

3. Lower the probe slowly into the monitoring well until the audible alarm sounds. This indicates the depth to water has been reached.

4. Move the cable up and down slowly to identify the depth at which the alarm just begins to sound. Measure this depth against the mark on the lip of the well riser used as a surveyed reference point (typically the north side of the riser).

5. Read depth from the graduated cable to the nearest 0.01 foot. Do not use inches. If the e-line is not graduated, use a rule or tape measure graduated in 0.01-foot increments to measure from the nearest reference mark on the e-line cable.

6. Record the water level on a Water Level Monitoring Record (sample attached).

7. Remove the probe from the well slowly, drying the cable and probe with a clean paper wipe. Be sure to repeat decontamination before use in another well.

8. Replace well plug and protective cap or cover. Lock in place as appropriate.

ATTACHMENTS

Water Level Monitoring Record (sample)

REFERENCES

Benchmark FOPs:
040 Non-Disposable and Non-Dedicated Sampling Equipment Decontamination

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WATER LEVEL MONITORING RECORD

Project Name: Client:
Project No.: Location:
Field Personnel: Date:
Weather:

Well No.	Time	Top of Riser Elevation (fmsl)	Static Depth to Water (fbTOR)	Groundwater Elevation (fmsl)	Total Depth (fbTOR)	Last Total Depth Measurement (fbTOR)

Comments/Remarks:

PREAPRED BY: DATE:

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FIELD OPERATING PROCEDURES

Groundwater Sample Collection Procedures

FOP 024.0

GROUNDWATER SAMPLE COLLECTION PROCEDURES

PURPOSE

This procedure describes the methods for collecting groundwater samples from monitoring wells and domestic supply wells following purging and sufficient recovery. This procedure also includes the preferred collection order in which water samples are collected based on the volatilization sensitivity or suite of analytical parameters required.

PROCEDURE

Allow approximately 3 to 10 days following well development before performing purge and sample activities at any well location. Conversely, perform sampling as soon as practical after sample purging at any time after the well has recovered sufficiently to sample, or within 24 hours after evacuation, if the well recharges slowly. If the well does not yield sufficient volume for all required laboratory analytical testing (including quality control), a decision should be made to prioritize analyses based on contaminants of concern at the site. If the well takes longer than 24 hours to recharge, the Project Manager should be consulted. The following two procedures outline sample collection activities for monitoring and domestic type wells.

Monitoring Wells

1. Purge the monitoring well in accordance with the Benchmark FOPs for Groundwater Purging Procedures Prior to Sample Collection or Low Flow (Minimal Drawdown) Groundwater Purging & Sampling Procedures. Perform sampling as soon as practical after purging at any time after the well has recovered sufficiently to sample, or within 24 hours after evacuation, if the well recharges slowly. If the well does not yield sufficient volume for all required laboratory analytical testing (including quality control), a decision should be made to prioritize analyses based on contaminants of concern at the site. Analyses will be prioritized in the order of the parameters volatilization sensitivity. After volatile organics have been collected, field parameters

must be measured from the next sample collected. If a well takes longer than 24 hours to recharge, the Project Manager should be consulted.

2. Sampling equipment that is not disposable or dedicated to the well will be decontaminated in accordance with the Benchmark Field Operating Procedure for Non-Disposable and Non-Dedicated Sampling Equipment Decontamination.

3. Calibrate all field meters (i.e., pH/Eh, turbidity, specific conductance, dissolved oxygen, PID etc.) in accordance with the Benchmark Field Operating Procedure for Calibration and Maintenance of the specific field meter.

4. Prepare the electronic water level indicator (e-line) in accordance with the procedures referenced in the Benchmark Field Operating Procedure for Groundwater Level Measurement and decontaminate the e-line probe and a lower portion of cable following the procedures referenced in the Benchmark Field Operating Procedure for Non-disposable and Non-dedicated Sampling Equipment Decontamination. Store the e-line in a protected area until use. This may include wrapping the e-line in clean plastic until the time of use.

5. Inspect the well/piezometer for signs of vandalism or damage and record condition on the Groundwater Field Form (sample attached). Specifically, inspect the integrity of the following: concrete surface seal, lock, protective casing and well cover, well casing and J-plug/cap. Report any irregular findings to the Project Manager.

6. Unlock and remove the well protective cap or cover and place on clean plastic to avoid introducing foreign material into the well.

7. Calibrate the photoionization detector (PID) in accordance with the Benchmark Field Operating Procedure for Calibration and Maintenance of Portable Photoionization Detector.

8. Monitor the well for organic vapors using a PID, as per the Work Plan. If a reading of greater than 5 ppm is recorded, the well should be allowed to vent until levels drop below 5 ppm before proceeding with purging. Record PID measurements on a well-specific Groundwater Field Form (sample attached).

9. Lower the e-line probe slowly into the monitoring well and record the measurement on a well-specific Groundwater Field Form (sample attached).

10. Groundwater samples will be collected directly from the sampling valve on the flow through cell (low-flow), discharge port of a standard pump assembly (peristaltic, pneumatic, submersible, or Waterra™ pump) or bailer (stainless steel, PVC or polyethylene) into appropriate laboratory provided containers. In low-yielding wells at which the flow through cell is not used, the samples may be collected using a disposable bailer.

11. If disposable polyethylene bailers are used, the bailer should be lowered *slowly* below the surface of the water to minimize agitation and volatilization. For wells that are known to produce turbid samples (values greater than 50 NTU), the bailer should be lowered and retrieved at a rate that limits surging of the well.

12. Sampling data will be recorded on a Groundwater Field Form (sample attached).

13. Pre-label all sample bottles in the field using a waterproof permanent marker in accordance with the Benchmark Sample Labeling, Storage and Shipment FOP. The following information, at a minimum, should be included on the label:

    - Project Number;
    - Sample identification code (as per project specifications);
    - Date of sample collection (mm, dd, yy);
    - Time of sample collection (military time only) (hh:mm);
    - Specify "grab" or "composite" sample type;
    - Sampler initials;
    - Preservative(s) (if applicable); and
    - Analytes for analysis (if practicable).

14. Collect a separate sample of approximately 200 ml into an appropriate container prior to collecting the first and following the last groundwater sample collected to measure the following field parameters:

Parameter	Units
Dissolved Oxygen	parts per million (ppm)

Specific Conductance	μmhos/cm or μS or mS
pH	pH units
Temperature	^{o}C or ^{o}F
Turbidity	NTU
Eh (*optional*)	mV
PID VOCs (*optional*)	ppm

Record all field measurements on a Groundwater Field Form (sample attached).

15. Collect samples into pre-cleaned bottles provided by the analytical laboratory with the appropriate preservative(s) added based on the volatilization sensitivity or suite of analytical parameters required, as designated in the **Sample Collection Order** section below.

16. Lower the e-line probe slowly into the monitoring well and record the measurement on a well-specific Groundwater Field Form (sample attached).

17. The samples will be labeled, stored and shipped in accordance with the Benchmark Field Operating Procedure for Sample Labeling, Storage and Shipment Procedures.

Domestic Supply Wells

1. Calculate or estimate the volume of water in the well. It is desirable to purge at least one casing volume before sampling. This is controlled, to some extent, by the depth of the well, well yield and the rate of the existing pump. If the volume of water in the well cannot be calculated, the well should be purged continuously for no less than 15 minutes.

2. Connect a sampling tap to an accessible fitting between the well and the pressure tank where practicable. A hose will be connected to the device and the hose discharge located 25 to 50 feet away. The well will be allowed to pump until the lines and one well volume is removed. Flow rate will be measured with a container of known volume and a stopwatch.

3. Place a clean piece of polyethylene or Teflon™ tubing on the sampling port and collect the samples in the order designated below and in the sample containers supplied by the laboratory for the specified analytes. ***DO NOT*** use standard garden hose to collect samples.

4. Sampling results and measurements will be recorded on a Groundwater Field Form (sample attached) as described in the previous section.

5. Collect samples into pre-cleaned bottles provided by the analytical laboratory with the appropriate preservative(s) added based on the volatilization sensitivity or suite of analytical parameters required, as designated in the **Sample Collection Order** section below.

6. The samples will be labeled, stored and shipped in accordance with the Benchmark Field Operating Procedure for Sample Labeling, Storage and Shipment Procedures.

SAMPLE COLLECTION ORDER

All groundwater samples, from monitoring wells and domestic supply wells, will be collected in accordance with the following.

1. Samples will be collected preferentially in recognition of volatilization sensitivity. The preferred order of sampling if no free product is present is:

    - Field parameters
    - Volatile Organic Compounds (VOCs)
    - Purgeable organic carbons (POC)
    - Purgeable organic halogens (POH)
    - Total Organic Halogens (TOX)
    - Total Organic Carbon (TOC)
    - Extractable Organic Compounds (i.e., BNAs, SVOCs, etc.)
    - Total petroleum hydrocarbons (TPH) and oil and grease
    - PCBs and pesticides
    - Total metals (Dissolved Metals)
    - Total Phenolic Compounds

- Cyanide
- Sulfate and Chloride
- Turbidity
- Nitrate (as Nitrogen) and Ammonia
- Preserved inorganics
- Radionuclides
- Unpreserved inorganics
- Bacteria
- Field parameters

2. Document the sampling procedures and related information in the Project Field Book and on a Groundwater Field Form (sample attached).

DOCUMENTATION

The three words used to ensure adequate documentation for groundwater sampling are accountability, controllability, and traceability. Accountability is undertaken in the sampling plan and answers the questions who, what, where, when, and why to assure that the sampling effort meets its goals. Controllability refers to checks (including QA/QC) used to ensure that the procedures used are those specified in the sampling plan. Traceability is documentation of what was done, when it was done, how it was done, and by whom it was done, and is found in the field forms, Project Field Book, and chain-of-custody forms. At a minimum, adequate documentation of the sampling conducted in the field consists of an entry in the Project Field Book (with sewn binding), field data sheets for each well, and a chain-of-custody form.

As a general rule, if one is not sure whether the information is necessary, it should nevertheless be recorded, as it is impossible to over-document one's fieldwork. Years may go by before the documentation comes under close scrutiny, so the documentation must be capable of defending the sampling effort without the assistance or translation of the sampling crew.

The minimum information to be recorded daily with an indelible pen in the Project Field Book and/or field data sheets includes date and time(s), name of the facility, name(s) of the sampling crew, site conditions, the wells sampled, a description of how the sample shipment was handled, and a QA/QC summary. After the last entry for the day in the Project Field Book, the Field Team Leader should sign the bottom of the page under the last entry and then draw a line across the page directly under the signature.

PRECAUTIONS/RECOMMENDATIONS

The following precautions should be adhered to prior to and during sample collection activities:

- Field vehicles should be parked downwind (to avoid potential sample contamination concerns) at a minimum of 15 feet from the well and the engine turned off prior to PID vapor analysis and VOC sample collection.

- Ambient odors, vehicle exhaust, precipitation, or windy/dusty conditions can potentially interfere with obtaining representative samples. These conditions should be minimized and should be recorded in the field notes. Shield sample bottles from strong winds, rain, and dust when being filled.

- The outlet from the sampling device should discharge below the top of the sample's air/water interface, when possible. The sampling plan should specify how the samples will be transferred from the sample collection device to the sample container to minimize sample alterations.

- The order of sampling should be from the least contaminated to the most contaminated well to reduce the potential for cross contamination of sampling equipment (see the Sampling Plan or Work Plan).

- Samples should not be transferred from one sampling container to another.

- Sampling equipment must not be placed on the ground, because the ground may be contaminated and soil contains trace metals. Equipment and supplies should be removed from the field vehicle only when needed.

- Smoking and eating should not be allowed until the well is sampled and hands are washed with soap and water, due to safety and possibly sample contamination concerns. These activities should be conducted beyond a 15-foot radius of the well.

- No heat-producing or electrical instruments should be within 15 feet of the well, unless they are intrinsically safe, prior to PID vapor analysis.

- Minimize the amount of time that the sample containers remain open.

- Do not touch the inside of sample bottles or the groundwater sample as it enters the bottle. Disposable gloves may be a source of phthalates, which could be introduced into groundwater samples if the gloves contact the sample.

- Sampling personnel should use a new pair of disposable gloves for each well sampled to reduce the potential for exposure of the sampling personnel to contaminants and to reduce sample cross contamination. In addition, sampling personnel should change disposable gloves between purging and sampling operations at the same well.

- Sampling personnel should not use perfume, insect repellent, hand lotion, etc., when taking groundwater samples. If insect repellent must be used, then sampling personnel should not allow samples or sampling equipment to contact the repellent, and it should be noted in the documentation that insect repellent was used.

- Complete the documentation of the well. A completed assemblage of paperwork for a sampling event includes the completed field forms, entries in the Project Field Book (with a sewn binding), transportation documentation (if required), and possibly chain-of-custody forms.

ATTACHMENTS

Groundwater Field Form (sample)

REFERENCES

1. Wilson, Neal. *Soil Water and Ground Water Sampling*, 1995

Benchmark FOPs:

007	*Calibration and Maintenance of Portable Dissolved Oxygen Meter*
008	*Calibration and Maintenance of Portable Field pH/Eh Meter*
009	*Calibration and Maintenance of Portable Field Turbidity Meter*
011	*Calibration and Maintenance of Portable Photoionization Detector*
012	*Calibration and Maintenance of Portable Specific Conductance Meter*
022	*Groundwater Level Measurement*
023	*Groundwater Purging Procedures Prior to Sample Collection (optional)*
031	*Low Flow (Minimal Drawdown) Groundwater Purging & Sampling Procedures (optional)*
040	*Non-Disposable and Non-Dedicated Sampling Equipment Decontamination*
046	*Sample Labeling, Storage and Shipment Procedures*

GROUNDWATER FIELD FORM

Project Name: Date:

Location: Project No.: Field Team:

Well No.	Diameter (inches):	Sample Time:
Product Depth (fbTOR):	Water Column (ft):	DTW when sampled:
DTW (static) (fbTOR):	Casing Volume:	Purpose: ☐ Development ☐ Sample
Total Depth (fbTOR):	Purge Volume (gal):	Purge Method:

Time	Water Level (fbTOR)	Acc. Volume (gallons)	pH (units)	Temp. (deg. C)	SC (uS)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Appearance & Odor
	0 Initial								
	1								
	2								
	3								
	4								
	5								
	6								
	7								
	8								
	9								
	10								
Sample Information:			Date: (if different from above)						
	S1								
	S2								

Well No.	Diameter (inches):	Sample Time:
Product Depth (fbTOR):	Water Column (ft):	DTW when sampled:
DTW (static) (fbTOR):	Casing Volume:	Purpose: ☐ Development ☐ Sample
Total Depth (fbTOR):	Purge Volume (gal):	Purge Method:

Time	Water Level (fbTOR)	Acc. Volume (gallons)	pH (units)	Temp. (deg. C)	SC (uS)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Appearance & Odor
	0 Initial								
	1								
	2								
	3								
	4								
	5								
	6								
	7								
	8								
	9								
	10								
Sample Information:			Date: (if different from above)						
	S1								
	S2								

REMARKS:

Note: All water level measurements are in feet, distance from top of riser.

Volume Calculation

Diam.	Vol. (g/ft)
1"	0.041
2"	0.163
4"	0.653
6"	1.469

Stabilization Criteria

Parameter	Criteria
pH	± 0.1 unit
SC	± 3%
Turbidity	± 10%
DO	± 0.3 mg/L
ORP	± 10 mV

PREPARED BY:

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FIELD OPERATING PROCEDURES

Hollow Stem Auger Drilling Procedures

FOP 026.1

HOLLOW STEM AUGER (HSA) DRILLING PROCEDURES

PURPOSE

This guideline presents a method for drilling a borehole through unconsolidated materials, including soils or overburden, and consolidated materials, including bedrock.

PROCEDURE

The following procedure will be used to drill a borehole for sampling and/or well installation, using hollow-stem auger methods and equipment.

1. Follow Benchmark's Field Operating Procedure for Drill Site Selection Procedure prior to implementing any drilling activity.
2. Perform drill rig safety checks with the driller by completing the Drilling Safety Checklist form (sample attached).
3. Conduct tailgate health and safety meeting with project team and drillers by completing the Tailgate Safety Meeting Form.
4. Calibrate air-monitoring equipment in accordance with the appropriate Benchmark's Field Operating Procedures (i.e., PID, FID, combustible gas meter) or manufacturer's recommendations for calibration of field meters (i.e., DataRAM 4 Particulate Meter).
5. Ensure all drilling equipment (i.e., augers, rods, split-spoons) appear clean and free of soil prior to initiating any subsurface intrusion. Decontamination of drilling equipment should be in accordance with Benchmark's FOP: Drilling and Excavation Equipment Decontamination Procedures.
6. Mobilize the auger rig to the site and position over the borehole.
7. Level and stabilize the rig using the rig jacks, and recheck the rig location against the planned drilling location. If necessary, raise the jacks and adjust the rig position.

8. Place a metal or plywood auger pan over the borehole location to collect the auger cuttings. This auger pan will be equipped with a 12-inch nominal diameter hole for auger passage. As an alternative, a piece of polyethylene tarp may be used as a substitute.

9. Advance augers into the subsurface. For sampling or pilot-hole drilling, nominal 8-inch outside diameter (OD) augers should be used. The boring diameter will be approved by the Benchmark field supervisor.

10. Collect soil samples via split spoon sampler in accordance with Benchmark's Field Operating Procedure for Split Spoon Sampling.

11. Check augers periodically during drilling to ensure the boring is plumb. Adjust rig position as necessary to maintain plumb.

12. Continue drilling until reaching the assigned total depth, or until auger refusal occurs. Auger refusal is when the drilling penetration drops below 0.1 feet per 10 minutes, with the full weight of the rig on the auger bit, and a center <u>bit</u> (not center plug) in place.

13. Plug and abandon boreholes not used for well installation in accordance with Benchmark's Field Operating Procedure for Abandonment of Borehole.

OTHER PROCEDURAL ISSUES

- Slip rings may be used for lifting a sampling or bit string. The string will not be permitted to extend more than 15 feet above the mast crown.

- Borings will not be over drilled (rat holed) without the express permission of the Benchmark field supervisor. All depth measurements should be accurate to the nearest 0.1 foot, to the extent practicable.

- Potable water may be placed in the auger stem if critically necessary for borehole control or to accomplish sampling objectives and must be approved by the Benchmark Project Manager and/or NYSDEC Project Manager. Upon approval, the potable water source and quantity used will be documented in the Project Field Book and subsequent report submittal.

ATTACHMENTS

Drilling Safety Checklist (sample)
Tailgate Safety Meeting Form (sample)

REFERENCES

Benchmark FOPs:

001	*Abandonment of Borehole Procedures*
010	*Calibration and Maintenance of Portable Flame Ionization Detector*
011	*Calibration and Maintenance of Portable Photoionization Detector*
017	*Drill Site Selection Procedure*
018	*Drilling and Excavation Equipment Decontamination Procedures*
058	*Split Spoon Sampling Procedures*

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DRILLING SAFETY CHECKLIST

Project: **Supplemental Phase II RFI/ICMs**
Date:
Project No.: **0041-009-500**
Drilling Company:
Client: **RealCo., Inc.**
Drill Rig Type:

ITEMS TO CHECK	OK	ACTION NEEDED
"Kill switches" installed by the manufacturer are in operable condition and all workers at the drill site are familiar with their location and how to activate them?		
"Kill switches" are accessible to workers on both sides of the rotating stem? NOTE: Optional based on location and number of switches provided by the manufacturer.		
Cables on drill rig are free of kinks, frayed wires, "bird cages" and worn or missing sections?		
Cables are terminated at the working end with a proper eye splice, either swaged Coupling or using cable clamps?		
Cable clamps are installed with the saddle on the live or load side? Clamps should not be alternated and should be of the correct size and number for the cable size to which it is installed. Clamps are complete with no missing parts?		
Hooks installed on hoist cables are the safety type with a functional latch to prevent accidental separation?		
Safety latches are functional and completely span the entire throat of the hook and have positive action to close the throat except when manually displaced for connecting or disconnecting a load?		
Drive shafts, belts, chain drives and universal joints shall be guarded to prevent accidental insertion of hands and fingers or tools.		
Outriggers shall be extended prior to and whenever the boom is raised off its cradle. Hydraulic outriggers must maintain pressure to continuously support and stabilize the drill rig even while unattended.		
Outriggers shall be properly supported on the ground surface to prevent settling into the soil.		
Controls are properly labeled and have freedom of movement. Controls should not be blocked or locked in an action position.		
Safeties on any device shall not be bypassed or neutralized.		
Controls shall be operated smoothly and cables and lifting devices shall not be jerked or operated erratically to overcome resistance.		
Slings, chokers and lifting devices are inspected before using and are in proper working order? Damaged units are removed from service and are properly tagged?		
Shackles and clevises are in proper working order and pins and screws are fully inserted before placing under a load?		
High-pressure hoses have a safety (chain, cable or strap) at each end of the hose section to prevent whipping in the event of a failure?		
Rotating parts of the drill string shall be free of sharp projections or hooks, which could entrap clothing or foreign objects?		
Wire ropes should not be allowed to bend around sharp edges without cushion material.		
The exclusion zone is centered over the borehole and the radius is equal or greater than the boom height?		

ITEMS TO CHECK	OK	ACTION

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DRILLING SAFETY CHECKLIST

Project: **Supplemental Phase II RFI/ICMs**

Date:

Project No.: **0041-009-500**

Drilling Company:

Client: **RealCo., Inc.**

Drill Rig Type:

ITEMS TO CHECK	OK	ACTION NEEDED
The work area around the borehole shall be kept clear of trip hazards and walking surfaces should be free of slippery material.		
Workers shall not proceed higher than the drilling deck without a fall restraining device and must attach the device in a manner to restrict fall to less than 6 feet.		
A fire extinguisher of appropriate size shall be immediately available to the drill crew. The drill crew shall have received annual training on proper use of the fire extinguisher.		
29 CFR 1910.333 © (3) Except where electrical distribution and transmission lines have been de-energized and visibly grounded, drill rigs will be operated proximate to, under, by, or near power lines only in accordance with the following: .333 © (3) (ii) 50 kV or less -minimum clearance is 10 ft. For 50 kV or over - 10ft. Plus ½ in. For each additional kV **Benchmark Policy: Maintain 20 feet clearance**		
29 CFR 1910.333 © (3) (iii) While the rig is in transit with the boom in the down position, clearance from energized power lines will be maintained as follows: Less than 50 kV - 4 feet 50 to 365 kV - 10 feet 365 to 720 kV - 16 feet		

Name: (printed)

Signed:

Date:

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TAILGATE SAFETY MEETING FORM

Project Name: Date: Time:
Project Number: Client:
Work Activities:

HOSPITAL INFORMATION:

Name:
Address: *City:* *State:* *Zip:*
Phone No.: *Ambulance Phone No.*

SAFETY TOPICS PRESENTED:

Chemical Hazards:

Physical Hazards: Slips, Trips, Falls

PERSONAL PROTECTIVE EQUIPMENT:

Activity: *PPE Level:* A B C D
Activity: *PPE Level:* A B C D
Activity: *PPE Level:* A B C D
Activity: *PPE Level:* A B C D
Activity: *PPE Level:* A B C D

New Equipment:

Other Safety Topic (s): Environmental Hazards (aggressive fauna)
Eating, drinking, use of tobacco products is prohibited in the Exclusion Zone (EZ)

ATTENDEES

Name Printed	Signatures

Meeting conducted by:

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FIELD OPERATING PROCEDURES

Low-Flow (Minimal Drawdown) Groundwater Purging & Sampling Procedure

FOP 031.1

LOW FLOW (MINIMAL DRAWDOWN) GROUNDWATER PURGING & SAMPLING PROCEDURES

PURPOSE

This procedure describes the methods used for performing low flow (minimal drawdown) purging, also referred to as micro-purging, at a well prior to groundwater sampling to obtain a representative sample from the water-bearing zone. This method of purging is used to minimize the turbidity of the produced water. This may increase the representativeness of the groundwater samples by avoiding the necessity of filtering suspended solids in the field prior to preservation of the sample.

Well purging is typically performed immediately preceding groundwater sampling. The sample should be collected as soon as the parameters measured in the field (i.e., pH, specific conductance, dissolved oxygen, Eh, temperature, and turbidity) have stabilized.

PROCEDURE

Allow approximately 3 to 10 days following well development for groundwater to return to static conditions before performing low-flow purge and sample activities at any well location. Conversely, perform low-flow sampling as soon as purged groundwater has stabilized. If the well does not yield sufficient volume (i.e., cannot maintain a constant water level during purging) for low-flow purge and sampling, then an alternative method must be performed in accordance with TurnKey's Groundwater Purging Procedures Prior to Sample Collection FOP.

1. Water samples should not be taken immediately following well development. Sufficient time should be allowed to stabilize the groundwater flow regime in the vicinity of the monitoring well. This lag time will depend on site conditions and methods of installation but may exceed one week.

2. Prepare the electronic water level indicator (e-line) in accordance with the procedures referenced in the Benchmark's Groundwater Level Measurement FOP and decontaminate the e-line probe and a lower portion of cable following the procedures referenced in the Benchmark's Non-disposable and Non-dedicated Sampling Equipment Decontamination FOP. Store the e-line in a protected area until use. This may include wrapping the e-line in clean plastic until the time of use.

3. Calibrate all sampling devices and monitoring equipment in accordance with manufacturer's recommendations, the site Quality Assurance Project Plan (QAPP) and/or Field Sampling Plan (FSP). Calibration of field instrumentation should be followed as specified in Benchmark's Calibration and Maintenance FOP for each individual meter.

4. Inspect the well/piezometer for signs of vandalism or damage and record condition on the Groundwater Field Form (sample attached). Specifically, inspect the integrity of the following: concrete surface seal, lock, protective casing and well cover, well casing and J-plug/cap. Report any irregular findings to the Project Manager.

5. Unlock and remove the well protective cap or cover and place on clean plastic to avoid introducing foreign material into the well.

6. Monitor the well for organic vapors using a PID, as per the Work Plan. If a reading of greater than 5 ppm is recorded, the well should be allowed to vent until levels drop below 5 ppm before proceeding with purging.

7. Lower the e-line probe slowly into the monitoring well and record the initial water level in accordance with the procedures referenced in Benchmark's Groundwater Level Measurement FOP. Refer to the construction diagram for the well to identify the screened depth.

8. Decontaminate all non-dedicated pump and tubing equipment following the procedures referenced in the Benchmark's Non-disposable and Non-dedicated Sampling Equipment Decontamination FOP.

9. Lower the purge pump or tubing (i.e., low-flow electrical submersible, peristaltic, etc.) slowly into the well until the pump/tubing intake is approximately in the middle of the screened interval. Rapid insertion of the pump will increase the turbidity of well water, and can increase the required purge time. This step can be eliminated if dedicated tubing is already within the well.

   Placement of the pump close to the bottom of the well will cause increased entrainment of solids, which may have settled in the well over time. Low-flow purging has the advantage of minimizing mixing between the overlying stagnant casing water and water within the screened interval. The objective of low-flow purging is to maintain a purging rate, which minimizes stress (drawdown) of the water level in the well. Low-flow refers to the velocity with which water enters the pump intake and that is imparted to the formation pore water in the immediate vicinity of the well screen.

10. Lower the e-line back down the well as water levels will be frequently monitored during purge and sample activities.

11. Begin pumping to purge the well. The pumping rate should be between 100 and 500 milliliters (ml) per minute (0.03 to 0.13 gallons per minute) depending on site hydrogeology. Periodically check the well water level with the e-line adjusting the flow rate as necessary to stabilize drawdown within the well. If possible, a steady flow rate should be maintained that results in a stabilized water level (drawdown of 0.3 feet or less). If the water level exceeds 2 feet below static and declining, slow the purge rate until the water level generally stabilizes. Record each pumping rate and water level during the event.

    The low flow rate determined during purging will be maintained during the collection of analytical samples. At some sites where geologic heterogeneities are sufficiently different within the screened interval, high conductivity zones may be preferentially sampled.

12. Measure and record field parameters (pH, specific conductance, Eh, dissolved oxygen (DO), temperature, and turbidity) during purging activities. In lieu of measuring all of the parameters, a minimum subset could be limited to pH, specific conductance, and turbidity or DO. A reduction in the field parameter list must be approved by the Project Manager and/or the NYSDEC Project Manager.

    Water quality indicator parameters should be used to determine purging needs prior to sample collection in each well. Stabilization of indicator parameters should be used to determine when formation water is first encountered during purging. In general, the order of stabilization is pH, temperature, and specific conductance, followed by Eh, DO and turbidity. Performance criteria for determination of stabilization should be based on water-level drawdown, pumping rate and equipment specifications for measuring indicator parameters. An in-line flow through cell to continuously measure the above parameters may be used. The in-line device should be disconnected or bypassed during sample collection.

13. Purging will continue until parameters of water quality have stabilized. Record measurements for field indicator parameters (including water levels) at regular intervals during purging. The stability of these parameters with time can be used to guide the decision to discontinue purging. Proper adjustments must be made to stabilize the flow rate as soon as possible.

14. Record well purging and sampling data in the Project Field Book or on the Groundwater Field Form (sample attached). Measurements should be taken approximately every three to five minutes, or as merited given the rapidity of change.

15. Purging is complete when field indicator parameters stabilize. Stabilization is achieved after all field parameters have stabilized for three successive readings. Three successive readings should be within ± 0.1 units for pH, ± 3% for specific conductance, ± 10 mV for Eh, and ± 10% for turbidity and dissolved oxygen. These stabilization guidelines are provided for rough estimates only,

actual site-specific knowledge may be used to adjust these requirements higher or lower.

An in-line water quality measurement device (e.g., flow-through cell) should be used to establish the stabilization time for several field parameters on a well-specific basis. Data on pumping rate, drawdown and volume required for parameter stabilization can be used as a guide for conducting subsequent sampling activities.

16. Collect all project-required samples from the discharge tubing at the flow rate established during purging in accordance with Benchmark's Groundwater Sample Collection Procedures FOP. **If a peristaltic pump and dedicated tubing is used, collect all project-required samples from the discharge tubing as stated before, however volatile organic compounds should be collected in accordance with the procedure presented in the next section.** Continue to maintain a constant flow rate such that the water level is not drawn down as described above. Fill sample containers with minimal turbulence by allowing the ground water to flow from the tubing along the inside walls of the container.

17. If field filtration is recommended as a result of increased turbidity greater than 50 NTU, an in-line filter equipped with a 0.45-micron filter should be utilized. Collection of a filtered sample must be accompanied by an unfiltered sample.

18. Replace the dedicated tubing down the well taking care to avoid contact with the ground surface.

19. Restore the well to its capped/covered and locked condition.

20. Upon purge and sample collection completion, slowly lower the e-line to the bottom of the well/piezometer. Record the total depth to the nearest 0.01-foot and compare to the previous total depth measurement. If a significant discrepancy exists, re-measure the total depth. Record observations of purge water to determine whether the well/piezometer had become silted due to inactivity or damaged (i.e., well sand within purge water). Upon confirmation

of the new total depth and determination of the cause (i.e., siltation or damage), notify the Project Manager following project field activities.

PERISTALTIC PUMP VOC SAMPLE COLLECTION PROCEDURE

The collection of VOCs from a peristaltic pump and dedicated tubing assembly shall be collected using the following procedure.

1. Once all other required sample containers have been filled, turn off the peristaltic pump. The negative pressure effects of the pump head have not altered groundwater remaining within the dedicated tubing assembly and as such, this groundwater can be collected for VOC analysis.

2. While maintaining the pressure on the flexible tubing within the pump head assembly, carefully remove and coil the polyethylene tubing from the well; taking care to prevent the tubing from coming in contact with the ground surface and without allowing groundwater to escape or drain from the tubing intake.

3. Once the polyethylene tubing is removed, turn the variable speed control to zero and reverse the pump direction.

4. Slowly increase the pump rate allowing the groundwater within the polyethylene tubing to be "pushed" out of the intake end (i.e., positive displacement) making sure the groundwater within the tubing is not "pulled" through the original discharge end (i.e., negative displacement). Groundwater pulled through the pump head assembly CANNOT be collected for VOC analysis.

5. Slowly fill each VOC vial by holding the vial at a 45-degree angle and allowing the flowing groundwater to cascade down the side until the vial is filled with as minimal disturbance as possible. As the vial fills, slowly rotate the vial to vertical. **DO NOT OVERFILL THE VIAL, AS THE PRESERVATIVE WILL BE LOST.** The vial should be filled only enough so that the water creates a slight meniscus at the vial mouth.

6. Cap the VOC vials leaving no visible headspace (i.e., air-bubbles). Gently tap each vial against your hand checking for air bubbles.

7. If an air bubble is observed, slowly remove the cap and repeat Steps 5 and 6.

ATTACHMENTS

Groundwater Field Form (sample)

REFERENCES

United States Environmental Protection Agency, 540/S-95/504, 1995. *Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures.*

Benchmark FOPs:

007	*Calibration and Maintenance of Portable Dissolved Oxygen Meter*
008	*Calibration and Maintenance of Portable Field pH/Eh Meter*
009	*Calibration and Maintenance of Portable Field Turbidity Meter*
011	*Calibration and Maintenance of Portable Photoionization Detector*
012	*Calibration and Maintenance of Portable Specific Conductance Meter*
022	*Groundwater Level Measurement*
024	*Groundwater Sample Collection Procedures*
040	*Non-Disposable and Non-Dedicated Sampling Equipment Decontamination*
046	*Sample Labeling, Storage and Shipment Procedures*

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GROUNDWATER FIELD FORM

Project Name: Date:

Location: Project No.: Field Team:

Well No.	Diameter (inches):	Sample Time:
Product Depth (fbTOR):	Water Column (ft):	DTW when sampled:
DTW (static) (fbTOR):	Casing Volume:	Purpose: ☐ Development ☐ Sample
Total Depth (fbTOR):	Purge Volume (gal):	Purge Method:

Time	Water Level (fbTOR)	Acc. Volume (gallons)	pH (units)	Temp. (deg. C)	SC (uS)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Appearance & Odor
	0 Initial								
	1								
	2								
	3								
	4								
	5								
	6								
	7								
	8								
	9								
	10								
Sample Information:			Date: (if different from above)						
	S1								
	S2								

Well No.	Diameter (inches):	Sample Time:
Product Depth (fbTOR):	Water Column (ft):	DTW when sampled:
DTW (static) (fbTOR):	Casing Volume:	Purpose: ☐ Development ☐ Sample
Total Depth (fbTOR):	Purge Volume (gal):	Purge Method:

Time	Water Level (fbTOR)	Acc. Volume (gallons)	pH (units)	Temp. (deg. C)	SC (uS)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Appearance & Odor
	0 Initial								
	1								
	2								
	3								
	4								
	5								
	6								
	7								
	8								
	9								
	10								
Sample Information:			Date: (if different from above)						
	S1								
	S2								

REMARKS:

Note: All water level measurements are in feet, distance from top of riser.

Volume Calculation

Diam.	Vol. (g/ft)
1"	0.041
2"	0.163
4"	0.653
6"	1.469

Stabilization Criteria

Parameter	Criteria
pH	± 0.1 unit
SC	± 3%
Turbidity	± 10%
DO	± 0.3 mg/L
ORP	± 10 mV

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FIELD OPERATING PROCEDURES

Management of Investigative-Derived Waste (IDW)

FOP 032.1

MANAGEMENT OF INVESTIGATION-DERIVED WASTE (IDW)

PURPOSE

The purpose of these guidelines is to ensure the proper holding, storage, transportation, and disposal of materials generated from field investigation activities that may contain hazardous wastes. Investigation-derived waste (IDW) includes the following:

- Drill cuttings, discarded soil samples, drilling mud solids, and used sample containers.
- Well development and purge waters and discarded groundwater samples.
- Decontamination waters and associated solids.
- Soiled disposable personal protective equipment (PPE).
- Used disposable sampling equipment.
- Used plastic sheeting and aluminum foil.
- Other equipment or materials that either contain or have been in contact with potentially impacted environmental media.

Because these materials may contain regulated chemical constituents, they must be managed as a solid waste. This management may be terminated if characterization analytical results indicate the absence of these constituents.

PROCEDURE

1. Contain all investigation-derived wastes in Department of Transportation (DOT)-approved 55-gallon drums, roll-off boxes, or other containers suitable for the wastes.

2. Contain wastes from separate borings or wells in separate containers (i.e. do not combine wastes from several borings/wells in a single container, unless it is a container used specifically for transfer purposes, or unless specific permission to do so has been provided by the Benchmark Field Team Leader. Unused samples from surface sample locations within a given area may be combined.

3. To the extent practicable, separate solids from drilling muds, decontamination waters, and similar liquids. Place solids within separate containers.

4. Transfer all waste containers to a staging area. Access to this area will be controlled. Waste containers must be transferred to the staging area as soon as practicable after the generating activity is complete.

5. Pending transfer, all containers will be covered and secured when not immediately attended.

6. Label all containers with regard to contents, origin, date of generation, using Benchmark's IDW container label (sample attached). Use indelible ink for all labeling.

7. Complete the Investigative Derived Waste Container Log (sample attached) as waste containers are labeled in order to track and inventory project waste. Leave a copy of the log with the site manager or fax copy to the owner/operator as necessary.

8. Collect samples for waste characterization purposes, or use boring/well sample analytical data for characterization.

9. For wastes determined to be hazardous in character, **be aware of accumulation time limitations**. Coordinate the disposal of these wastes with the plant manager/owner/operator, if applicable.

10. Upon Property Owner, Project Manager, and/or NYSDEC Project Manager approval, dispose of investigation-derived wastes as follows:

- Soil, water, and other environmental media for which analysis does not detect organic constituents, and for which inorganic constituents are at levels that meet the Site's cleanup objectives, may be spread on the Property or otherwise treated as a non-waste material. Disposal quantity and on-site location will be documented on Project Field Books and in the project report submittal.

- Soil, water, and other environmental media in which organic compounds are detected or metals are present above the Site's cleanup objectives will be disposed off-site in accordance with applicable state and federal regulations. Disposal quantity and off-site location will be documented on Project Field Books and in the project report submittal.

- Personal protective equipment, disposable bailers, and similar equipment may be disposed as municipal waste, unless waste characterization results mandate otherwise.

WASTE STORAGE MANAGEMENT

Hazardous materials generated on site should be temporarily stored in a secure location that is under the control of the owner/operator or does not allow for vandalism (i.e., within a locked building structure or within a locked fenced in area). A waste-staging area should be designated on-site by the Project Manager in conjunction with the owner/operator.

ATTACHMENTS

Investigation Derived Waste Container Log (sample)
Investigation Derived Waste Container Label (sample)

REFERENCES

None

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INVESTIGATION DERIVED WASTE CO

Project Name: Location:

Project Number: Personnel:

Container		Contents	Date		Staging Location	Date Sampled	C
Number	Description		Started	Ended			

Prepared By:

Signed:

IDW Container Label (sample):

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Project Name:
Project Number:

Container I.D.:
Contents/Matrix:
Estimated Quantity:
Date of Generation:
Date of Sample Collection:

Contact Name:
Contact Phone Number:

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FIELD OPERATING PROCEDURES

Monitoring Well Construction for Hollow Stem Auger Boreholes

FOP 033.0

MONITORING WELL CONSTRUCTION FOR HOLLOW STEM AUGER BOREHOLES

PURPOSE

Wells will be installed within selected boreholes for the purpose of evaluating groundwater characteristics. Well installation procedures depend upon the drilling method. This procedure describes well construction and installation for boreholes drilled using the hollow stem auger method. Refer to the Benchmark's Hollow Stem Auger Drilling Procedures FOP. Nominal dimensions and materials for the well are shown in the attached well construction diagram.

PROCEDURE

1. Advance borehole in accordance with the Benchmark's Hollow Stem Auger Drilling Procedure FOP to the required depth. The nominal inside diameter (ID) of the auger stem used should be at least 2 inches larger than the outside diameter (OD) of the riser and screen selected for the well installation. Record the monitoring well construction on the Field Borehole/Monitoring Well Installation Log (sample attached) (see Documentation Requirements for Drilling and Well Installation FOP).

2. Remove the drill rods and center bit/plug from the auger stem and verify borehole depth using weighted measuring tape.

3. In the event of an over drill (i.e. borehole depth is more than one foot greater than desired base of screen depth), use bentonite chips poured through the auger stem to seal the over drilled portion of the borehole. Be sure to note bentonite chip thickness on Field Borehole/Monitoring Well Installation Log.

4. Add a maximum of 6 inches of filter pack material through the auger stem to the base of the borehole. (Note: This step may be avoided if dense non-aqueous phase liquids are suspected to be present and it is desirable to have the screen and/or sump at the base of the borehole.)

5. Measure the length of the well string (i.e. riser and screen), and lower the well string into the well assembly to the desired depth. All measurements during the well installation process will be accurate to 0.1 foot.

6. Surface pour filter pack material into the annulus between the well and the auger stem as the augers are gradually withdrawn from the borehole. Use a weighted tape to confirm that the level of sand is maintained within the augers at all times. Record material volumes used.

7. After filter pack materials are brought to the required level, surface pour bentonite chips or pellets into the annulus between the well and the auger stem to form the filter pack seal. If necessary to avoid bridging, delayed hydration (coated) pellets may be used. Record the volume of material used.

8. Allow the bentonite chips/pellets to adequately hydrate for approximately 30 to 45-minutes. Cap or cover the well top of riser.

9. Mix cement/bentonite grout to a smooth consistency using a centrifugal or reciprocating pump. Do not hand mix. All water used must be potable quality. Record the volume of water used.

10. Fill the remaining annulus between the well and the auger stem with grout by surface pouring or pumping, and begin withdrawal of the auger string. Periodically top the auger string off with additional grout. If groundwater is present within the annulus above the bentonite chip/pellet seal, cement/bentonite grout will be pressure tremie grouted from bottom to top in order to displace groundwater from the borehole.

11. When the auger string is withdrawn, center the upper portion of the well riser within the borehole, and place drums or barricades around the well for protection while the grout cures. Place and lock a security cap (i.e., J-plug) in the opening of the well riser.

12. Leave the well undisturbed for at least 24 hours to allow the grout to cure. If excessive grout fallback occurs, top off as necessary with bentonite chips or additional grout.

13. Construct the surface completion as shown in the attached Typical Monitoring Well Detail (Figure 1). Select flush completions for all locations in active operational or high traffic areas, or in other areas where an above grade completion would be undesirable. Use aboveground completions in all other areas.

14. Place a dedicated lock on the well or protective casing, and keep well locked when not actively attended.

15. Permanently label the well with the appropriate well identifier as determined by the Project Manager or specified in the Work Plan.

16. Permanently mark a survey location on the north side at the top of the casing with a saw cut. Survey all wells for horizontal location and elevation, using a surveyor licensed by the State of New York. Coordinates and elevations will be provided in a coordinate system consistent with previous well surveys at the Site. Information obtained will include location (*x* and *y*) of the well, and elevation (*z*) of the ground surface, the pad, and the top of riser.

17. Develop the well as described in the Benchmark Field Operating Procedure for Monitoring Well Development.

18. Manage all waste materials generated during well installation and development as described in the Benchmark Field Operating Procedure for Management of Investigation Derived Waste.

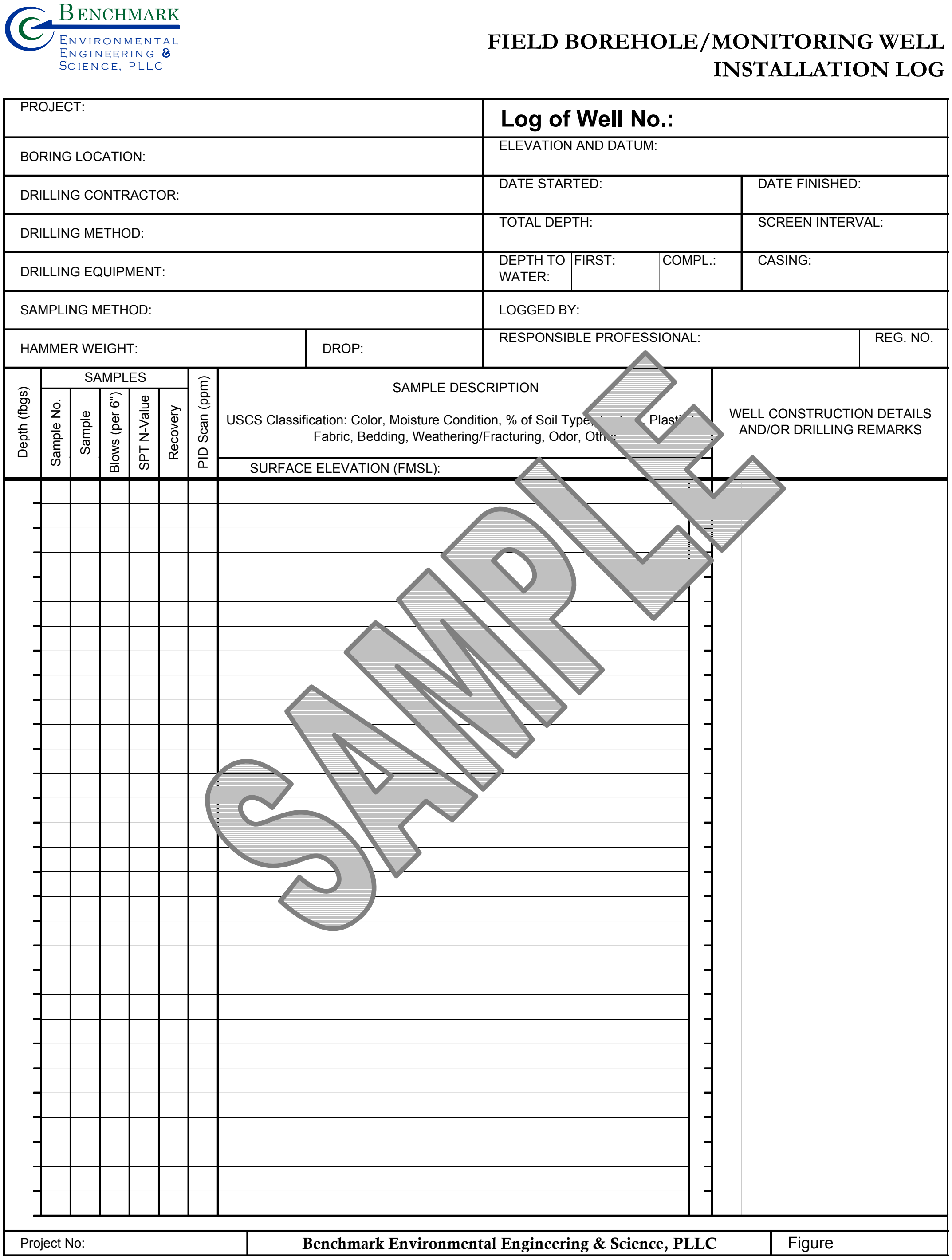
ATTACHMENTS

Field Borehole/Monitoring Well Installation Log (sample)
Typical Monitoring Well Detail (Figure 1)

REFERENCES

<u>Benchmark FOPs:</u>

015	*Documentation Requirements for Drilling and Well Installation*
026	*Hollow Stem Auger Drilling Procedures*
032	*Management of Investigation Derived Waste*
036	*Monitoring Well Development Procedures*



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FIELD BOREHOLE/MONITORING WELL INSTALLATION LOG

PROJECT:	**Log of Well No.:**
BORING LOCATION:	ELEVATION AND DATUM:
DRILLING CONTRACTOR:	DATE STARTED: DATE FINISHED:
DRILLING METHOD:	TOTAL DEPTH: SCREEN INTERVAL:
DRILLING EQUIPMENT:	DEPTH TO WATER: FIRST: COMPL.: CASING:
SAMPLING METHOD:	LOGGED BY:
HAMMER WEIGHT: DROP:	RESPONSIBLE PROFESSIONAL: REG. NO.

Depth (fbgs)	SAMPLES					PID Scan (ppm)	SAMPLE DESCRIPTION USCS Classification: Color, Moisture Condition, % of Soil Type, Texture, Plasticity, Fabric, Bedding, Weathering/Fracturing, Odor, Other SURFACE ELEVATION (FMSL):	WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS
	Sample No.	Sample	Blows (per 6")	SPT N-Value	Recovery			

Project No:

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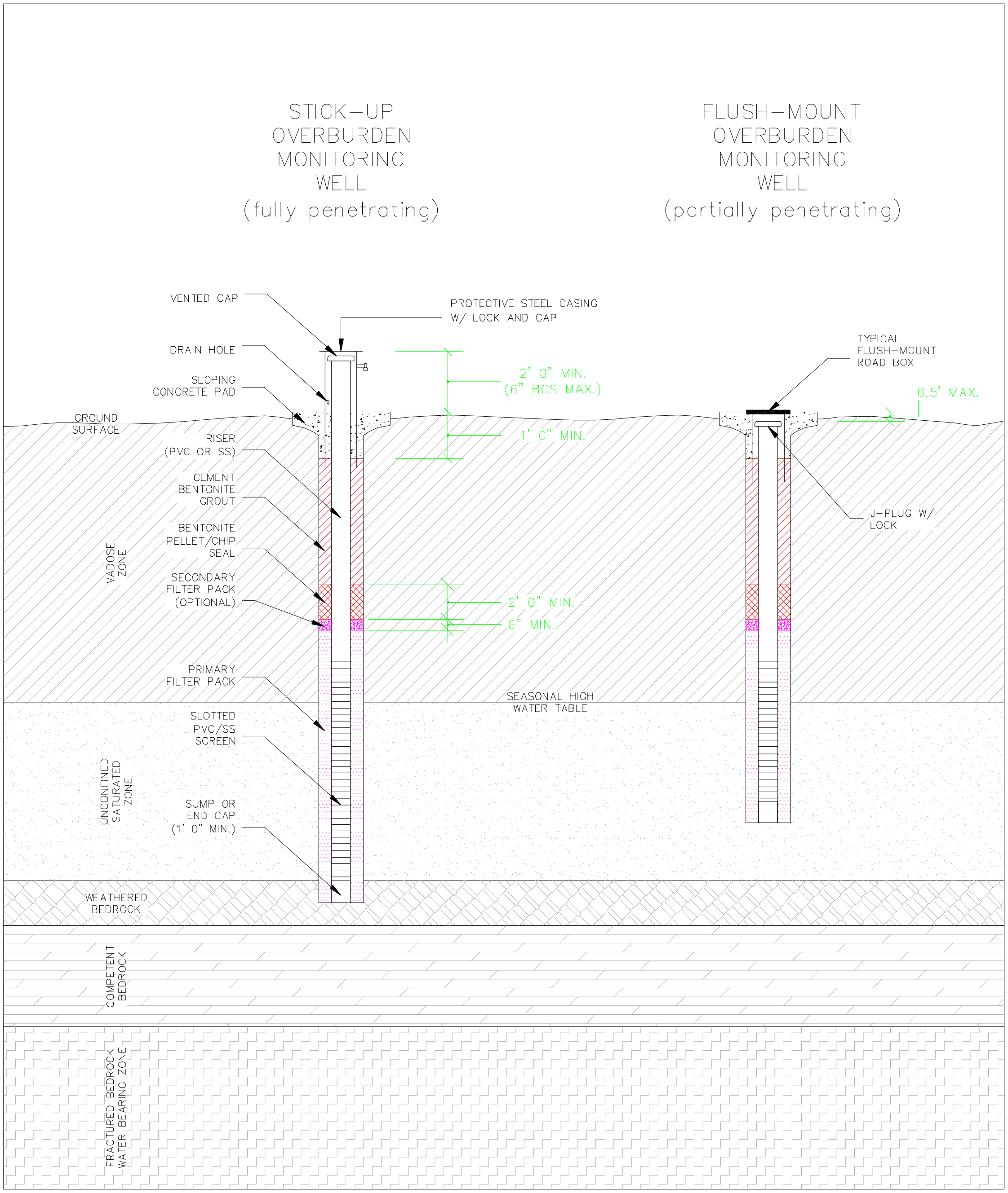
Figure

FIGURE 1


STICK–UP OVERBURDEN MONITORING WELL (fully penetrating)
FLUSH–MOUNT OVERBURDEN MONITORING WELL (partially penetrating)
VENTED CAP
PROTECTIVE STEEL CASING W/ LOCK AND CAP
DRAIN HOLE
SLOPING CONCRETE PAD
GROUND SURFACE
2' 0" MIN. (6" BGS MAX.)
1' 0" MIN.
TYPICAL FLUSH–MOUNT ROAD BOX
0.5' MAX.
RISER (PVC OR SS)
CEMENT BENTONITE GROUT
BENTONITE PELLET/CHIP SEAL
SECONDARY FILTER PACK (OPTIONAL)
J–PLUG W/ LOCK
VADOSE ZONE
2' 0" MIN.
6" MIN.
PRIMARY FILTER PACK
SEASONAL HIGH WATER TABLE
SLOTTED PVC/SS SCREEN
UNCONFINED SATURATED ZONE
SUMP OR END CAP (1' 0" MIN.)
WEATHERED BEDROCK
COMPETENT BEDROCK
FRACTURED BEDROCK WATER BEARING ZONE

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FIELD OPERATING PROCEDURES

Monitoring Well Development Procedures

FOP 036.0

MONITORING WELL DEVELOPMENT PROCEDURES

PURPOSE

This procedure describes the methods for the development of newly installed monitoring wells and re-development of existing monitoring wells that have been inactive for an extended period of time (i.e., one year or more). Monitoring wells are developed after installation in order to remove introduced water and drilling fluids, reduce the turbidity of the water, and improve the hydraulic communication between the well and the water-bearing formation. Well development will not commence until the annular grout seal has cured, but will be performed within ten calendar days of well installation.

PROCEDURE

1. All well development will include surge blocking or false bailing with one or more of the following fluid removal methods. Well development activities may include:

   - Bailing
   - Air Lifting
   - Submersible Pumping
   - Other methods as approved by the Benchmark Field Team Leader.
   - The appropriate water removal method will be selected based on water level depth and anticipated well productivity.

2. Assemble and decontaminate equipment (if necessary), and place in the well. Reference the Benchmark Field Operating Procedure for Non-Disposable and Non-Dedicated Sampling Equipment Decontamination.

3. Alternate the use of agitation methods with water removal methods, using the former to suspend solids in the well water, and the latter to remove the turbid water. For example, use a vented surge block to agitate the well, moving up and down within the screened interval and then use a pump to clear the well. A bailer may be used for both purposes, by surging with the bailer (false

bailing) for a period within the screened interval, then bailing a volume of water from the well.

4. When using surging methods, initiate this activity gradually, with short (2 to 3 feet) strokes. After several passes across the screened interval, increase the speed and length of the surge strokes.

5. Continue development until the following objectives are achieved:

   - Field parameters stabilize to the following criteria:
     - Dissolved Oxygen: ± 0.3 mg/L
     - Turbidity: ± 10%
     - Specific Conductance: ± 3%
     - ORP: ± 10 mV
     - pH: ± 0.1 units
   - The well will generate non-turbid water during continued pumping typically less than 50 NTU.
   - A minimum of 10 well volumes has been evacuated from the well.
   - In the case of lost water during drilling activities, the volume of water removed exceeds twice the volume of water lost to the formation during the drilling process, as indicated by the water balance.

6. Document the development methods, volumes, field parameter measurements, and other observations on the attached Benchmark Groundwater Well Development Log (sample attached).

ATTACHMENTS

Groundwater Well Development Log (sample)

REFERENCES

<u>Benchmark FOPs:</u>

040 Non-Disposable and Non-Dedicated Sampling Equipment Decontamination

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GROUNDWATER WELL DEVELOPMENT LOG

Project Name:	WELL NUMBER:
Project Number:	Sample Matrix:
Client:	Weather:

WELL DATA: DATE: TIME:

Casing Diameter (inches):	Casing Material:
Screened interval (fbTOR):	Screen Material:
Static Water Level (fbTOR):	Bottom Depth (fbTOR):
Elevation Top of Well Riser (fmsl):	Datum Ground Surface: Mean Sea Level
Elevation Top of Screen (fmsl):	Stick-up (feet):

PURGING DATA: DATE: START TIME: END TIME:

VOLUME CALCULATION:

(A) Total Depth of Well (fbTOR):	
(B) Casing Diameter (inches):	
(C) Static Water Level (fbTOR):	
One Well Volume (V, gallons): V = 0.0408 [$(B)^2$ x { (A) - (C) }]	

*Use the table to the right to calculate one well volume.

Field Personnel:

Volume Calculation

Well Diameter	Volume gal/ft
1"	0.041
2"	0.163
3"	0.367
4"	0.653
5"	1.020
6"	1.469
8"	2.611

Stabilization Criteria

Parameter	Criteria
DO	+/- 0.3 mg/L
Turbidity	+/- 10%
SC	+/- 3%
ORP	+/- 10 mV
pH	+/- 0.1 unit

EVACUATION STABILIZATION TEST DATA:

Time	Water Level (fbTOR)	Accumulated Volume (gallons)	pH (units)	Temperature (degrees C)	Specific Conductance (uS/cm)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Appearance & Odor

REMARKS:

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FIELD OPERATING PROCEDURES

Sample Labeling, Storage, and Shipment Procedures

FOP 046.0

SAMPLE LABELING, STORAGE & SHIPMENT PROCEDURES

PURPOSE

The collection and analysis of samples of environmental media, including soils, groundwater, surface water, and sediment, are the central activities of the field investigation. These samples must be properly labeled to preserve its identity, and properly stored and shipped in a manner that preserves its integrity and chain of custody. This procedure presents methods for these activities.

SAMPLE LABELING PROCEDURE

1. Assign each sample retained for analysis a unique 9-digit alphanumeric identification code or as indicated in the Project Work Plan. Typically, this code will be formatted as follows:

<table>
<tr><th colspan="2">Sample I.D. Example: GW051402047</th></tr>
<tr><td>GW</td><td>Sample matrix
GW = groundwater; SW = surface water;
SUB = subsurface soil; SS = surface soil;
SED = sediment; L = leachate; A = air</td></tr>
<tr><td>05</td><td>Month of sample collection</td></tr>
<tr><td>14</td><td>Day of sample collection</td></tr>
<tr><td>02</td><td>Year of sample collection</td></tr>
<tr><td>047</td><td>Consecutive sample number</td></tr>
</table>

2. Consecutive sample numbers will indicate the individual sample's sequence in the total set of samples collected during the investigation/sampling event. The sample number above, for example, would indicate the 47th sample retained for analysis during the field investigation, collected on May 14, 2002.

3. Affix a non-removable (when wet) label to each sample container. The following information will be written on the label with black or blue ink that will not smudge when wet:

    - Project number
    - Sample ID (see Step 1 above)
    - Date of sample collection
    - Time of sample collection (military time only)
    - Specify "grab" or "composite" sample with an "X"
    - Sampler initials
    - Preservative(s) (if applicable)
    - Analytes for analysis (if practicable)

4. Record all sample label information in the Project Field Book and on a Sample Summary Collection Log (see attached samples), keyed to the sample identification number. In addition, add information regarding the matrix, sample location, depth, etc. to provide a complete description of the sample.

SAMPLE STORAGE PROCEDURE

1. Immediately after collection, placement in the proper container, and labeling, place samples to be retained for chemical analysis into resealable plastic bags.

2. Place bagged samples into an ice chest filled approximately half-full of double bagged ice. Blue ice is not an acceptable substitute for ice.

3. Maintain samples in an ice chest or in an alternative location (e.g. sample refrigerator) as approved by the Benchmark Field Team Leader until time of shipment. Periodically drain melt-water off coolers and replenish ice as necessary.

4. Ship samples on a daily basis, unless otherwise directed by the Benchmark Field Team Leader.

5. Maintain appropriate custody procedures on coolers and other sample storage containers at all times. These procedures are discussed in detail in the Project Quality Assurance Project Plan, Monitoring Plan or Work Plan.

6. Samples shall be kept in a secure location locked and controlled (i.e., locked building or fenced area) so that only the Project Field Team Leader has access to the location or under the constant visual surveillance of the same.

SAMPLE SHIPPING PROCEDURE

1. Fill out the chain-of-custody form completely (see attached sample) with all relevant information. The white original goes with the samples and should be placed in a resealable plastic bag and taped inside the sample cooler lid; the sampler should retain the copy.

2. Place a layer of inert cushioning material such as bubble pack in the bottom of cooler.

3. Place each bottle in a bubble wrap sleeve or other protective wrap. To the extent practicable, then place each bottle in a resealable plastic bag.

4. Open a garbage bag (or similar) into a cooler and place sample bottles into the garbage bag (or similar) with volatile organic analysis (VOA) vials near the center of the cooler.

5. Pack bottles with ice in plastic bags. At packing completion, cooler should be at least 50 percent ice, by volume. Coolers should be completely filled, so that samples do not move excessively during shipping.

6. Duct tape (or similar) cooler drain closed and wrap cooler completely in two or more locations to secure lid, specifically covering the hinges of the cooler.

7. Place laboratory label address identifying cooler number (i.e., 1 of 4, 2 of 4 etc.) and overnight delivery waybill sleeves on cooler lid or handle sleeve (Federal Express).

8. Sign the custody seal tape with an indelible soft-tip marker and place over the duct tape across the front and back seam between the lid and cooler body.

9. Cover the signed custody seal tape with an additional wrap of transparent strapping tape.

10. Place "Fragile" and "This Side Up" labels on all four sides of the cooler. "This Side Up" labels are yellow labels with a black arrow with the arrowhead pointing toward the cooler lid.

11. For coolers shipped by overnight delivery, retain a copy of the shipping waybill, and attach to the chain-of-custody documentation.

ATTACHMENTS

Soil/Sediment Sample Summary Collection Log (sample)
Groundwater/Surface Water Sample Summary Collection Log (sample)
Wipe Sample Summary Collection Log (sample)
Air Sample Summary Collection Log (sample)
Chain-Of-Custody Form (sample)

REFERENCES

None

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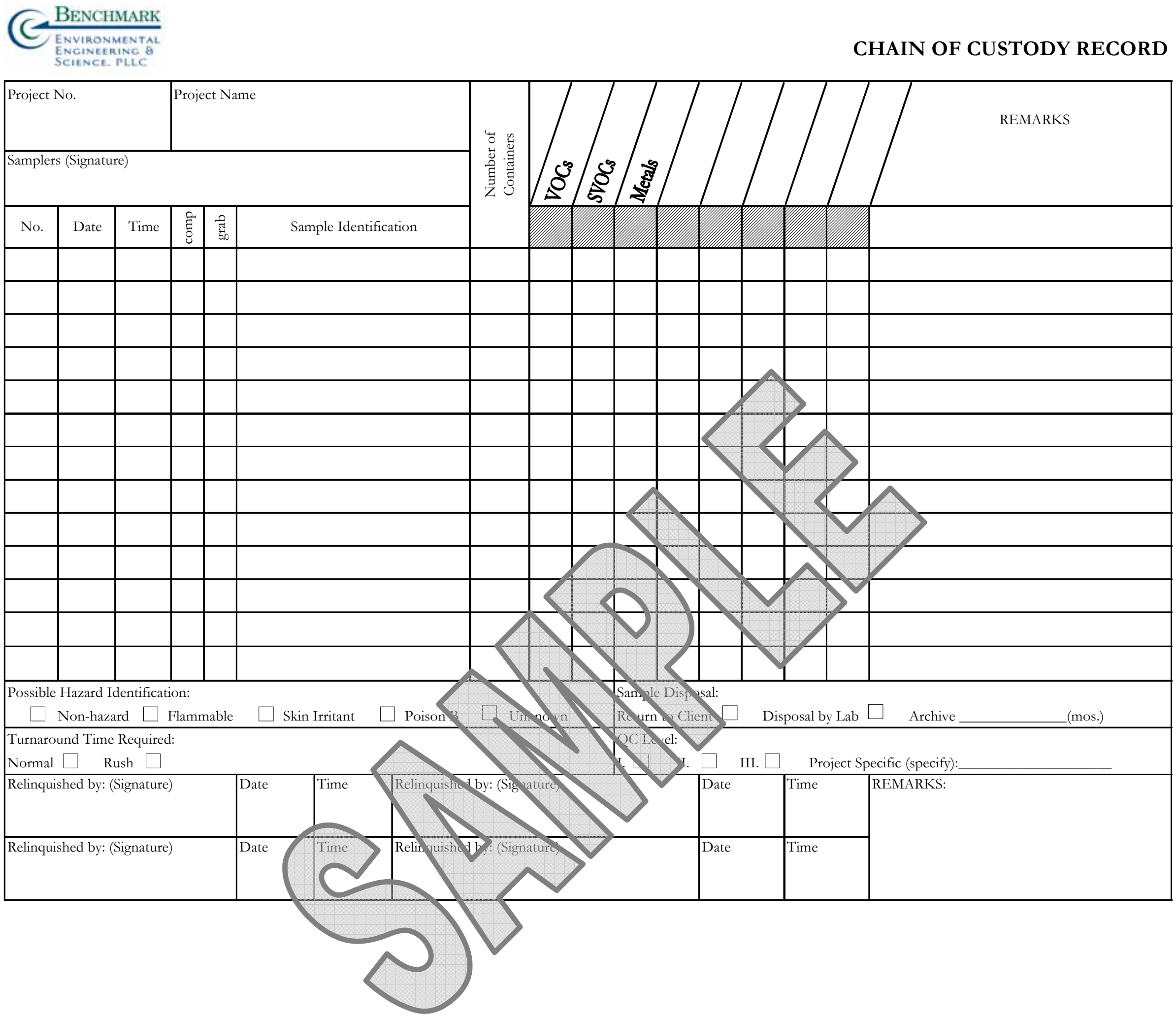
AIR SAMPLE COLLECTION SUMMARY LOG

Field ID	Location	QC Type	Analytical Parameters	Containers	Date	Time	Sampler Initials	Comments (e.g. problems encountered, ref. to variance, location changes, important observations or descriptions, etc.)

Notes:

1. See QAPP for sampling frequency and actual number of QC samples.
2. SC - Summa Canister.
3. TB - Tedlar Bag (quantity).
4. No Matrix Spike, Matrix Spike Duplicate, Matrix Spike Blanks, Field Duplicates, Field Blanks or Rinsates collected for air samples.



CHAIN OF CUSTODY RECORD

Project No.

Project Name

Samplers (Signature)

No.	Date	Time	comp	grab	Sample Identification	Number of Containers	VOCs	SVOCs	Metals						REMARKS
							▨	▨	▨	▨	▨	▨	▨	▨	

Possible Hazard Identification:
☐ Non-hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal:
Return to Client ☐ Disposal by Lab ☐ Archive ____________(mos.)

Turnaround Time Required:
Normal ☐ Rush ☐

QC Level:
I. ☐ II. ☐ III. ☐ Project Specific (specify):__________________

Relinquished by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	REMARKS:
Relinquished by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	

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WIPE SAMPLE COLLECTION SUMMARY LOG

Field ID	Location	QC Type	Analytical Parameters	Containers	Date	Time	Sampler Initials	Comments (e.g. problems encountered, ref. to variance, location changes, important observations or descriptions, etc.)

Notes:

1. See QAPP for sampling frequency and actual number of QC samples.
2. CWM - clear, wide-mouth glass jar with Teflon-lined cap.
3. FD - Field Duplicate.
4. FB - Field Blank.
5. RS - Rinsate.
6. No Matrix Spike, Matrix Spike Duplicate or Matrix Spike Blanks for wipe samples.
7. Rinsates should be taken at a rate of 1 per day during wipe sampling. Only take when reusable equipment is used.
8. Wipe sample FB collected by wiping unused glove (and any other sampling equipment coming into contact with sampled surface) with prepared gauze pad and place in sample jar. Take at a rate of 1 FB per 20 samples.
9. Wipe sample FDs taken adjacent to original sample at a rate of 1 FD per 20 samples.
10. **EH :** Extract and Hold

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AIR SAMPLE COLLECTION SUMMARY LOG

Field ID	Location	QC Type	Analytical Parameters	Containers	Date	Time	Sampler Initials	Comments (e.g. problems encountered, ref. to variance, location changes, important observations or descriptions, etc.)

Notes:

1. See QAPP for sampling frequency and actual number of QC samples.
2. SC - Summa Canister.
3. TB - Tedlar Bag (quantity).
4. No Matrix Spike, Matrix Spike Duplicate, Matrix Spike Blanks, Field Duplicates, Field Blanks or Rinsates collected for air samples.

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CHAIN OF CUSTODY RECORD

Project No.

Project Name

Samplers (Signature)

No.	Date	Time	comp	grab	Sample Identification	Number of Containers	VOCs	SVOCs	Metals						REMARKS

Possible Hazard Identification:

☐ Non-hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal:

Return to Client ☐ Disposal by Lab ☐ Archive ____________(mos.)

Turnaround Time Required:

Normal ☐ Rush ☐

QC Level:

I. ☐ II. ☐ III. ☐ Project Specific (specify):__________________

Relinquished by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	REMARKS:
Relinquished by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	

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FIELD OPERATING PROCEDURES

Screening of Soil Samples for Organic Vapors During Drilling Activities

FOP 047.0

SCREENING OF SOIL SAMPLES FOR ORGANIC VAPORS DURING DRILLING ACTIVITIES

PURPOSE

This procedure is used to screen soil samples for the presence of volatile organic constituents (VOCs) using a field organic vapor meter. These meters will be either photoionization detector (PID) or flame-ionization detector (FID) type. This screening is performed at the drilling and sampling location as a procedure for ensuring the health and safety of personnel at the site and to identify potentially contaminated soil samples for laboratory analysis. All soil samples will be field screened to provide a vertical profile of soil contamination by volatile organic substances.

PROCEDURE

1. Calibrate air-monitoring equipment in accordance with the appropriate Benchmark's Field Operating Procedures or manufacturers recommendations for calibration of field meters.

2. Collect split-spoon (or other sampler) samples in accordance with Benchmark's Split Spoon Sampling Procedure FOP.

3. When the split-spoon or other sampler is opened or accessed, shave a thin layer of material from the entire length of the core.

4. Scan the core visually and with the PID or FID noting stratification, visible staining, or other evidence of contamination.

5. Based on this initial scan of the sample, collect approximately 100 milliliters (ml) of soil using a decontaminated or dedicated stainless steel spatula, scoop, or equivalent. Place this soil into a labeled wide-mouth glass jar approximately ½ to ¾ full and seal with aluminum foil and a screw top cap. Alternatively, the soil may be placed into a clean, re-sealable plastic bag and sealed. Be sure to leave some headspace above the soil sample within the sealed container.

6. Place field screening sample (i.e., jar or bag) in a location where the ambient temperature is at least 70° Fahrenheit.

7. Leave the field screening sample bag for at least 30 minutes, but no more than 60 minutes.

8. Carefully remove the screw top cap from the jar and slowly insert the tip of the organic vapor meter (PID or FID) through the aluminum foil seal making the smallest hole possible. Alternatively, unseal a portion of the plastic bag just big enough to insert the probe of a calibrated PID.

9. Record the maximum reading in parts per million by volume (ppmv) on the Field Borehole Log or Field Borehole/Monitoring Well Installation Log form (see attached samples) (see Documentation Requirements for Drilling and Well Installation FOP), at the depth interval corresponding to the depth of sample collection.

ATTACHMENTS

Field Borehole Log (sample)
Field Borehole/Monitoring Well Installation Log (sample)

REFERENCES

<u>Benchmark FOPs:</u>

010	*Calibration and Maintenance of Portable Flame Ionization Detector*
011	*Calibration and Maintenance of Portable Photoionization Detector*
015	*Documentation Requirements for Drilling and Well Installation*
058	*Split Spoon Sampling Procedures*

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FIELD BOREHOLE LOG

PROJECT:

Log of Boring No.:

BORING LOCATION:

ELEVATION AND DATUM:

DRILLING CONTRACTOR:

DATE STARTED:

DATE FINISHED:

DRILLING METHOD:

TOTAL DEPTH:

SCREEN INTERVAL:

DRILLING EQUIPMENT:

DEPTH TO WATER: FIRST: COMPL.:

CASING:

SAMPLING METHOD:

LOGGED BY:

HAMMER WEIGHT:

DROP:

RESPONSIBLE PROFESSIONAL:

REG. NO.

Depth (fbgs)	SAMPLES					PID Scan (ppm)	SAMPLE DESCRIPTION USCS Classification: Color, Moisture Condition, % of Soil Type, Texture, Plasticity, Fabric, Bedding, Weathering/Fracturing, Odor, Other	REMARKS
	Sample No.	Sample	Blows (per 6")	SPT N-Value	Recovery		SURFACE ELEVATION (FMSL):	

ABANDONMENT:

Volume of cement/bentonite grout required: $V = \pi r^2$ x 7.48 = gallons borehole depth = ft.

Volume of cement/bentonite grout installed: gallons borehole diameter = ft.

Has bridging of grout occurred? ☐ yes ☐ no borehole radius = ft.

If yes, explain resolution:

Method of installation:

Project No: **Benchmark Environmental Engineering & Science, PLLC** Figure

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FIELD BOREHOLE/MONITORING WELL INSTALLATION LOG

PROJECT:		**Log of Well No.:**			
BORING LOCATION:		ELEVATION AND DATUM:			
DRILLING CONTRACTOR:		DATE STARTED:			DATE FINISHED:
DRILLING METHOD:		TOTAL DEPTH:			SCREEN INTERVAL:
DRILLING EQUIPMENT:		DEPTH TO WATER:	FIRST:	COMPL.:	CASING:
SAMPLING METHOD:		LOGGED BY:			
HAMMER WEIGHT:	DROP:	RESPONSIBLE PROFESSIONAL:			REG. NO.

Depth (fbgs)	SAMPLES					PID Scan (ppm)	SAMPLE DESCRIPTION USCS Classification: Color, Moisture Condition, % of Soil Type, Texture, Plasticity, Fabric, Bedding, Weathering/Fracturing, Odor, Other SURFACE ELEVATION (FMSL):	WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS
	Sample No.	Sample	Blows (per 6")	SPT N-Value	Recovery			

Project No:	**Benchmark Environmental Engineering & Science, PLLC**	Figure

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FIELD OPERATING PROCEDURES

Soil Description Procedures Using The Visual-Manual Method

FOP 054.2

SOIL DESCRIPTION PROCEDURES USING THE VISUAL-MANUAL METHOD

PURPOSE

This guideline presents a means for insuring consistent and proper field identification and description of collected soils during a project (via, split-spoon (barrel) sampler, hand auger, test pit etc.). The lithology and moisture content of each soil sample will be physically characterized by visual-manual observation in accordance with ASTM Method D2488, Standard Practice for Description and Identification of Soils (Visual-Manual Procedure). When precise classification of soils for engineering purposes is required, the procedures prescribed in ASTM Method D2487 (Standard Practice for Classification of Soils for Engineering Purposes [Unified Soil Classification System, USCS]) will be used. The method of soil characterization presented herein describes soil types based on grain size, liquid and plastic limits, and moisture content based on visual examination and manual tests. When using this FOP to classify soil, the detail of description provided for a particular material should be dictated by the complexity and objectives of the project. However, more often than not, "after the fact" field information is required later in the project, therefore, every attempt to describe the soil as completely as possibly should be made.

Intensely weathered or decomposed rock that is friable and can be reduced to gravel size or smaller by normal hand pressure should be classified as a soil. The soil classification would be followed by the parent rock name in parenthesis. Projects requiring depth to bedrock determinations should always classify weathered or decomposed bedrock as bedrock (i.e., landfill siting). The project manager should always be consulted prior to making this determination.

PROCEDURE

Assemble necessary equipment and discuss program requirements with drilling contractor.

1. Calibrate air-monitoring equipment in accordance with the appropriate Benchmark's Field Operating Procedures or manufacturers recommendations for calibration of field meters.

2. Collect desired soil sample in accordance with appropriate Benchmark FOP (i.e., split-spoon sampling, hand augering, test pitting etc.).

3. Shave a thin layer off the entire length of the sample to expose fresh sample.

4. Photograph and scan the sample with a photoionization detector (PID) at this time, if applicable, in accordance with Benchmark's Screening of Soil Samples for Organic Vapors During Drilling Activities FOP.

5. Describe the sample using terminology presented in the Descriptive Terms section below.

6. Record all pertinent information in the Project Field Book and Field Borehole Log (sample attached) or Field Borehole/Monitoring Well Installation Log (sample attached).

7. After the sample has been described, place a representative portion of the sample in new, precleaned jars or self-sealing plastic bags for archival purposes (if required). Label the jar or bag with the sample identification number, sample interval, date, project number and store in a secure location.

8. If the soil is to be submitted to a laboratory for analysis, collect the soil sample with a dedicated stainless steel sampling tool, place the sample into the appropriate laboratory-supplied containers, and store in an ice-chilled cooler staged in a secure location in accordance with Benchmark's Sample Labeling, Storage and Shipment Procedures FOP.

9. All remaining soil from soil sample collection activities shall be containerized in accordance with Benchmark's Management of Investigative-Derived Waste (IDW) FOP and/or the Project Work Plan.

DESCRIPTIVE TERMS

All field soil samples will be described using the Unified Soil Classification System (USCS) presented in Figures 1 and 2 (attached). In addition to ASTM Method D2488, Method D1586, Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils (a.k.a., Standard Penetration Test, STP), when implemented, can also be used to classify the resistance of soils. In certain instances, it is desirable to supplement the USCS classification with a geologic interpretation of the soil sample that is supported by the soil descriptive terms presented in this section. The project manager should be consulted when making any geologic interpretation. Field test methods are provided to assist field personnel in classifying soil and are identified by a bold blue **FTM** and shaded. Classification of sampled soils will use the following ASTM descriptive terms and criteria:

- **Group Name** (USCS, see Figure 2)
- **Group Symbol** (USCS, see Figure 2) – only use if physical laboratory testing has been performed to substantiate. The USCS can be applied to most unconsolidated materials, and is represented by a two-letter symbol, except Peat (Pt).
    - The first letter includes: G (gravel), S (sand), M (silt), C (clay), and O (organic).
    - The second letter includes: P (poorly graded or uniform particle sizes), W (well graded or diversified particle sizes), H (high plasticity), and L (low plasticity).
    - Examples:
        - GW = well graded gravels and gravel-sand mixtures, little or no fines
        - GP = poorly graded gravels and gravel-sand mixtures, little or no fines
        - GM = silty gravels, gravel-sand-silt mixtures

    - GC = clayey gravels, gravel-sand-clay mixtures
    - SW = well graded sands and gravelly sands, little or no fines
    - SP = poorly graded sands and gravelly sands, little or no fines
    - SM = silty sand, sand-silt mixtures
    - SC = clayey sand sand-clay mixtures
    - ML = inorganic silts, very fine sands, rock flour, silty or clayey fine sands
    - CL = inorganic clays of low to medium plasticity, gravelly/sandy/silty/lean clays
    - OL = organic silts and organic silty clays of low plasticity
    - MH = inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts (very rare)
    - CH = inorganic clays of high plasticity, fat clays
    - OH = organic clays of medium to high plasticity
    - Pt = peat, muck, and other highly organic soils

- **Angularity** (ASTM D2488; Table 1)
  - Angular – particles have sharp edges and relatively planar sides with unpolished surfaces
  - Subangular – particles are similar to angular description but have rounded edges
  - Subrounded – particles have nearly planar sides but have well-rounded corners and edges
  - Rounded – particles have smoothly curved sides and no edges
- **Particle Shape** (ASTM D2488; Table 2)
  - Flat – particles with width/thickness > 3
  - Elongated – particles with length/width > 3
  - Flat and Elongated – particles meet criteria for both flat and elongated
- **Moisture Condition** (ASTM D2488; Table 3)
  - Dry – absence of moisture, dusty, dry to the touch
  - Moist – damp, but no visible water
  - Wet – visible free water, usually soil is below water table
- **Reaction with Hydrochloric Acid (HCL)** (ASTM D2488; Table 4)
  - None – no visible reaction

  - Weak – some reaction, with bubbles forming slowly
  - Strong – violent reaction, with bubbles forming immediately
- **Consistency of Cohesive Soils** (ASTM D2488; Table 5)
  - Very soft – squeezes between fingers when fist is closed; easily penetrated several inches by fist (SPT = 2 or less)
  - Soft – easily molded by fingers; easily penetrated several inches by thumb (SPT = 2 to 4)
  - Firm – molded by strong pressure of fingers; can be penetrated several inches by thumb with moderate effort (SPT = 4 to 8)
  - Stiff – dented by strong pressure of fingers; readily indented by thumb but can be penetrated only with great effort (SPT = 8 to 15)
  - Very stiff – readily indented by thumbnail (SPT = 15 to 30)
  - Hard – indented with difficultly by thumbnail (SPT >30)
- **Cementation** (ASTM D2488; Table 6)
  - Weak – crumbles or breaks with handling or slight finger pressure
  - Moderate – crumbles or breaks with considerable finger pressure
  - Strong – will not crumble or break with finger pressure
- **Structure (Fabric)** (ASTM D2488; Table 7)
  - Varved – alternating 1 mm to 12 mm (0.04 – 0.5 inch) layers of sand, silt and clay
  - Stratified – alternating layers of varying material or color with the layers less than 6 mm (0.23 inches) thick; note thickness
  - Laminated – alternating layers of varying material or color with the layers less than 6 mm (0.23 inches) thick; note thickness
  - Fissured – contains shears or separations along planes of weakness
  - Slickensided – shear planes appear polished or glossy, sometimes striated

  - Blocky – cohesive soil that can be broken down into small angular lumps which resist further breakdown
  - Lensed – inclusion of small pockets of different soils, such as small lenses of sand scattered through a mass of clay; note thickness
  - Homogeneous or Massive – same color and appearance throughout

- **Inorganic Fine-Grained Soil Characteristics** (ASTM D2488; Table 12)

  Several field tests can be performed to determine the characteristics of fine-grained soils (material passing the No. 40 sieve), such as dry strength, dilatency, and toughness. These field testing methods are described below.

  - **Dry Strength** (ASTM D2488; Table 8)

    FTM (Dry Strength): Select enough material and moisten with water until it can be molded or shaped without sticking to your fingers (slightly below the sticky limit) into a ball about 1 inch in diameter. From this ball, form three balls about ½ inch in diameter and allow to dry in air, or sun, or by artificial means (temperature not to exceed 60° C (140° F). Soil containing natural dry lumps about ½ inch in diameter may be used in place of molded balls, however the dry strengths are usually lower. Test the strength by crushing the dry balls or lumps between your fingers using the descriptions below.

    - None – the dry specimen crumbles with the slightest pressure of handling
    - Low – the dry specimen crumbles with some finger pressure
    - Medium – the dry specimen breaks into pieces or crumbles with considerable finger pressure
    - High – the dry specimen cannot be broken with finger pressure. The specimen will break into pieces between the thumb and a hard surface.
    - Very High – the dry specimen cannot be broken between the thumb and a hard surface

  - **Dilatency** (ASTM D2488; Table 9)

    FTM (Dilatency): Place enough material in your hand to form a ball approximately ½ inch in diameter and moisten with water until it can be molded or shaped without sticking to your fingers (slightly below the sticky limit). Smooth the ball in the palm of one hand with the blade of a knife or small spatula. Shake horizontally, striking the side of the hand vigorously against the other several times. Note the reaction of water appearing on the surface of the soil. The soil is said to have given a reaction to this test if, when it is shaken, water comes to the surface of the sample producing a smooth, shiny appearance. Squeeze the sample between the thumb and forefinger and note the reaction as follows:

- None – no visible change in the specimen
- Slow – water slowly appears on the surface of the specimen during shaking and does not disappear or disappears slowly upon squeezing
- Rapid – water quickly appears on the surface of the specimen during shaking and disappears upon squeezing

- **Toughness** (ASTM D2488; Table 10)

  FTM (Toughness): Following the dilatency test above, shape the test specimen into an elongated pat and roll by hand on a smooth surface or between palms into a thread about 1/8 inch in diameter. Fold the sample threads and re-roll repeatedly until the thread crumbles at a diameter of about 1/8 inch (e.g., near the plastic limit). Note the pressure required to roll the thread near the plastic limit as well as the strength of the thread. After the thread crumbles, lump the pieces together and knead the lump until it crumbles. Describe the toughness as follows:

  - Low – only slight pressure is required to roll the thread near the plastic limit. The thread and the lump are weak and very soft.
  - Medium – medium pressure is required to roll the thread to near the plastic limit. The thread and the lump are soft.
  - High – considerable pressure is required to roll the thread to near the plastic limit. The thread and the lump are firm.

Using the results of the dry strength, dilatency, and toughness test described above, classify the soil according to the following:

Soil Symbol	Dry Strength	Dilatency	Toughness
Silt (ML)	None to low	Slow to rapid	Low or thread cannot be formed
Lean clay (CL)	Medium to high	None to slow	Medium
Elastic Silt (MH)	Low to medium	None to slow	Low to medium
Fat Clay (CH)	High to very high	None	Low to medium high

- **Plasticity** (ASTM D2488; Table 11)

  Two field test methods can be used to determine plasticity of fine-grained soils (material passing the No. 40 sieve): the roll or thread test and the ribbon test. Each test is described below.

  FTM (Roll or Thread Test): As with the toughness test above, mix a representative portion of the soil sample with water until it can be molded or shaped without sticking to your fingers (slightly below the sticky limit). Place an elongated cylindrical sample on a nonabsorbent rolling surface (e.g., glass or was paper on a flat surface) and attempt to roll it into a thread approximately 1/8 inch in diameter. The results of this test are defined below (non-plastic to high plasticity).

  FTM (Ribbon Test): Form a roll from a handful of moist soil (slightly below the sticky limit) about ½ to ¾ inches in diameter and about 3 to 5 inches long. Place the material in the palm of your hand and, starting at one end, flatten the roll between your thumb and forefinger to form the longest and thinnest ribbon possible that can be supported by the cohesive properties of the material before breaking. If the soil sample holds together for a length of 6 to 10 inches without breaking, the material is considered to be both highly plastic and highly compressive (Fat Clay, CH). If the soil cannot be ribboned, it is non-plastic (Silt, ML or MH). If it can be ribboned only with difficulty into short lengths, it has low plasticity (Lean Clay, CL). Use the following terms to describe the plasticity of soil:

  - Nonplastic (ML or MH) – a 3 mm (0.12 inches) thread cannot be rolled at any water content
  - Low Plasticity (CL, ML, or MH) – the thread can barely be rolled, and crumbles easily
  - Medium Plasticity (CL) – the thread is easy to roll and not much time is required to reach the plastic limit before crumbling
  - High Plasticity (CH) – it takes considerable time rolling and kneading to reach the plastic limit; the thread can be rolled several times before crumbling

Note: A soil with as little as 20% clay will behave as a clayey soil. A soil needs 45% to over 60% medium to coarse sand to behave as a sandy soil. In a soil with 20% clay and 80% sand, the soil will behave as a clayey soil.

- **Relative Density of Cohesionless (Granular) Soils**
  - Very loose – easily penetrated 30 cm (1.2 inches) with 13 mm (0.5 inch) rebar pushed by hand (SPT = 0 to 4)
  - Loose – easily penetrated several cm with 13 mm (0.5 inch) rebar pushed by hand (SPT = 4 to 10)
  - Medium dense – easily to moderately penetrated with 13 mm (0.5 inch) rebar driven by 2.3 kg (6 pound) hammer (SPT = 10 to 30)
  - Dense – penetrated 0.3 m (1 foot) with difficulty using 13 mm (0.5 inch) rebar driven by 2.3 kg (6 pound) hammer (SPT = 30 to 50)
  - Very dense – penetrated only a few cm with 13 mm (0.5 inch) rebar driven by 2.3 kg (6 pound) hammer (SPT = >50)
- **Color** (use Munsel® Color System, as necessary)
- **Particle Size** (see Figure 3)
  - Boulder – larger than a basketball
  - Cobble – grapefruit, orange, volleyball
  - Coarse Gravel – tennis ball, grape

  - Fine Gravel – pea
  - Coarse Sand – rock salt
  - Medium Sand – opening in window screen
  - Fine Sand – sugar, table salt
  - Fines (silt and clay) – cannot visually determine size (unaided)
- **Gradation**
  - Well Graded (GW, SW) – full range and even distribution of grain sizes present
  - Poorly-graded (GP, SP) – narrow range of grain sizes present
  - Uniformly-graded (GP, SP) – consists predominantly of one grain size
  - Gap-graded (GP-SP) – within the range of grain sizes present, one or more sizes are missing
- **Organic Material** – Organic soils usually have a dark brown to black color and may have an organic odor. Often, organic soils will change color, for example, black to brown, when exposed to the air. Some organic soils will lighten in color significantly when air-dried. Organic soils normally will not have a high toughness or plasticity. The thread of the toughness test will be spongy.
  - PEAT – 50 to 100 percent organics by volume, primary constituent
  - Organic (soil name) – 15 to 50 percent organics by volume, secondary organic constituent
  - (Soil name) with some organics – 5 to 15 percent organics by volume, additional organic constituents
- **Fill Materials** – All soils should be examined to see if they contain materials indicative of man-made fills. Man-made fill items should be listed in each of the soil descriptions. Common fill indicators include glass, brick, dimensioned lumber, concrete, pavement sections, asphalt, metal, plastics, plaster etc. Other items that could suggest fill include buried vegetation mats, tree limbs, stumps etc. The soil description for a fill material should be followed by the term "FILL", i.e., for a sandy silt with some brick fragments the description would be "SANDY

SILT (ML), with brick fragments (Fill)". The size and distribution of fill indicators should be noted. The limits (depth range) of fill material should be determined and identified at each exploration location.

- **Other Constituents/Characteristics**
    - Additional constituents and/or pertinent soil characteristics not included in the previous categories should be described depending on the scope and objectives of the project. Observations that may be discussed include:
        - Oxide staining
        - Odor
        - Origin
        - Presence of root cast
        - Presence of mica
        - Presence of gypsum
        - Presence of calcium carbonate
        - Percent by volume of cobbles & boulders with size description and appropriate rock classification
    - Other pertinent information from the exploratory program should be recorded, if it would be useful from a biddability/constructability perspective. The conditions that should be listed include caving or sloughing, difficulty in drilling and groundwater infiltration.

SOIL DESCRIPTIONS

Generally, soil descriptions collected during most investigations are not intended for civil engineering (construction) purposes, but rather for hydrogeologic and contaminant transport purposes. As such, the ASTM visual-manual assessments are somewhat limited in that they are only performed in order to indicate important information about potential hydraulic properties of a soil. Soil descriptions should be concise, stressing major constituents and characteristics, and should be given in a consistent order and format. The following order is recommended:

- Soil name. The basic name of the predominant grain size and a single-word modifier indicating the major subordinate grain size (i.e., mostly clay with some silt). The feel test can be used to determine the texture of the soil by rubbing some moist soil between your fingers; sand feels gritty, silt feels smooth, and clays feel sticky. The terms representing percentages of grain size to be used include:
    - Trace – particles are present, but estimated to be less than 5%
    - Few – 5 to 10%
    - Little – 15 to 25%
    - Some – 30 to 45%
    - Mostly – 50 to 100%
- Color (using Munsell® charts, as necessary). Color is an important property in identifying organic soils, and within a given locality it may also be useful in identifying materials of similar geologic origin. It the sample contains layers or patches of varying colors (e.g., mottled), this shall be noted and all representative colors shall be described. The color shall be described for moist samples, however if the color represents a dry condition, it must be stated as such in the log. Generally, colors become darker as the moisture content increases and lighter as the soil dries. Examples include:
    - Some fine-grained soils (OL, OH) with dark drab shades of brown or gray, including almost black, contain organic colloidal matter.
    - In contrast, clean, bright looking shades of gray, olive green, brown, red, yellow, and white are associated with inorganic soils.
    - Gray-blue or gray- and yellow-mottled colors frequently result from poor drainage.
    - Red, yellow, and yellowish brown result from the presence of iron oxides.

  - White to pink may indicate considerable silica, calcium carbonate, or aluminum compounds.

- Field moisture condition as dry, moist, or wet;
- Gradation or Plasticity. Granular soils (i.e., sands or gravels) should be described as well-graded, poorly graded, uniform, or gap-graded, depending on the gradation of the minus 3-inch fraction. Cohesive soils (i.e., silts and clays) should be described as non-plastic, low, medium, or high, depending on the results of the manual evaluation for dry strength, dilatency, toughness, and plasticity discussed previously.
- Consistency/Density. An estimate of consistency of a cohesive soil or density of a granular soil, usually based on the SPT results (see Descriptive Terms section of this FOP);
- Soil Structure or Mineralogy. Description of discontinuities, inclusions, and structures, including joints, fissures, and slickensides.
- Odor. Describe the odor if organic or unusual. Soils containing a significant amount of organic material usually have a distinctive odor of decaying vegetation. This is especially apparent in fresh samples, but if the samples are dried, the odor may often be revived by heating a moistened sample. If the odor is unusual (petroleum, chemical, etc.), it should be noted in the log.
- Other important geologic information such as consolidation, gravel size and shape, visible internal structure, root holes, mica, odors, etc.

The first step when describing soil is to determine if the sample is predominantly fine-grained or coarse-grained (see Figures 3 and 4). Coarse-grained soils are relatively easy to identify, however descriptions of fine-grained soils can be more difficult, requiring additional field tests to assist the field geologist arrive at the proper soils classification (see **FTMs** under Descriptive Terms above). These tests are explained in detail in the ASTM Standard D2488 and briefly herein. Generally, the differentiation between silt and clay is based on plasticity and "texture". However, tests for dry strength and dilatency, along with plasticity, can be very helpful and are recommended in the ASTM Standard. If additional tests are performed, in addition to plasticity, to classify the fines, record them with the soil description on the logs. Doing this will assist the reader (i.e., Project Manager) to follow the logic used to describe a soil (e.g., medium plasticity, <u>low</u> dry strength = elastic silt [MH]; not a lean clay [CL]).

Fines described in the classification should be modified by their plasticity (e.g., non-plastic fines, low plasticity fines, etc.) reserving the words "silt" and "clay" for the soil name.

In summary, adhering to the ASTM Standard and the guidelines outlined in this FOP will provide uniformity in soil descriptions provided by all field personnel. Prior to mobilization to the field, field staff should make sure to have laminated copies of the ASTM Standard flow charts and tables as well as this FOP (as necessary). Some examples of complete soil descriptions are as follows:

<u>Coarse-grained Soil</u>

POORLY GRADED FINE SAND w/ SILT: Dark grey, wet, mostly fine sand with some non-plastic fines, some iron-stained mottling, laminated, medium dense

<u>Fine-grained Soil</u>

LEAN CLAY: Dark reddish/brown, moist, mostly fines, medium plasticity, firm, no dilatency, medium dry strength, root holes.

<u>Soil/Fill (option 1) – visual evidence of fill</u>

FILL: Black, moist, mostly fines with some fine sand, slag, cinders, metal, brick, non-plastic, loose when disturbed, strong odor

Soil/Fill (option 2) – no visual evidence of fill, suspected reworked material

FILL (reworked): Black, moist, mostly fines with some fine sand and few coarse angular gravel, non-plastic, hard, loose when disturbed, mild odor

BORING AND MONITORING WELL INSTALLATION LOGS

Currently, Benchmark utilizes WinLoG software to construct subsurface logs and a template of the log is included in this FOP as an example. One of the most important functions of a boring/monitoring well installation log, besides transmitting the soil description, is to indicate where the "data" (soil samples) were collected, giving the reader an idea of how reliable or representative the description is. On each sample log, depths of attempted and recovered or non-recovered interval are shown. Odor, if noted, should be considered subjective and not necessarily indicative of specific compounds or concentrations.

Remember: all field logs should be NEAT, ACCURATE, and LEGIBLE. Don't forget that the well completion diagram completed for each well requires details of the surface completion (i.e., flush-mount, stick-up etc.). It is the responsibility of the field staff to double-check each log (i.e., soil names, classifications, well construction details etc.) prior to implementing into a final report. A registered professional (i.e., professional engineer, PE or professional geologist, PG) must review each log and will be ultimately responsible for its content and accuracy.

REQUIRED EQUIPMENT

- Knife
- Engineer's rule/measuring tape

- Permanent marker
- Pre-cleaned wide-mouth sample jars (typically provided by the driller)
- Pre-cleaned wide-mouth laboratory sample jars (provided by the laboratory)
- Stainless steel sampling equipment (i.e., spoons, spatulas, bowls etc.)
- 10x hand lens
- Hydrochloric acid
- ASTM D2488 flow charts (preferably laminated)
- ASTM D2488 test procedures (Tables 1 through 12) (preferably laminated)
- Camera (disposable, 35 mm or digital)
- Munsell soil color chart (as necessary)
- Project Field Book/field forms

ATTACHMENTS

Figure 1; Field Guide for Soil and Stratigraphic Analysis
Figure 2; USCS Soil Classification Flow Chart (modified from ASTM D2488)
Figure 3; Illustration of Particle Sizes
Figure 4; Grain-Size Scale (Modified Wentworth Scale)

Field Borehole Log (sample)

REFERENCES

American Society for Testing and Materials, 2008a. *ASTM D1586: Standard Test Method for Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils.*

American Society for Testing and Materials, 2010. *ASTM D2487: Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).*

American Society for Testing and Materials, 2009a. *ASTM D2488: Standard Practice for Description and Identification of Soils (Visual-Manual Procedure).*

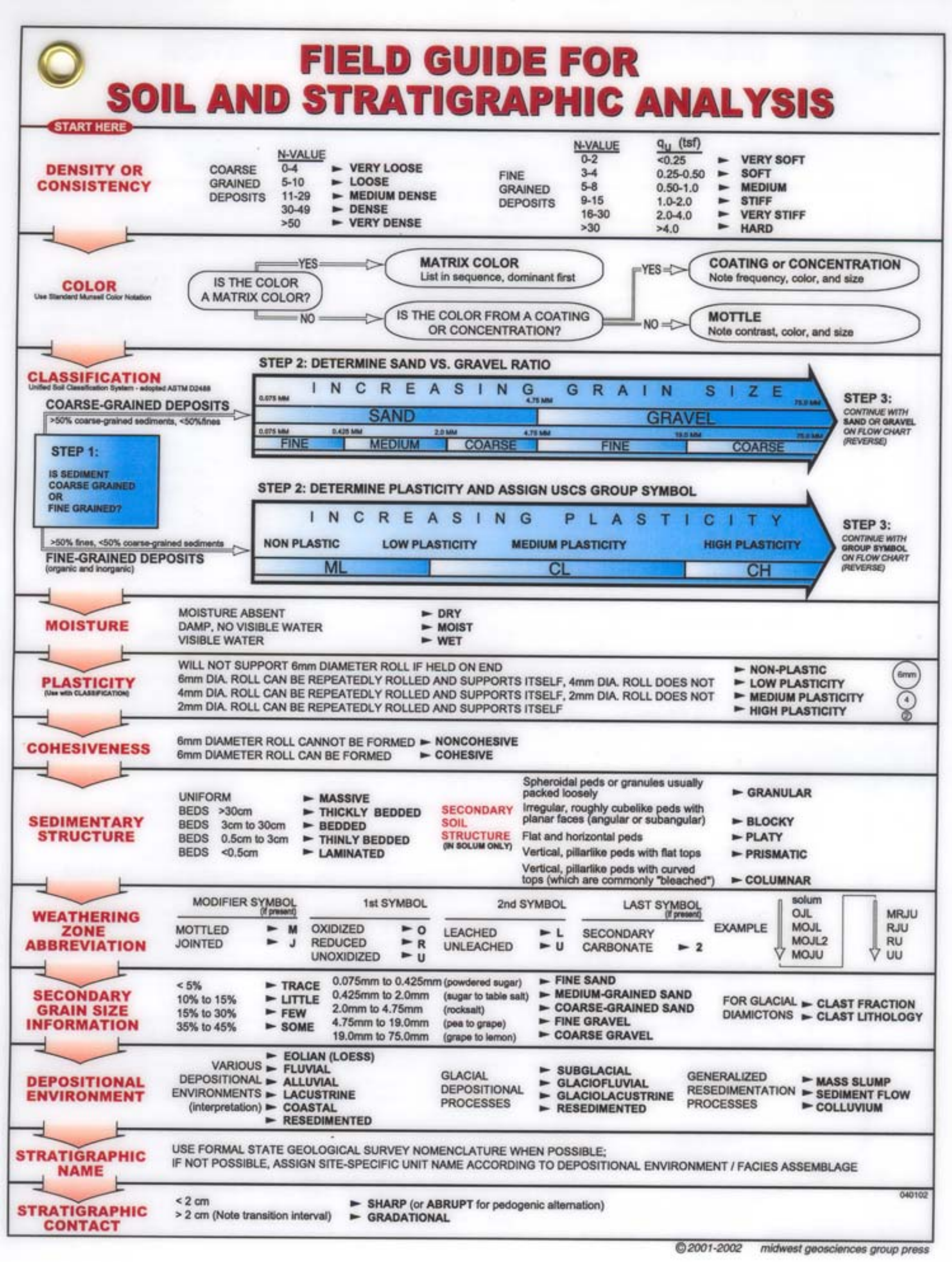
State of California, Department of Transportation, Engineering Service Center, Office of Structural Foundations, August 1996. *Soil & Rock Logging Classification Manual (Field Guide), by Joseph C. de Larios.*

Benchmark FOPs:

010	*Calibration and Maintenance of Portable Flame Ionization Detector*
011	*Calibration and Maintenance of Portable Photoionization Detector*
015	*Documentation Requirements for Drilling and Well Installation*
025	*Hand Augering Procedures*
032	*Management of Investigation-Derived Waste*
046	*Sample Labeling, Storage and Shipment Procedures*
047	*Screening of Soil Samples for Organic Vapors During Drilling Activities*
058	*Split-Spoon Sampling Procedures*
065	*Test Pit Excavation and Logging Procedures*

FIGURE 1

FIELD GUIDE FOR SOIL AND STRATIGRAPHIC ANALYSIS



FIELD GUIDE FOR SOIL AND STRATIGRAPHIC ANALYSIS

START HERE

DENSITY OR CONSISTENCY

	N-VALUE	
COARSE GRAINED DEPOSITS	0-4	► VERY LOOSE
	5-10	► LOOSE
	11-29	► MEDIUM DENSE
	30-49	► DENSE
	>50	► VERY DENSE

	N-VALUE	q_u (tsf)	
FINE GRAINED DEPOSITS	0-2	<0.25	► VERY SOFT
	3-4	0.25-0.50	► SOFT
	5-8	0.50-1.0	► MEDIUM
	9-15	1.0-2.0	► STIFF
	16-30	2.0-4.0	► VERY STIFF
	>30	>4.0	► HARD

COLOR
Use Standard Munsell Color Notation

IS THE COLOR A MATRIX COLOR?
YES ► MATRIX COLOR
List in sequence, dominant first
NO ► IS THE COLOR FROM A COATING OR CONCENTRATION?
YES ► COATING or CONCENTRATION
Note frequency, color, and size
NO ► MOTTLE
Note contrast, color, and size

CLASSIFICATION
Unified Soil Classification System - adopted ASTM D2488

STEP 1:
IS SEDIMENT COARSE GRAINED OR FINE GRAINED?

COARSE-GRAINED DEPOSITS
>50% coarse-grained sediments, <50%fines

STEP 2: DETERMINE SAND VS. GRAVEL RATIO

INCREASING GRAIN SIZE

0.075 MM — SAND — 4.75 MM — GRAVEL — 75.0 MM

0.075 MM FINE 0.425 MM MEDIUM 2.0 MM COARSE 4.75 MM FINE 19.0 MM COARSE 75.0 MM

STEP 3:
CONTINUE WITH SAND OR GRAVEL ON FLOW CHART (REVERSE)

FINE-GRAINED DEPOSITS
(organic and inorganic)
>50% fines, <50% coarse-grained sediments

STEP 2: DETERMINE PLASTICITY AND ASSIGN USCS GROUP SYMBOL

INCREASING PLASTICITY

NON PLASTIC — LOW PLASTICITY: ML
MEDIUM PLASTICITY: CL
HIGH PLASTICITY: CH

STEP 3:
CONTINUE WITH GROUP SYMBOL ON FLOW CHART (REVERSE)

MOISTURE

MOISTURE ABSENT	► DRY
DAMP, NO VISIBLE WATER	► MOIST
VISIBLE WATER	► WET

PLASTICITY
(Use with CLASSIFICATION)

WILL NOT SUPPORT 6mm DIAMETER ROLL IF HELD ON END	► NON-PLASTIC
6mm DIA. ROLL CAN BE REPEATEDLY ROLLED AND SUPPORTS ITSELF, 4mm DIA. ROLL DOES NOT	► LOW PLASTICITY
4mm DIA. ROLL CAN BE REPEATEDLY ROLLED AND SUPPORTS ITSELF, 2mm DIA. ROLL DOES NOT	► MEDIUM PLASTICITY
2mm DIA. ROLL CAN BE REPEATEDLY ROLLED AND SUPPORTS ITSELF	► HIGH PLASTICITY

6mm
4
2

COHESIVENESS

6mm DIAMETER ROLL CANNOT BE FORMED	► NONCOHESIVE
6mm DIAMETER ROLL CAN BE FORMED	► COHESIVE

SEDIMENTARY STRUCTURE

UNIFORM	► MASSIVE
BEDS >30cm	► THICKLY BEDDED
BEDS 3cm to 30cm	► BEDDED
BEDS 0.5cm to 3cm	► THINLY BEDDED
BEDS <0.5cm	► LAMINATED

SECONDARY SOIL STRUCTURE
(IN SOLUM ONLY)

Spheroidal peds or granules usually packed loosely	► GRANULAR
Irregular, roughly cubelike peds with planar faces (angular or subangular)	► BLOCKY
Flat and horizontal peds	► PLATY
Vertical, pillarlike peds with flat tops	► PRISMATIC
Vertical, pillarlike peds with curved tops (which are commonly "bleached")	► COLUMNAR

WEATHERING ZONE ABBREVIATION

MODIFIER SYMBOL (if present)		1st SYMBOL		2nd SYMBOL		LAST SYMBOL (if present)	
MOTTLED	► M	OXIDIZED	► O	LEACHED	► L	SECONDARY CARBONATE	► 2
JOINTED	► J	REDUCED	► R	UNLEACHED	► U		
		UNOXIDIZED	► U				

EXAMPLE

solum	
OJL	MRJU
MOJL	RJU
MOJL2	RU
MOJU	UU

SECONDARY GRAIN SIZE INFORMATION

< 5%	► TRACE
10% to 15%	► LITTLE
15% to 30%	► FEW
35% to 45%	► SOME

0.075mm to 0.425mm	(powdered sugar)	► FINE SAND
0.425mm to 2.0mm	(sugar to table salt)	► MEDIUM-GRAINED SAND
2.0mm to 4.75mm	(rocksalt)	► COARSE-GRAINED SAND
4.75mm to 19.0mm	(pea to grape)	► FINE GRAVEL
19.0mm to 75.0mm	(grape to lemon)	► COARSE GRAVEL

FOR GLACIAL DIAMICTONS
► CLAST FRACTION
► CLAST LITHOLOGY

DEPOSITIONAL ENVIRONMENT

VARIOUS DEPOSITIONAL ENVIRONMENTS (interpretation)
► EOLIAN (LOESS)
► FLUVIAL
► ALLUVIAL
► LACUSTRINE
► COASTAL
► RESEDIMENTED

GLACIAL DEPOSITIONAL PROCESSES
► SUBGLACIAL
► GLACIOFLUVIAL
► GLACIOLACUSTRINE
► RESEDIMENTED

GENERALIZED RESEDIMENTATION PROCESSES
► MASS SLUMP
► SEDIMENT FLOW
► COLLUVIUM

STRATIGRAPHIC NAME

USE FORMAL STATE GEOLOGICAL SURVEY NOMENCLATURE WHEN POSSIBLE;
IF NOT POSSIBLE, ASSIGN SITE-SPECIFIC UNIT NAME ACCORDING TO DEPOSITIONAL ENVIRONMENT / FACIES ASSEMBLAGE

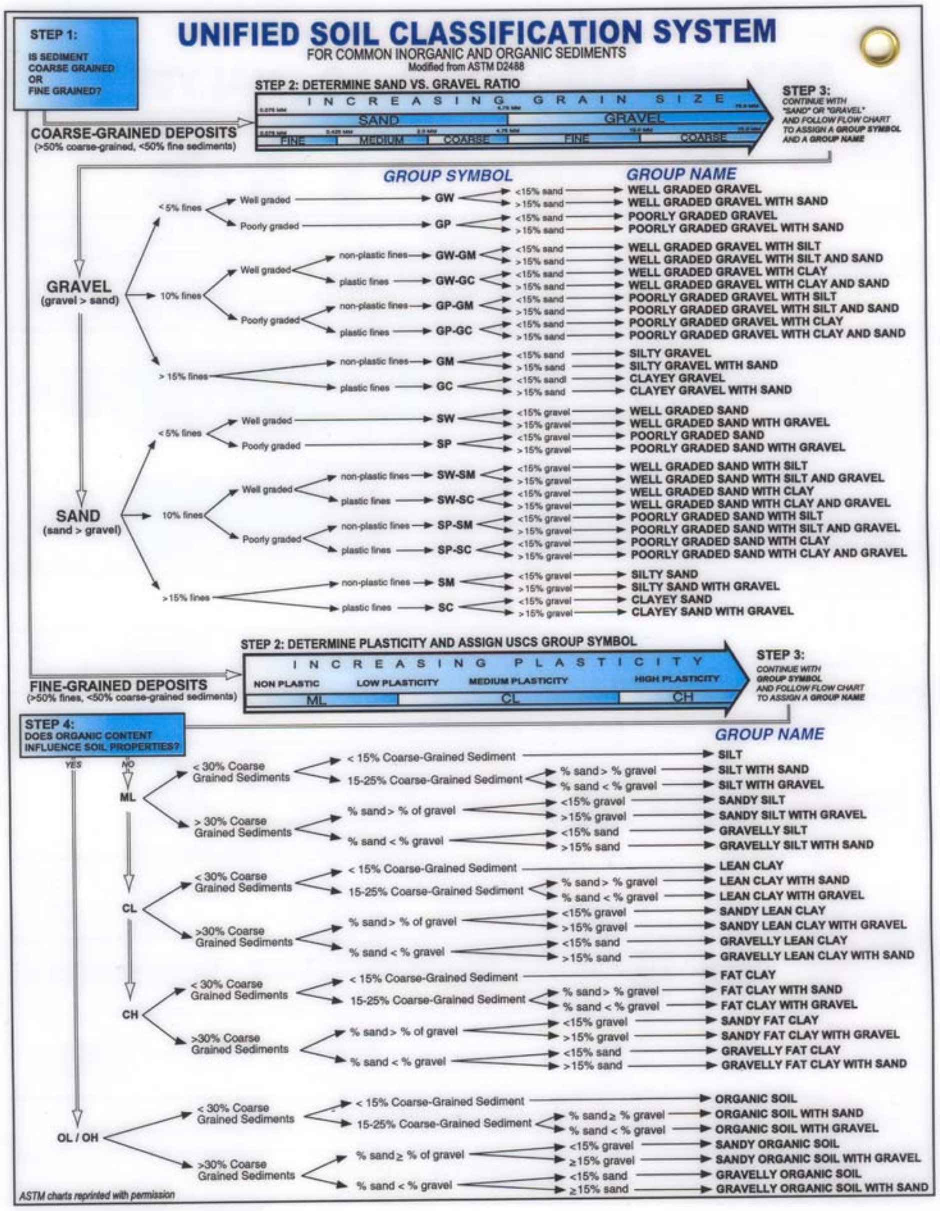
STRATIGRAPHIC CONTACT

< 2 cm	► **SHARP** (or **ABRUPT** for pedogenic alternation)
> 2 cm (Note transition interval)	► **GRADATIONAL**

040102

FIGURE 2

USCS SOIL CLASSIFICATION FLOW CHART
(MODIFIED FROM ASTM D2488)



ASTM charts reprinted with permission

FIGURE 3

ILLUSTRATION OF PARTICLE SIZES

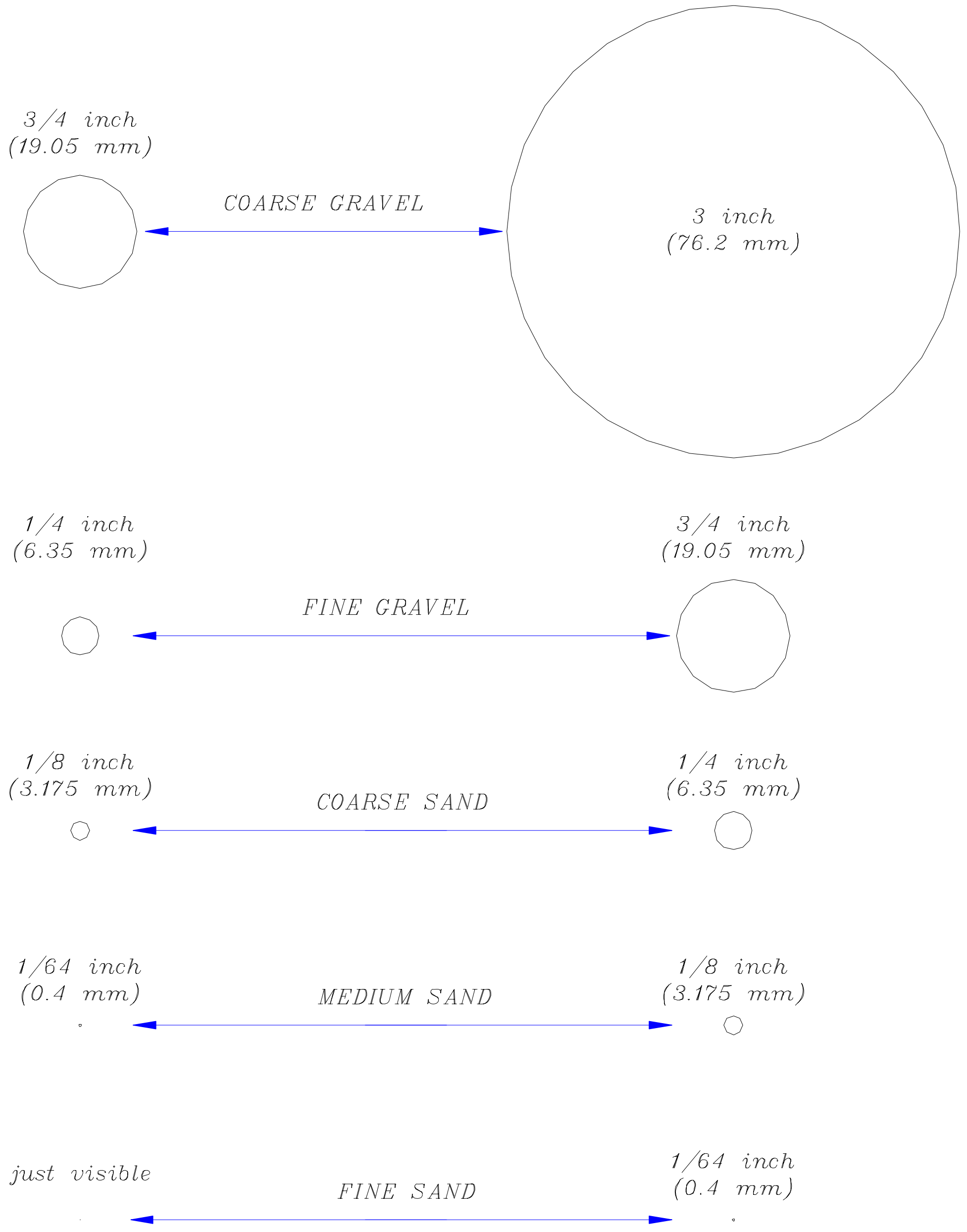


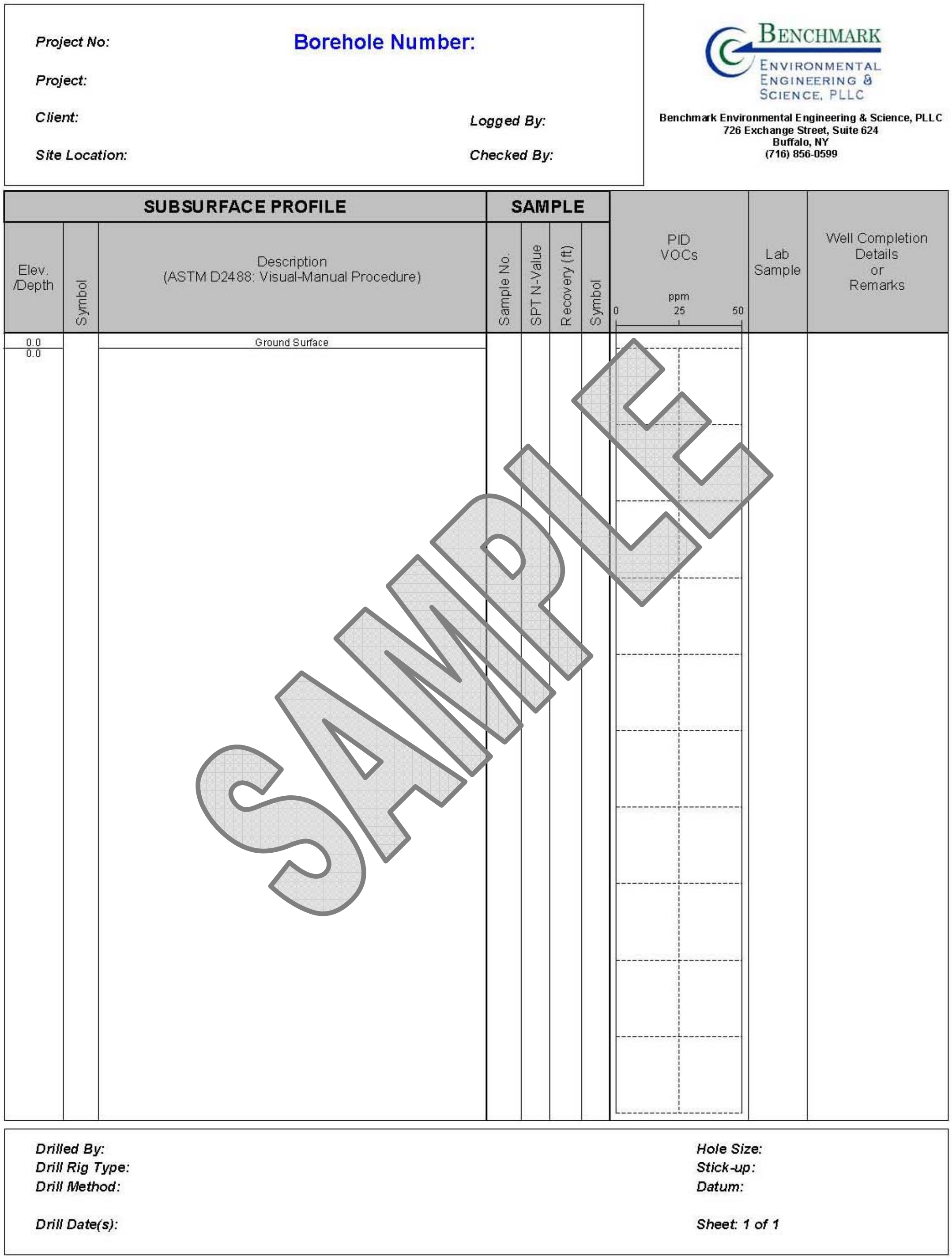
FIGURE 4

GRAIN-SIZE SCALE (MODIFIED WENTWORTH SCALE)

Grain size refers to the physical dimensions of particles of rock or other solid. This is different from the crystallite size, which is the size of a single crystal inside the solid (a grain can be made of several single crystals). Grain sizes can range from very small colloidal particles, through clay, silt, sand, and gravel, to boulders. Size ranges define limits of classes that are given names in the Wentworth scale used in the United States. The Krumbein *phi* (φ) scale, a modification of the Wentworth scale created by W. C. Krumbein, is a logarithmic scale computed by the equation: $\varphi = -\log_2(\text{grain size in mm})$.

φ scale	Size range (metric)	Size range (approx. inches)	Aggregate name (Wentworth Class)
< −8	> 256 mm	> 10.1 in	Boulder
−6 to −8	64–256 mm	2.5–10.1 in	Cobble
−5 to −6	32–64 mm	1.26–2.5 in	Very coarse gravel
−4 to −5	16–32 mm	0.63–1.26 in	Coarse gravel
−3 to −4	8–16 mm	0.31–0.63 in	Medium gravel
−2 to −3	4–8 mm	0.157–0.31 in	Fine gravel
−1 to −2	2–4 mm	0.079–0.157 in	Very fine gravel
0 to −1	1–2 mm	0.039–0.079 in	Very coarse sand
1 to 0	½–1 mm	0.020–0.039 in	Coarse sand
2 to 1	¼–½ mm	0.010–0.020 in	Medium sand
3 to 2	125–250 µm	0.0049–0.010 in	Fine sand
4 to 3	62.5–125 µm	0.0025–0.0049 in	Very fine sand
8 to 4	3.90625–62.5 µm	0.00015–0.0025 in	Silt
> 8	< 3.90625 µm	< 0.00015 in	Clay
<10	< 1 µm	< 0.000039 in	Colloid

In some schemes "gravel" is anything larger than sand (>2.0 mm), and includes "granule", "pebble", "cobble", and "boulder" in the above table. In this scheme, "pebble" covers the size range 4 to 64 mm (−2 to −6 φ).



Project No:

Borehole Number:

Project:

Client:

Logged By:

Site Location:

Checked By:

Benchmark Environmental Engineering & Science, PLLC
726 Exchange Street, Suite 624
Buffalo, NY
(716) 856-0599

SUBSURFACE PROFILE			SAMPLE				PID VOCs	Lab Sample	Well Completion Details or Remarks
Elev. /Depth	Symbol	Description (ASTM D2488: Visual-Manual Procedure)	Sample No.	SPT N-Value	Recovery (ft)	Symbol	ppm 0 25 50		
0.0 0.0		Ground Surface							

Drilled By:
Drill Rig Type:
Drill Method:

Drill Date(s):

Hole Size:
Stick-up:
Datum:

Sheet: 1 of 1

TurnKey
Environmental
Restoration, LLC

FIELD OPERATING PROCEDURES

Soil Sample Collection for VOC Analysis - EnCore Sampling

FOP 057.0

SOIL SAMPLE COLLECTION FOR VOC ANALYSIS – ENCORE SAMPLING

BACKGROUND AND PURPOSE

This procedure describes the methods for collecting soil samples for VOC analysis to ensure that the sample adequately represents the VOC concentrations in the soil in accordance with SW-846 Method 5035A (effective July 1, 2002). These compounds tend to volatilize from the soil after disturbance or introduction to the atmosphere. Therefore, care must be exercised to ensure that the sample collected is not altered during the collection and storage procedures. A variety of sampling options are allowed and Appendix A of Method 5035A provides details regarding the many options available for sample collection. The collection and preservation procedures are intended to prevent loss of VOCs during sample transport, handling and analysis.

Method 5035A is a method designed for volatile sample collection and analysis of soils and solid wastes for volatile organic compounds. This method is described in Update III to the Third Edition of SW-846, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, and is required for all analytical methods using purge and trap techniques (8021, 8015B, and 8260B). Alternative protocols may be used in some states (including New York), however this method is strongly recommended.

The volatile analysis is performed over two ranges:

	GC/MS (µg/kg)	GC (µg/kg)
Low Level	5 – 300	Not Available
High Level	>250	>20

The different levels require different sampling techniques. The low level method can only handle samples within a specific concentration range (these samples CANNOT be diluted), therefore a high level sample MUST be collected to ensure that all the target analytes can be quantified.

Naturally occurring carbonates in some soils may cause effervescence (foaming) on contact with the sodium bisulfate (NaHSO4) solution used as preservative for the low-level preparation. This interference makes it necessary for the laboratory to use the high-level prep or an alternative technique for low level. Check with the NYSDEC to discuss acceptable options.

Typically, analytical laboratories will support the following options for the two levels:

Option	No. of Containers	Sample Size (g)	Holding Time (days)
A – Low Level EnCore™ Samplers	3*	5	14**
B – High Level EnCore™ Sampler	1*	5	14**
C – High Level Methanol vial w/syringe	1	10	14

* Additional EnCore™ Samplers are required for MS/MSD.

** The sample MUST be extracted and preserved in sodium bisulfate or methanol within 48 hours of collection.

NOTE: The EnCore™ Sampler is disposable – it can only be used ONCE. It CANNOT be cleaned and/or reused. The samplers MUST be used in conjunction with an EnCore™ T-handle.

PROCEDURE

The preferred method for collecting and storing a soil sample for VOC analysis is using the EnCore™ method. This field procedure is described in this FOP.

1. The sampling team should reference the manufacturers' directions prior to sample collection (attached).

    a. Ensure that the EnCore™ Sampler is present at the sampling location before collecting the sample from the borehole or surface sample location. The necessary parts of the EnCore™ Sampler will consist of three disposable coring bodies, three disposable caps, and a reusable stainless steel T-handle.

    b. Retrieve the sampling tool from the borehole or sample location.

    c. Expose a surface of the soil sample. For Shelby tube samples, this would require the extrusion of the sample. For split spoon samples, this would require the spoon be disassembled and opened. If liners are being used in conjunction with a split spoon or solid barrel sampler, this would require the removal of the liners from the sampler, so that the soil at the liner's end is exposed.

    d. Following the manufacturer's directions for the use of the EnCore™ Sampler (attached), collect three aliquots of soil from the exposed soil surface, using the three coring bodies. After the collection of each aliquot, cap and label each aliquot. The manufacturer's direction for use of the EnCore™ Sampler are attached

2. If the use of the EnCore™ Sampler is not possible due to soil texture (e.g. gravels) the sample must be field preserved with acid and methanol in accordance with SW-846 Method 5035A.

3. If the soil material is too coarse for sampling with the EnCore™ Sampler and contains excessive calcium carbonate material that reacts with the acid preservative, the sample will be retained in the brass or stainless steel liner of the split-spoon sampler or similar device. The ends of these liners will be covered with Teflon™ rounds, capped and sealed with tape.

4. Record all information associated with sample collection in the Project Field Book.

5. The samples will be labeled, stored and shipped in accordance with the TurnKey's Field Operating Procedure for Sample Labeling, Storage and Shipment Procedures.

ATTACHMENTS

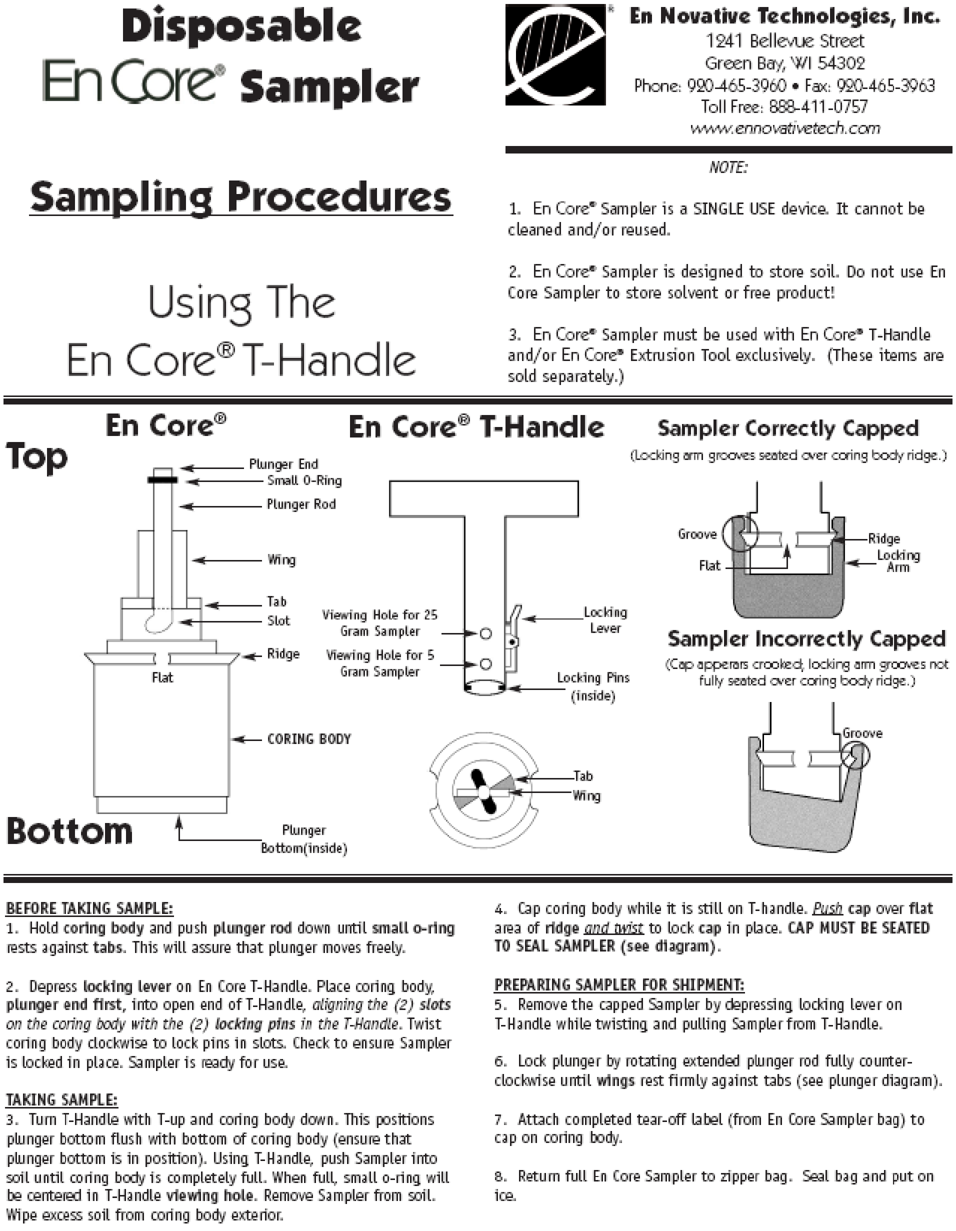
EnCore™ Sampling Procedure (manufacturers instructions)

REFERENCES

TurnKey FOPs:
046 Sample Labeling, Storage and Shipment Procedures

ATTACHMENT

EnCore™ Sampling Procedure (manufacturers instructions)



Disposable En Core® Sampler

En Novative Technologies, Inc.
1241 Bellevue Street
Green Bay, WI 54302
Phone: 920-465-3960 • Fax: 920-465-3963
Toll Free: 888-411-0757
www.ennovativetech.com

Sampling Procedures

Using The
En Core® T-Handle

NOTE:

1. En Core® Sampler is a SINGLE USE device. It cannot be cleaned and/or reused.

2. En Core® Sampler is designed to store soil. Do not use En Core Sampler to store solvent or free product!

3. En Core® Sampler must be used with En Core® T-Handle and/or En Core® Extrusion Tool exclusively. (These items are sold separately.)

BEFORE TAKING SAMPLE:

1. Hold **coring body** and push **plunger rod** down until **small o-ring** rests against **tabs**. This will assure that plunger moves freely.

2. Depress **locking lever** on En Core T-Handle. Place coring body, **plunger end first**, into open end of T-Handle, *aligning the (2) slots on the coring body with the (2)* ***locking pins*** *in the T-Handle*. Twist coring body clockwise to lock pins in slots. Check to ensure Sampler is locked in place. Sampler is ready for use.

TAKING SAMPLE:

3. Turn T-Handle with T-up and coring body down. This positions plunger bottom flush with bottom of coring body (ensure that plunger bottom is in position). Using T-Handle, push Sampler into soil until coring body is completely full. When full, small o-ring will be centered in T-Handle **viewing hole**. Remove Sampler from soil. Wipe excess soil from coring body exterior.

4. Cap coring body while it is still on T-handle. *Push* **cap** over **flat** area of **ridge** *and twist* to lock cap in place. **CAP MUST BE SEATED TO SEAL SAMPLER (see diagram).**

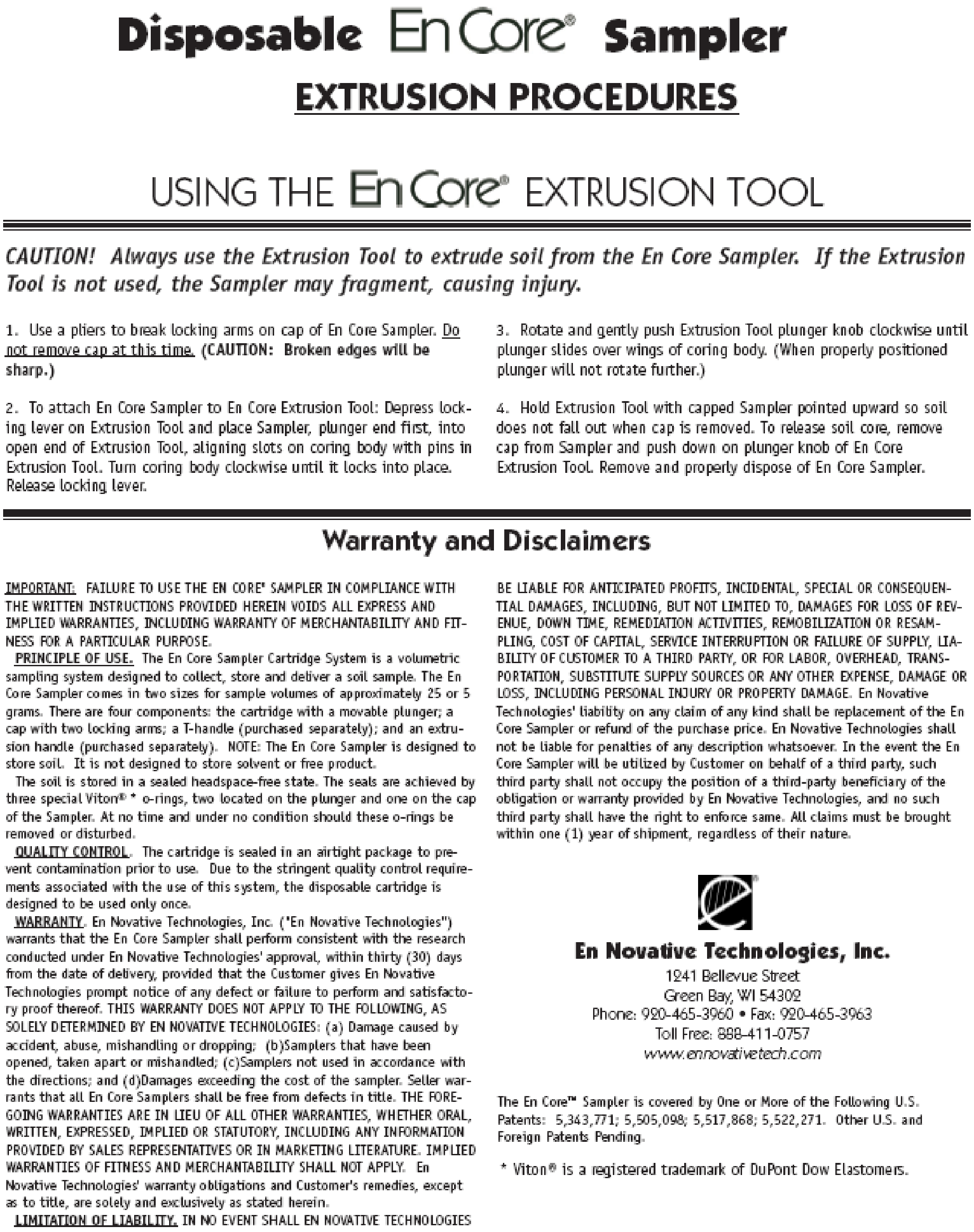
PREPARING SAMPLER FOR SHIPMENT:

5. Remove the capped Sampler by depressing locking lever on T-Handle while twisting and pulling Sampler from T-Handle.

6. Lock plunger by rotating extended plunger rod fully counter-clockwise until **wings** rest firmly against tabs (see plunger diagram).

7. Attach completed tear-off label (from En Core Sampler bag) to cap on coring body.

8. Return full En Core Sampler to zipper bag. Seal bag and put on ice.



Disposable En Core® Sampler

EXTRUSION PROCEDURES

USING THE En Core® EXTRUSION TOOL

CAUTION! Always use the Extrusion Tool to extrude soil from the En Core Sampler. If the Extrusion Tool is not used, the Sampler may fragment, causing injury.

1. Use a pliers to break locking arms on cap of En Core Sampler. Do not remove cap at this time. **(CAUTION: Broken edges will be sharp.)**

2. To attach En Core Sampler to En Core Extrusion Tool: Depress locking lever on Extrusion Tool and place Sampler, plunger end first, into open end of Extrusion Tool, aligning slots on coring body with pins in Extrusion Tool. Turn coring body clockwise until it locks into place. Release locking lever.

3. Rotate and gently push Extrusion Tool plunger knob clockwise until plunger slides over wings of coring body. (When properly positioned plunger will not rotate further.)

4. Hold Extrusion Tool with capped Sampler pointed upward so soil does not fall out when cap is removed. To release soil core, remove cap from Sampler and push down on plunger knob of En Core Extrusion Tool. Remove and properly dispose of En Core Sampler.

Warranty and Disclaimers

IMPORTANT: FAILURE TO USE THE EN CORE® SAMPLER IN COMPLIANCE WITH THE WRITTEN INSTRUCTIONS PROVIDED HEREIN VOIDS ALL EXPRESS AND IMPLIED WARRANTIES, INCLUDING WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

PRINCIPLE OF USE. The En Core Sampler Cartridge System is a volumetric sampling system designed to collect, store and deliver a soil sample. The En Core Sampler comes in two sizes for sample volumes of approximately 25 or 5 grams. There are four components: the cartridge with a movable plunger; a cap with two locking arms; a T-handle (purchased separately); and an extrusion handle (purchased separately). NOTE: The En Core Sampler is designed to store soil. It is not designed to store solvent or free product.

The soil is stored in a sealed headspace-free state. The seals are achieved by three special Viton® * o-rings, two located on the plunger and one on the cap of the Sampler. At no time and under no condition should these o-rings be removed or disturbed.

QUALITY CONTROL. The cartridge is sealed in an airtight package to prevent contamination prior to use. Due to the stringent quality control requirements associated with the use of this system, the disposable cartridge is designed to be used only once.

WARRANTY. En Novative Technologies, Inc. ("En Novative Technologies") warrants that the En Core Sampler shall perform consistent with the research conducted under En Novative Technologies' approval, within thirty (30) days from the date of delivery, provided that the Customer gives En Novative Technologies prompt notice of any defect or failure to perform and satisfactory proof thereof. THIS WARRANTY DOES NOT APPLY TO THE FOLLOWING, AS SOLELY DETERMINED BY EN NOVATIVE TECHNOLOGIES: (a) Damage caused by accident, abuse, mishandling or dropping; (b)Samplers that have been opened, taken apart or mishandled; (c)Samplers not used in accordance with the directions; and (d)Damages exceeding the cost of the sampler. Seller warrants that all En Core Samplers shall be free from defects in title. THE FOREGOING WARRANTIES ARE IN LIEU OF ALL OTHER WARRANTIES, WHETHER ORAL, WRITTEN, EXPRESSED, IMPLIED OR STATUTORY, INCLUDING ANY INFORMATION PROVIDED BY SALES REPRESENTATIVES OR IN MARKETING LITERATURE. IMPLIED WARRANTIES OF FITNESS AND MERCHANTABILITY SHALL NOT APPLY. En Novative Technologies' warranty obligations and Customer's remedies, except as to title, are solely and exclusively as stated herein.

LIMITATION OF LIABILITY. IN NO EVENT SHALL EN NOVATIVE TECHNOLOGIES BE LIABLE FOR ANTICIPATED PROFITS, INCIDENTAL, SPECIAL OR CONSEQUENTIAL DAMAGES, INCLUDING, BUT NOT LIMITED TO, DAMAGES FOR LOSS OF REVENUE, DOWN TIME, REMEDIATION ACTIVITIES, REMOBILIZATION OR RESAMPLING, COST OF CAPITAL, SERVICE INTERRUPTION OR FAILURE OF SUPPLY, LIABILITY OF CUSTOMER TO A THIRD PARTY, OR FOR LABOR, OVERHEAD, TRANSPORTATION, SUBSTITUTE SUPPLY SOURCES OR ANY OTHER EXPENSE, DAMAGE OR LOSS, INCLUDING PERSONAL INJURY OR PROPERTY DAMAGE. En Novative Technologies' liability on any claim of any kind shall be replacement of the En Core Sampler or refund of the purchase price. En Novative Technologies shall not be liable for penalties of any description whatsoever. In the event the En Core Sampler will be utilized by Customer on behalf of a third party, such third party shall not occupy the position of a third-party beneficiary of the obligation or warranty provided by En Novative Technologies, and no such third party shall have the right to enforce same. All claims must be brought within one (1) year of shipment, regardless of their nature.

En Novative Technologies, Inc.
1241 Bellevue Street
Green Bay, WI 54302
Phone: 920-465-3960 • Fax: 920-465-3963
Toll Free: 888-411-0757
www.ennovativetech.com

The En Core™ Sampler is covered by One or More of the Following U.S. Patents: 5,343,771; 5,505,098; 5,517,868; 5,522,271. Other U.S. and Foreign Patents Pending.

* Viton® is a registered trademark of DuPont Dow Elastomers.

BENCHMARK
ENVIRONMENTAL
ENGINEERING &
SCIENCE, PLLC

FIELD OPERATING PROCEDURES

Surface and Subsurface Soil Sampling Procedures

FOP 063.2

SURFACE AND SUBSURFACE SOIL SAMPLING PROCEDURES

PURPOSE

This procedure describes the methods for sampling surface soil and subsurface soil samples for physical and chemical laboratory analysis during intrusive activities such as test pitting, hand augering, drilling, surface soil sampling etc. Typical health and safety related issues should be addressed in the Project Health and Safety Plan.

PRE-SAMPLING PROCEDURES

1. Review project objectives and the Project Health and Safety Plan (HASP).
2. Conduct tailgate health and safety meeting with project team and/or subcontractor(s) by completing the Tailgate Safety Meeting Form (sample attached).
3. Calibrate air-monitoring equipment in accordance with the appropriate Benchmark's Field Operating Procedures or manufacturers recommendations for calibration of field meters.
4. Commence intrusive activities in accordance with specific Benchmark FOPs (test pitting, hand augering, drilling etc.) or as directed by the Project Work Plan.
5. Conduct air monitoring as required by the HASP, Project Work Plan or Benchmark's FOP Real-Time Air Monitoring During Intrusive Activities. Record all results on the Real Time Air Monitoring Log (sample attached).
6. Decontaminate all <u>non-dedicated</u> stainless steel (or Pyrex glass) equipment in accordance with Benchmark's Non-disposable and Non-dedicated Sampling Equipment Decontamination procedures.
7. Collect soil samples in accordance with the following sections.

SURFACE SOIL/FILL SAMPLING PROCEDURES

Collection of surface soil/fill samples facilitates the evaluation of potential health risks to current site receptors that may be exposed to soil/fill via direct contact, incidental ingestion, or inhalation of airborne particulates. The following procedure is in accordance with NYSDEC sampling protocol of surface soil/fill material.

1. Collect all soil samples using dedicated (or decontaminated non-dedicated) sampling tools (i.e., spoons, trowels, bowls etc.), preferably constructed of stainless steel.

2. If the sample area is vegetated, then collect the surface soil sample from 0 to 2 inches below ground surface (bgs) following removal of the sod.

3. If there is no soil present within the sample area (i.e., only slag, concrete, mixed with fines), excavate an area 12 inches by 12 inches by 6 inches deep, screen the material to less than 1/8 inch (No. 4 sieve), and submit the screened material for analysis. If there is not enough material to completely fill the sample jar, then expand the excavation 3 inches in all four directions screening the additional material. Expand the excavation in this manner until sufficient sample volume is obtained. Volatile organic analysis of surface soil/fill utilizing this method will yield negatively biased results and should not be performed.

SURFACE/SUBSURFACE SOIL SAMPLING PROCEDURES

1. Collect all soil samples using dedicated (or decontaminated non-dedicated) sampling tools (i.e., spoons, trowels, bowls etc.), preferably constructed of stainless steel.

   Surface soil samples are typically collected from 0 to 6 inches below ground surface (bgs). Subsurface soils are typically sampled from varying depths greater than 6-inches bgs based on field observations and as directed by the Project Work Plan.

2. Transfer samples for chemical (VOC, SVOC, Metals etc.) and physical (i.e., Atterberg Limits, Grain Size, Permeability etc.) analytical testing by direct grab (i.e., directly from the bucket of the excavation equipment, split-spoon sampler, hand auger etc.) using the dedicated (or decontaminated non-dedicated) sampling tools into appropriate laboratory-supplied containers and seal. The chemical or physical laboratory selected to perform the analysis should determine minimum sample volume for analysis.

3. Prepare collected samples in accordance with Benchmark's FOP: Sample Labeling, Storage and Shipment Procedures. Do not allow the chemical soil samples to freeze during storage and shipping. It should be noted, ice is not required for physical soil samples and all physical soil samples should be kept at the collected soil moisture by securing with a tight sealing lid. Do not allow physical soil samples to gain or lose moisture from the collected soil moisture prior to analysis.

4. Record all sampling details (i.e., depth and location) in the Project Field Book; appropriate Benchmark log sheets depending on method of intrusion (i.e., drilling, test pitting, hand augering etc.); and on the Soil/Sediment Sample Collection Summary Log (sample attached).

PARAMETER-SPECIFIC PROCEDURES

1. Volatile Organic Compound (VOCs): Transfer sufficient soil volume to fill the laboratory-supplied container (typically 4 ounces) by packing the soil sample with the sampling tool to the top of the container leaving no headspace. At no time should a gloved hand (i.e., latex, nitrile etc.) be used to pack the sample into the sample container as the sample may be compromised via cross-contamination.

2. All Other Parameters: All other parameters include, but are not limited to, Semi-VOCs (SVOCs), polychlorinated biphenyls (PCBs), herbicides, pesticides, total metals etc. Transfer sufficient soil volume to fill the laboratory-supplied container by packing the soil sample with the sampling

tool to the top of the container. Unless otherwise indicated by the laboratory or the Project Work Plan, the sample jar for all other parameters does not have to be packed completely leaving no headspace as with the VOC containers.

ATTACHMENTS

Tailgate Safety Meeting Form (sample)
Soil/Sediment Sample Collection Summary Log (sample)
Real Time Air Monitoring Log (sample)

REFERENCES

Benchmark FOPs:

006	*Calibration and Maintenance of Combustible Gas/Oxygen Meter*
010	*Calibration and Maintenance of Portable Flame Ionization Detector*
011	*Calibration and Maintenance of Portable Photoionization Detector*
040	*Non-disposable and Non-dedicated Sampling Equipment Decontamination*
046	*Sample Labeling, Storage and Shipment Procedures*
073	*Real-Time Air Monitoring During Intrusive Activities*

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TAILGATE SAFETY MEETING FORM

Project Name: Date: Time:
Project Number: Client:
Work Activities:

HOSPITAL INFORMATION:

Name:
Address: *City:* *State:* *Zip:*
Phone No.: *Ambulance Phone No.*

SAFETY TOPICS PRESENTED:

Chemical Hazards:

Physical Hazards: Slips, Trips, Falls

PERSONAL PROTECTIVE EQUIPMENT:

Activity: *PPE Level:* A B C D
Activity: *PPE Level:* A B C D
Activity: *PPE Level:* A B C D
Activity: *PPE Level:* A B C D
Activity: *PPE Level:* A B C D

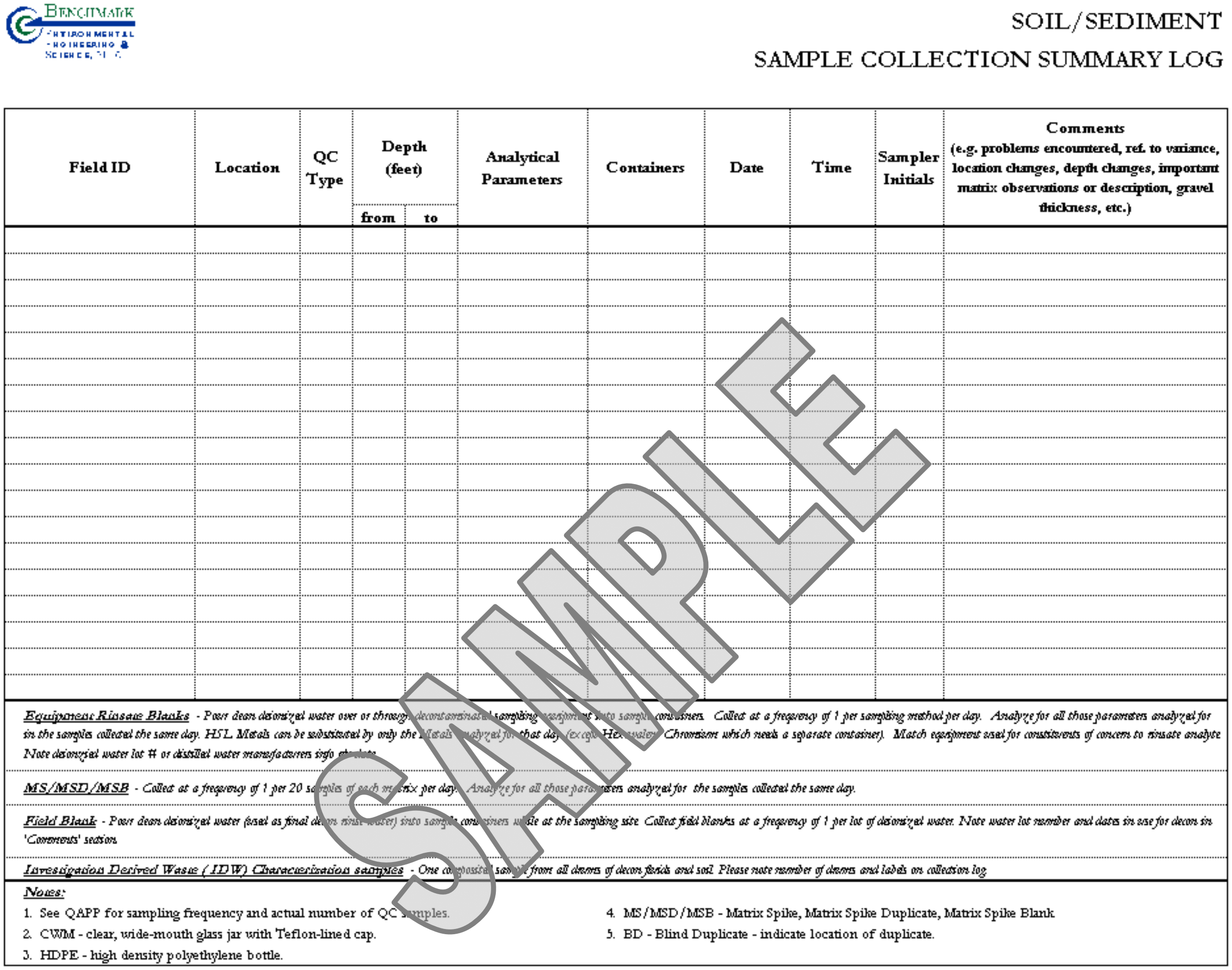
New Equipment:

Other Safety Topic (s): Environmental Hazards (aggressive fauna)
Eating, drinking, use of tobacco products is prohibited in the Exclusion Zone (EZ)

ATTENDEES

Name Printed	Signatures

Meeting conducted by:



SOIL/SEDIMENT
SAMPLE COLLECTION SUMMARY LOG

Field ID	Location	QC Type	Depth (feet)		Analytical Parameters	Containers	Date	Time	Sampler Initials	Comments (e.g. problems encountered, ref. to variance, location changes, depth changes, important matrix observations or description, gravel thickness, etc.)
			from	to						

__Equipment Rinsate Blanks__ - Pour clean deionized water over or through decontaminated sampling equipment into sample containers. Collect at a frequency of 1 per sampling method per day. Analyze for all those parameters analyzed for in the samples collected the same day. HSL Metals can be substituted by only the Metals analyzed for that day (except Hexavalent Chromium which needs a separate container). Match equipment used for constituents of concern to rinsate analyte. Note deionized water lot # or distilled water manufacturers info [illegible].

__MS/MSD/MSB__ - Collect at a frequency of 1 per 20 samples of each matrix per day. Analyze for all those parameters analyzed for the samples collected the same day.

__Field Blank__ - Pour clean deionized water (used as final decon rinse water) into sample containers while at the sampling site. Collect field blanks at a frequency of 1 per lot of deionized water. Note water lot number and dates in use for decon in 'Comments' section.

__Investigation Derived Waste (IDW) Characterization samples__ - One composite sample from all drums of decon fluids and soil. Please note number of drums and labels on collection log.

Notes:

1. See QAPP for sampling frequency and actual number of QC samples.
2. CWM - clear, wide-mouth glass jar with Teflon-lined cap.
3. HDPE - high density polyethylene bottle.
4. MS/MSD/MSB - Matrix Spike, Matrix Spike Duplicate, Matrix Spike Blank.
5. BD - Blind Duplicate - indicate location of duplicate.

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REAL TIME AIR MONITORING LOG

Date:
Project Name:
Project Number:
Project Location:
Client:
Purpose of Air Monitoring:

WEATHER CONDITIONS:

Time of Day:	A.M.	P.M.
Ambient Air Temp.:		
Wind Direction:		
Wind Speed:		
Precipitation:		

Date	Personnel	Time	Air Monitoring Meter Measurement (Units)							Location/Activity/Comments
			PID (ppm)	LEL (%)	H_2S (ppm)	O_2 (%)	CO (ppm)	Particulates (mg/m³)	Other	

NOTE: SEE EQUIPMENT CALIBRATION LOG FOR DESCRIPTION OF EQUIPMENT TYPE.

Prepared By: Date:

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FIELD OPERATING PROCEDURES

Real-Time Air Monitoring During Intrusive Activities

FOP 073.2

REAL-TIME AIR MONITORING DURING INTRUSIVE ACTIVITIES PROCEDURE

PURPOSE

This guideline presents requirements for real-time community air monitoring and required responses during all project required intrusive activities, such as drilling, test pitting, earthwork construction etc. This procedure is consistent with the requirements for community air monitoring for all intrusive projects, including projects conducted at remediation sites, as established by the New York State Department of Health (NYSDOH) and the New York State Department of Environmental Conservation (NYSDEC). Accordingly, it follows procedures and practices outlined under NYSDEC's DER-10 (May 2010) Appendix 1A (NYSDOH's Generic Community Air Monitoring Plan) and Appendix 1B (Fugitive Dust and Particulate Monitoring).

This FOP requires real-time monitoring for constituents of concern (COC) (i.e., volatile organic compounds (VOCs), lower explosive limit (% LEL), particulates (i.e., dust) etc.) at the upwind and downwind perimeter as well as the exclusion zone of a project site during all intrusive activities. This FOP is not intended for use in establishing action levels for worker respiratory protection (see Project Health and Safety Plan (HASP) for worker protection action levels). Rather, its intent is to provide a measure of protection for the surrounding community from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The community, as referenced in this document, includes any off-site residences, public buildings/grounds and commercial or industrial establishments adjacent to the project site. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, this FOP helps to confirm that work activities did not spread contamination off-site through via air transport mechanisms. Community air monitoring shall be integrated with the construction worker personal exposure-monitoring program contained in the project and site-specific HASP.

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

MONITORING & MITIGATION PROCEDURE

Real-time air monitoring perimeter locations for monitoring stations will be established based on the location of the exclusion zone (i.e., immediate work area) and wind direction. Where wind direction is shifting or winds are calm, the downwind monitoring location will default to the perimeter location nearest the most sensitive receptor (i.e., residential property). All downwind receptors being equal, the downwind monitoring location will default to the perimeter location downwind of the prevailing winds at the site. Although additional site specific COCs may be monitored during real-time air monitoring activities, the most common COCs are discussed in this FOP, including organic vapors (i.e., VOCs), airborne particulates (i.e., fugitive dust) and combustible gases (i.e., methane) and oxygen.

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

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

ORGANIC VAPORS

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

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

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

- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

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

- **<u>Special Requirements for Work Within 20 Feet of Potentially Exposed Individuals or Structures</u>**

    - When work areas are within 20 feet of potentially exposed populations or occupied structures, the continuous monitoring locations for VOCs and particulates must reflect the nearest potentially exposed individuals and the location of ventilation system intakes for nearby structures. The use of engineering controls such as vapor/dust barriers, temporary negative-pressure enclosures, or special ventilation devices should be considered to prevent exposures related to the work activities and to control dust and odors. Consideration should be given to implementing the planned activities when potentially exposed populations are at a minimum, such as during weekends or evening hours in non-residential settings.

- If total VOC concentrations opposite the walls of occupied structures or next to intake vents exceed 1 ppm, monitoring should occur within the occupied structure (s). Background readings in the occupied spaces must be taken prior to commencement of the planned work. Any unusual background readings should be discussed with NYSDOH prior to commencement of the work.

- If total particulate concentrations opposite the walls of occupied structures or next to intake vents exceed 150 mcg/m3, work activities should be suspended until controls are implemented and are successful in reducing the total particulate concentration to 150 mcg/m3 or less at the monitoring point.

- Depending upon the nature of contamination and remedial activities, other parameters (e.g., explosivity, oxygen, hydrogen SUlfide, carbon monoxide) may also need to be monitored Response levels and actions should be pre-determined, as necessary, for each site.

Additionally, if following the cessation of work and efforts to abate the emission source are unsuccessful, and if sustained organic vapor levels exceed 25 ppm above background within the 20-foot zone for more than 30 minutes, then the **Major Vapor Emission Response Plan** (see below) will automatically be placed into effect.

Major Vapor Emission Response Plan

Upon activation of Major Vapor Emission Response Plan, the following activities will be undertaken:

1. All Emergency Response Contacts as listed below and in the Site-Specific Health and Safety Plan will be contacted.

2. The local police authorities will immediately be contacted by the Site Safety and Health Officer and advised of the situation.

3. The Site Safety and Health Officer will determine if site workers can safely undertake source abatement measures. Abatement measures may include covering the source area with clean fill or plastic sheeting, or consolidating contaminated materials to minimize surface area. The Site Safety and Health Officer will adjust worker personal protective equipment as necessary to protect workers from over-exposure to organic vapors.

The following personnel are to be notified by the Site Safety and Health Officer in the listed sequence if the Major Vapor Emission Response Plan is activated:

Contact	**Phone**
Police/Fire Department	911
New York State DOH	(518) 402-7860
New York State DEC Region 8	(585) 226-2466, switchboard

New York State DEC Region 9	(716) 851-7220
State Emergency Response Hotline	(800) 457-7362

In addition, the Site Safety and Health Officer will provide these authorities with a description of the apparent source of the contamination and abatement measures being taken by the contractor, if any.

AIRBORNE PARTICULATES

Fugitive dust suppression and airborne particulate monitoring shall be performed during any intrusive activities involving disturbance or handling of site soil/fill materials. Fugitive dust suppression techniques will include the following minimum measures:

- Spraying potable water on all excessively dry work areas and roads.
- All fill materials leaving the site will be hauled in properly covered containers or haul trailers.
- Additional dust suppression efforts may be required as discussed below.

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

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter ($\mu g/m^3$) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 $\mu g/m^3$ above the upwind level and provided that no visible dust is migrating from the work area.

- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 $\mu g/m^3$ above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 $\mu g/m^3$ of the upwind level and in preventing visible dust migration.

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

Visual Assessment

In conjunction with the real-time monitoring program, TurnKey personnel and any subcontractors thereof will be responsible for visually assessing fugitive dust migration from the site. If airborne dust is observed leaving the site, the work will be stopped until supplemental dust suppression techniques are employed in those areas.

Supplemental Dust Suppression

Supplemental dust suppression techniques may include but are not necessarily limited to the following measures:

- Reducing the excavation size, number of excavations or volume of material handled.
- Restricting vehicle speeds.
- Applying water on buckets during excavation and dumping.
- Wetting equipment and excavation faces.
- Wetting haul roads.
- Restricting work during extreme wind conditions.
- Use of a street sweeper on paved haul roads, where feasible.

Work can resume using supplemental dust suppression techniques provided that the measures are successful in reducing the sustained downwind particulate concentration to below 150 ug/m^3 of the upwind level, and in preventing visible dust migration off-site.

COMBUSTIBLE GASES & OXYGEN

Ambient combustible gas and oxygen concentrations should be measured prior to commencing intrusive activities each workday and a minimum of every 30-minutes thereafter. Air monitoring activities should be performed using equipment appropriate to measure combustible gases in percent lower explosive limit (LEL) and percent oxygen and calibrated daily. All combustible gas and oxygen readings must be recorded in the Project Field Book and/or Real-Time Air Monitoring Logs (sample attached) and, if applicable, be made available for State (DEC and DOH) personnel to review.

Mitigation upon the detection of various action levels of organic vapors are presented below:

Combustible Gas:

- If the sustained ambient air concentration of combustible gas at the downwind perimeter of the site exceeds a reading of 10 to 25% LEL, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 10% LEL, work activities can resume with continued monitoring.

- If sustained combustible gas levels at the downwind perimeter of the site persist at levels in excess of 25% LEL, work activities must be halted, the source of explosion hazards identified, corrective actions taken to abate emissions and monitoring continued. Following combustible gas mitigation, work activities can resume provided that the sustained total organic vapor level 200 feet downwind of the exclusions zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less, (but in no case less than 20 feet) is below a sustained value of 10% LEL.

Oxygen:

- If the sustained ambient oxygen concentration at the downwind perimeter of the site measures a reading between 19.5% - 21% oxygen, work activities can continue with extreme caution, however attempts to determine the potential source of oxygen displacement must be conducted.

- If the sustained oxygen level readily decreases below 19.5% LEL, work activities should be discontinued and all personnel must leave the area immediately.

- If the sustained oxygen level at the downwind perimeter of the site persists at levels between 21-25%, work activities can resume with caution.

- If the sustained oxygen level at the downwind perimeter of the site persists at levels exceeding 25% (fire hazard potential), work activities should be discontinued and all personnel must leave the area immediately.

ATTACHMENTS

Real-Time Air Monitoring Log (sample)

REFERENCES

TurnKey FOPs:

006	*Calibration and Maintenance of Combustible Gas/Oxygen Meter*
010	*Calibration and Maintenance of Flame Ionization Detector*
011	*Calibration and Maintenance of Portable Photoionization Detector*
084	*Calibration and Maintenance of Portable Particulate Meter*

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REAL TIME AIR MONITORING LOG

Date:

Project Name:

Project Number:

Project Location:

Client:

Purpose of Air Monitoring:

WEATHER CONDITIONS:

Time of Day:	A.M.	P.M.
Ambient Air Temp.:		
Wind Direction:		
Wind Speed:		
Precipitation:		

Date	Personnel	Time	Air Monitoring Meter Measurement (Units)							Location/Activity/Comments
			PID (ppm)	LEL (%)	H_2S (ppm)	O_2 (%)	CO (ppm)	Particulates (mg/m^3)	Other	

NOTE: SEE EQUIPMENT CALIBRATION LOG FOR DESCRIPTION OF EQUIPMENT TYPE.

Prepared By: Date:

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FIELD OPERATING PROCEDURES

Geoprobe Drilling Procedures

FOP 078.0

GEOPROBE DRILLING PROCEDURES

PURPOSE

This guideline presents a method for direct-push drilling a borehole through unconsolidated materials, including soils or overburden.

PROCEDURE

The following procedure will be used to drill a borehole for sampling and/or well installation, using direct-push methods and equipment.

1. Follow Benchmark's Field Operating Procedure (FOP) for Drill Site Selection Procedure prior to implementing any drilling activity.

2. Perform drill rig safety checks with the driller by completing the Drilling Safety Checklist form (sample attached).

3. Conduct tailgate health and safety meeting with project team and drillers by completing the Tailgate Safety Meeting Form (sample attached).

4. Calibrate air-monitoring equipment in accordance with the appropriate Benchmark's FOPs or manufacturers recommendations.

5. Ensure all drilling equipment (i.e., rods, 4-foot sampler, dedicated PVC sleeves) appear clean and free of soil prior to initiating any subsurface intrusion. Decontamination of drilling equipment should be in accordance with Benchmark's Drilling and Excavation Equipment Decontamination Procedures FOP.

6. Mobilize the Geoprobe™ rig to the site and position over the borehole.

7. Level and stabilize the rig and recheck the rig location against the planned drilling location.

8. Fully advance the sampler into the subsurface using an ATV-mounted direct-push Geoprobe™ drill rig and 1.5-inch diameter sampler, typically 4-feet in length and fitted with a dedicated PVC sleeve, for each four-foot core of soil.

9. Retrieve the 4-foot sample core from the driller, place on a piece of polyethylene tarp, and cut open using a sharp utility knife.

10. Visually characterize each 4-foot soil core using the Unified Soil Classification System (USCS) in accordance with Benchmark's Soil Description Procedures Using the USCS FOP.

11. Scan each 4-foot core for total volatile organic vapors with a calibrated Photovac 2020 PID equipped with a 10.6 eV lamp, and report any visual and/or olfactory observations. Record PID scan measurements in the Project Field Book and appropriate field forms.

12. If required, collect a representative soil sample for headspace determinations. In general, soil samples representative of each 4-foot core interval are collected, placed in a sealable plastic bag, and kept at or near room temperature (approximately 65-70° F) for a minimum of 15 minutes prior to measurement. Record PID headspace determination measurements in the Project Field Book and appropriate field forms.

13. Check sampler and rods periodically during drilling to ensure the boring is plumb. Adjust rig position as necessary to maintain plumb.

14. Continue drilling until reaching the assigned total depth, or until sampler refusal occurs. Sampler refusal is when the drilling penetration drops below 0.1 feet per 2 minutes, with the full weight of the rig on the sampler.

15. Plug and abandon boreholes not used for temporary well installation in accordance with Benchmark's Field Operating Procedure for Abandonment of Borehole. Boreholes to be used as temporary wells should be completed in accordance with Benchmark's Temporary Well (Piezometer) Construction Procedures FOP.

16. Decontaminate all non-dedicated drilling tools between boring locations using potable tap water and a phosphate-free detergent (i.e., Alconox™) in accordance with Benchmark's Drilling and Excavation Equipment Decontamination Procedures FOP.

OTHER PROCEDURAL ISSUES

- Borings will not be over drilled (rat holed) without the express permission of the Benchmark field supervisor. All depth measurements should be accurate to the nearest 0.1 foot, to the extent practicable.

- Potable water may be placed in the sampler stem if critically necessary for borehole control or to accomplish sampling objectives. This will be performed only with the express permission of the Benchmark field supervisor.

ATTACHMENTS

Drilling Safety Checklist (sample)
Tailgate Safety Meeting Form (sample)

REFERENCES

<u>Benchmark FOPs:</u>

001	*Abandonment of Borehole Procedures*
017	*Drill Site Selection Procedure*
018	*Drilling and Excavation Equipment Decontamination Procedures*
054	*Soil Description Procedures Using the USCS*
077	*Temporary Well (Piezometer) Construction Procedures*

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DRILLING SAFETY CHECKLIST

Project: **Supplemental Phase II RFI/ICMs** Date:
Project No.: **0041-009-500** Drilling Company:
Client: **RealCo., Inc.** Drill Rig Type:

ITEMS TO CHECK	OK	ACTION NEEDED
"Kill switches" installed by the manufacturer are in operable condition and all workers at the drill site are familiar with their location and how to activate them?		
"Kill switches" are accessible to workers on both sides of the rotating stem? NOTE: Optional based on location and number of switches provided by the manufacturer.		
Cables on drill rig are free of kinks, frayed wires, "bird cages" and worn or missing sections?		
Cables are terminated at the working end with a proper eye splice, either swaged Coupling or using cable clamps?		
Cable clamps are installed with the saddle on the live or load side? Clamps should not be alternated and should be of the correct size and number for the cable size to which it is installed. Clamps are complete with no missing parts?		
Hooks installed on hoist cables are the safety type with a functional latch to prevent accidental separation?		
Safety latches are functional and completely span the entire throat of the hook and have positive action to close the throat except when manually displaced for connecting or disconnecting a load?		
Drive shafts, belts, chain drives and universal joints shall be guarded to prevent accidental insertion of hands and fingers or tools.		
Outriggers shall be extended prior to and whenever the boom is raised off its cradle. Hydraulic outriggers must maintain pressure to continuously support and stabilize the drill rig even while unattended.		
Outriggers shall be properly supported on the ground surface to prevent settling into the soil.		
Controls are properly labeled and have freedom of movement. Controls should not be blocked or locked in an action position.		
Safeties on any device shall not be bypassed or neutralized.		
Controls shall be operated smoothly and cables and lifting devices shall not be jerked or operated erratically to overcome resistance.		
Slings, chokers and lifting devices are inspected before using and are in proper working order? Damaged units are removed from service and are properly tagged?		
Shackles and clevises are in proper working order and pins and screws are fully inserted before placing under a load?		
High-pressure hoses have a safety (chain, cable or strap) at each end of the hose section to prevent whipping in the event of a failure?		
Rotating parts of the drill string shall be free of sharp projections or hooks, which could entrap clothing or foreign objects?		
Wire ropes should not be allowed to bend around sharp edges without cushion material.		
The exclusion zone is centered over the borehole and the radius is equal or greater than the boom height?		

ITEMS TO CHECK	OK	ACTION

Benchmark Environmental Engineering & Science, PLLC

DRILLING SAFETY CHECKLIST

Project: **Supplemental Phase II RFI/ICMs** Date:

Project No.: **0041-009-500** Drilling Company:

Client: **RealCo., Inc.** Drill Rig Type:

ITEMS TO CHECK	OK	ACTION NEEDED
The work area around the borehole shall be kept clear of trip hazards and walking surfaces should be free of slippery material.		
Workers shall not proceed higher than the drilling deck without a fall restraining device and must attach the device in a manner to restrict fall to less than 6 feet.		
A fire extinguisher of appropriate size shall be immediately available to the drill crew. The drill crew shall have received annual training on proper use of the fire extinguisher.		
29 CFR 1910.333 © (3) Except where electrical distribution and transmission lines have been de-energized and visibly grounded, drill rigs will be operated proximate to, under, by, or near power lines only in accordance with the following: .333 © (3) (ii) 50 kV or less -minimum clearance is 10 ft. For 50 kV or over - 10ft. Plus ½ in. For each additional kV **Benchmark Policy: Maintain 20 feet clearance.**		
29 CFR 1910.333 © (3) (iii) While the rig is in transit with the boom in the down position, clearance from energized power lines will be maintained as follows: Less than 50 kV - 4 feet 50 to 365 kV - 10 feet 365 to 720 kV - 16 feet		

Name: (printed)

Signed: Date:

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TAILGATE SAFETY MEETING FORM

Project Name: Date: Time:

Project Number: Client:

Work Activities:

HOSPITAL INFORMATION:

Name:

Address: *City:* *State:* *Zip:*

Phone No.: *Ambulance Phone No.*

SAFETY TOPICS PRESENTED:

Chemical Hazards:

Physical Hazards: Slips, Trips, Falls

PERSONAL PROTECTIVE EQUIPMENT:

Activity:	*PPE Level:*	A	B	C	D
Activity:	*PPE Level:*	A	B	C	D
Activity:	*PPE Level:*	A	B	C	D
Activity:	*PPE Level:*	A	B	C	D
Activity:	*PPE Level:*	A	B	C	D

New Equipment:

Other Safety Topic (s): Environmental Hazards (aggressive fauna)

Eating, drinking, use of tobacco products is prohibited in the Exclusion Zone (EZ)

ATTENDEES

Name Printed	Signatures

Meeting conducted by:

BENCHMARK
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FIELD OPERATING PROCEDURES

Calibration & Maintenance of Portable Particulate Meter

FOP 084.0

CALIBRATION AND MAINTENANCE OF PORTABLE PARTICULATE METER

PURPOSE

This guideline describes a method for calibration of a portable particulate meter, specifically the Thermo Electron Corporation MIE DataRAM 4 (Model DR-4000). The DataRAM 4 measures the concentration of airborne particulate matter (liquid or solid), as well as mean particle size, air temperature, and humidity, providing direct and continuous readout as well as electronic recording of the information. This parameter is of interest both as a general indicator of air quality, and because of its pertinence to community air monitoring typically required at most construction/remediation/investigation sites. The DataRAM covers a wide measurement range from 0.0001 mg/m^3 to 400 mg/m^3. With its large capacity internal data logging capabilities with data retrieval on screen or downloaded, the DataRAM can store up to 50,000 data points, including individual point averages, particle size, temperature, and humidity with time stamp as well as overall average and maximum concentration.

Because the DataRAM meter must be factory calibrated once a year, this guideline presents a method for start-up, operation, and maintenance, which is performed to verify instrument function. All field instruments will be calibrated, verified and recalibrated at frequencies required by their respective operating manuals or manufacturer's specifications, but not less than once each year. Field personnel should have access to all operating manuals for the instruments used for the field measurements. This procedure also documents critical maintenance activities for this meter. The user should reference the manufacturer's instruction manual prior to operating this unit.

ACCURACY & PRECISION

The calibrated accuracy of the DataRAM 4 particulate meter is within ± 2% of reading ± precision over the temperature range of -4° to 158° F (-10° to 50° C) and 10 to 95% relative humidity (non-condensing). The precision is ± 1% of reading or ± 0.001 mg/m^3, whichever is greater (1-second averaging) and ± 0.3% of reading or ± 0.0003 mg/m^3, whichever is greater (10-second averaging).

INSTRUMENT PANEL VIEW

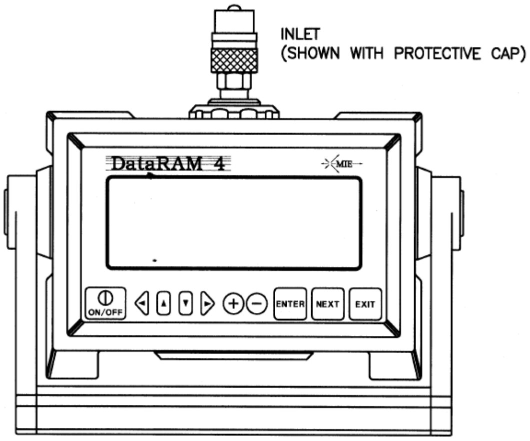


FIGURE 1. FRONT–PANEL VIEW OF DataRAM

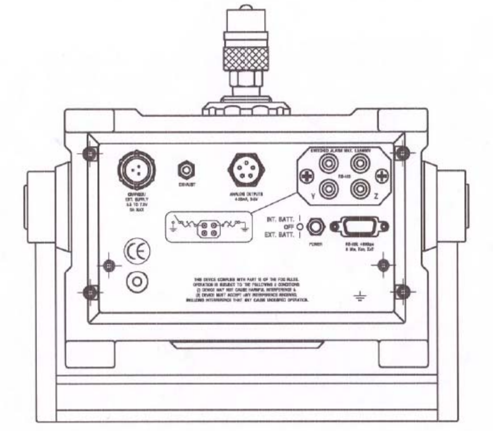


FIGURE 2. BACK–PANEL VIEW OF DataRAM

MAINTENANCE

General Guidelines

The DataRAM 4 is designed to be repaired at the factory. No user serviceable components are inside the metal enclosure of the DataRAM 4 with exception of the filter cartridge or the analytic filter holder. Access to the internal components of the unit by others than authorized MIE personnel voids warranty.

Unless a MALFUNCTION message is displayed, or other operational problems occur, the DataRAM 4 should be returned to the factory once every two years for routine check out, test, cleaning and calibration check.

Battery Charging and Cycling

If the DataRAM 4 is to be operated without its charger/power supply, i.e., deriving power from its internal battery, this battery should be fully charged before initiating a run. The

DataRAM 4 charger/power supply can be connected continuously to the instrument whether the DataRAM 4 is on or off. If the charger/power supply is not connected, the internal battery will discharge very slowly depending on storage temperature. Low storage temperature reduces battery capacity. High storage temperatures, however, reduce battery life which is of the order of 8 years at 20°C (68°F), and only 2 years at 40°C (104°F).

In general, the user should maintain the battery charge as high as possible in order to extend its charge/discharge cycling capacity (this characteristic differs from that of nickel-cadmium batteries).

Instrument Storage

If the DataRAM 4 is to be stored for an extended period of time (i.e., 3 months or more), place the 3-position switch on the back panel in its OFF position (mid-position), in order to minimize gradual battery discharge. This will have no effect on data retention or internal clock function. It is recommended, however, that the battery be recharged every 3 months in order to prolong battery life.

During storage always snap on quick-connect cap over the instrument inlet to protect the sensing optics from gradual dust contamination. Store DataRAM 4 in a dry environment.

Filter Replacement

To replace either of two types of filters used with DataRAM 4, place the instrument on its back rubber feet (front panel facing upward). On the bottom surface of the DataRAM, locate the large threaded plastic filter cover and holding the cross bar, rotate this cover counterclockwise. Remove cover and the filter holder within the open cavity.

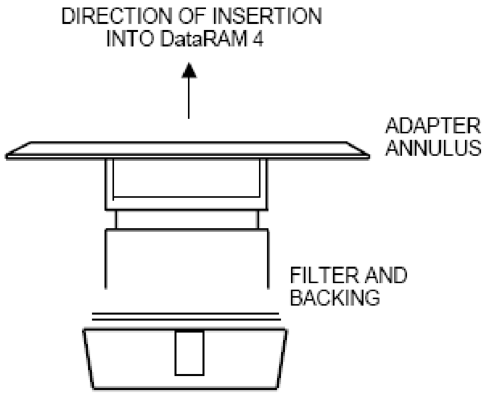
> *HEPA Filter Cartridge Replacement*
>
> The DataRAM 4 is shipped from the factory with the HEPA filter cartridge installed. This cartridge can be identified by its metallic cover. Remove this cartridge. Clean the internal black rubber gasket against which the cartridge is normally compressed. Install new HEPA-type cartridge (MIE part no. MSA-95302) by inserting its wider ridged end first. Reposition threaded plastic cover engaging threads carefully; rotate cover clockwise, hand tightening firmly. Properly dispose of used cartridge to prevent inadvertent re-use.

Analytic Filter Installation/Replacement

In order to install or replace the analytical filter holder, proceed as follows. Remove the HEPA cartridge normally in place. Remove (separate) the inlet cover (with the blue plug) of the Millipore plastic filter holder from the rest of that holder assembly containing the white membrane filter. Insert firmly the gray plastic adapter annulus into the open face of the filter holder assembly. Remove the red plastic plug from the exhaust nipple of the filter holder assembly. Ensure that all three components of the holder assembly are fully compressed to preclude any leafage. Insert the assembly into the filter cavity of the DataRAM 4 with the gray plastic adapter annulus bearing against the internal black gasket (adapter annulus inserted first). Reposition threaded plastic cover and hand-tighten carefully and firmly. Set aside HEPA cartridge for future use.

In order to remove and/or to replace the membrane filter within its holder, remove the gray plastic adapter annulus and separate (pry apart) the two transparent plastic rings that compress the membrane filter. Make sure to remove and replace only the membrane filter (using tweezers), leaving the white backing disc in the holder. A new membrane filter should then be placed over that backing and the sealing ring should then be inserted to trap and compress the filter and backing discs. For storage, the inlet cap with the blue plug should be inserted as well as the red plug on the back of the filter holder.

Analytical filter holder with adapter annulus inserted



Cleaning of Optical Sensing Chamber

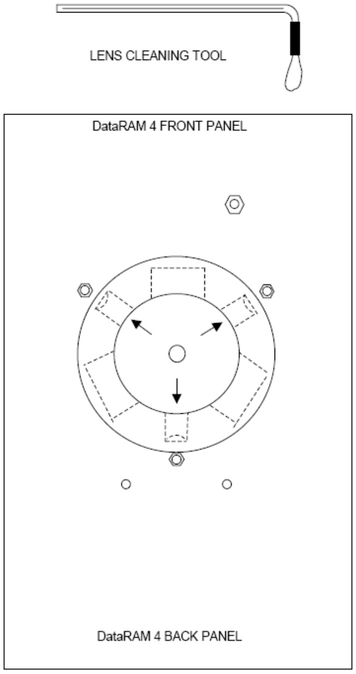
Although the DataRAM 4 incorporates filtered air shielding of the critical optical sensing surfaces, continued sampling of airborne particles at high concentrations may result in gradual build-up of contamination on those interior surfaces of the sensing chamber components. This may cause an excessively high optical background level. If this background level does becomes excessive, the DataRAM 4 will alert the user at the completion of the zeroing sequence by the display of a BACKGROUND HIGH message. If this message is presented, the DataRAM 4 can continue to be operated providing accurate measurements. However, it is then advisable to clean the front surfaces of the optical lenses within the sensing chamber at the first convenient opportunity, as described below. The tools required for this cleaning are: an intense concentrated light source (e.g., flash light) to view the inside of the sensing chamber, denatured alcohol, a soft lint-free cloth, and the special cleaning tool provided with the DataRAM 4 consisting of a cut-off cotton swab inserted in a plastic sleeve and held by a right-angle Allen wrench.

Proceed as follows to clean the lens surfaces within the sensing chamber:

- **Make sure to shut off power completely before proceeding with cleaning**
- Install the stainless steel cover on the inlet of the DataRAM 4 to protect this fitting.
- Place the DataRAM 4 upside down on a table, resting the instrument on the inlet cover and the rear protective bumper.
- Unscrew the gray plastic cover of the filter cavity on the bottom surface of the DataRAM 4.
- Remove the filter cartridge from its cavity.
- Carefully clean the black soft filter-sealing gasket within the filter cavity by wiping it with the lint-free soft cloth. Use alcohol if necessary.
- Shine the concentrated light source into the sensing chamber located about 3 cm (1¼ in.) beyond the soft-sealing gasket in the filter cavity.
- Locate the three smaller side cavities inside the sensing chamber, identified by the arrows on that figure (see page 6). These three cavities contain the lenses of the two sources and the common detector of the DataRAM 4. The frontal surfaces of these lenses are likely to require cleaning if the instrument indicates BACKGROUND HIGH.
- Wet the cotton swab of the lens-cleaning tool with alcohol (e.g., methanol, ethanol, or rubbing alcohol).

- Holding the cleaning tool by its long handle, insert this tool into the sensing chamber without touching the walls of this chamber.
- Direct the cotton swab tip towards the opening of one of the three smaller cavities as indicated by the arrows of the figure below, and insert the cotton tip into this cavity as far as it will go. Gently wipe that internal surface touched by the swab tip by a rotating motion. Carefully withdraw the swab tip from the cavity.
- Repeat previous cleaning step for the other two small cavities.
- Carefully remove the cleaning tool from the sensing chamber. Allow the alcohol to dry leaving the filter cavity open for about 15 minutes.
- Re-insert the filter cartridge into its cavity and close it with its gray plastic cover, hand-tightening it firmly. Remove the inlet cap and store on its pod on the back panel.
- Place the DataRAM 4 right side up and key ON. Proceed to check its optical background by running the ZERO/INITIALIZE check as. The message READY! should appear at the end of this check indicating that the lens contamination has been eliminated. Should the message BACKGROUND HIGH persist after completion of the above-described lens cleaning procedure, please contact the factory.

Lens cleaning tool and bottom view of open filter cavity showing location of sensor chamber lens cavities (arrows).



FACTORY CALIBRATION

For mass concentration measurements, each DataRAM 4 is factory calibrated against a set of reference monitors that, in turn, are periodically calibrated against a gravimetric standard traceable to the National Institute of Standards and Testing (NIST).

The primary factory reference method consists of generating a dust aerosol by means of a fluidized bed generator, and injecting continuously the dust into a mixing chamber from which samples are extracted concurrently by two reference filter collectors and by two master real-time monitors that are used for the routine calibration of every DataRAM 4.

The primary dust concentration reference value is obtained from the weight increase of the two filters due to the dust collected over a measured period of time, at a constant and known flow rate. The two master real-time monitors are then adjusted to agree with the reference mass concentration value (obtained from averaging the measurements of the two gravimetric filters) to within ±1%.

Three primary, NIST traceable, measurements are involved in the determination of the reference mass concentration: the weight increment from the dust collected on the filter, the sampling flow rate, and the sampling time. Additional conditions that must be met are: a) suspended dust concentration uniformity at all sampling inlets of the mixing chamber; b) identical sample transport configurations leading to reference and instrument under calibration; and c) essentially 100% collection efficiency of filters used for gravimetric reference for the particle size range of the test dust.

The test dust used for the MIE factory calibration of the DataRAM 4 is SAE Fine (ISO Fine) supplied by Powder Technology, Inc. It has the following physical characteristics (as dispersed into the mixing chamber):

- Mass median aerodynamic particle diameter: 2 to 3 µm
- Geometric standard deviation of lognormal size distribution: 2.5
- Bulk density: 2.60 to 2.65 g/cm3
- Refractive index: 1.54

In addition to the mass calibration described above, the DataRAM 4 is factory calibrated using a gas with known scattering coefficient in order to adjust the relative scattering irradiance at the two source wavelengths.

ATTACHMENTS

None

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FIELD OPERATING PROCEDURES

Outdoor Ambient Air VOC Sample Collection Procedure

FOP 090.0

OUTDOOR AMBIENT AIR VOC SAMPLE COLLECTION PROCEDURE

PURPOSE

This procedure describes the methods for collecting outdoor ambient air samples for volatile organic compound (VOC) analysis via USEPA Method TO-15 using Summa® canisters (or approved other). Typically, outdoor air samples are collected to characterize and document site-specific VOCs that may be present in outdoor ambient air. For sample collection associated with intrusive activities that may potentially release VOCs to the ambient air, sample location(s) typically are collected downwind of the intrusive activity at the perimeter of the work area and/or exclusion zone for the Site. Upwind sample location(s) may be utilized if regional facilities (e.g. gasoline service station, factories) are located proximate to the Site to assess off-site ambient VOC contributions (background).

SAMPLE COLLECTION PROCEDURES

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

- A site map should be prepared to indicate the outdoor ambient air sample locations including all site improvements (e.g., buildings, access roads, etc.), public roads/streets (if applicable), the location of potential VOC contributors (e.g., gasoline stations, factories, lawn movers, etc.), compass orientation (north), and scale.

- Weather conditions (e.g., precipitation, wind speed, outdoor temperature, and barometric pressure) should be reported on the Air Canister Field Record (sample attached); and

- Any pertinent observations, such as odors, readings from field instrumentation, and significant activities in the vicinity (e.g., operation of heavy equipment or dry cleaners) should be recorded.

The following describes the outdoor air sampling procedure:

1. Typically, a 6-liter, passivated (inert), stainless steel, evacuated sampling sphere (e.g., Summa canister) (or approved other) will be supplied by the laboratory that will be conducting the analysis. The canister should be received from the laboratory, certified clean, evacuated, and prepared for sampling.

2. Sampling will take place in accordance with the project work plan. Selected sample locations will be sufficiently spaced to allow location(s) to be field modified, if necessary.

3. The number of Summa canisters required as well as the flow rate of the constant differential low volume flow controllers will be supplied by the laboratory in accordance with the project work plan.

4. Prior to placement, complete an Air Canister Field Record (sample attached) of each canister, which includes: project information, field staff, weather conditions, canister serial number, flow controller number, sample date(s)/time(s), shipping date(s), canister lab vacuum, field vacuum check, initial field vacuum, final field vacuum, and duration of sample collection.

5. The pressure in the canisters must be monitored with the laboratory provided pressure gauge at the beginning and the end of the sampling period as well as before and after shipment of the canisters at the laboratory. The **target final field vacuum must be approximately 5 inches of mercury. Samples with a final field vacuum of greater than 10 inches of mercury, or equal to zero, will be flagged** and usability of the data will depend on the sample volume and reporting limits that can be achieved.

6. Canisters may be placed on the ground provided there is a clear plastic sheet beneath it to prevent cross contamination. The intake tubing, however, must be positioned at a height of approximately 3 to 5-feet above grade to collect air at an elevation representative of ambient air within the breathing zone. Typically, the canister is chained and locked to a secure step ladder with the intake tubing tethered to the ladder.

7. Ship the canisters to the laboratory under chain-of-custody command within three days of sample collection so that no sample will exceed the 30-day holding time (since receipt from the lab) per USEPA TO-15.

8. Air samples will be analyzed by Gas Chromatography/Mass Spectroscopy (GC/MS) in accordance with EPA Method TO-15, or as specified. Analytical results will be reported as concentrations of each VOC at each location during each sampling event, typically in parts per billion by volume (ppbv).

9. Sample collection should take place on warm, dry days. If rain or high humidity conditions develop during sampling, the sampling event should be suspended. Temperature, barometric pressure, and wind speed should be monitored during the sampling event, for use in analysis of the results. The combination of sampling location, height, and meteorological conditions will assure that sampling will measure VOCs at their highest concentrations.

QUALITY ASSURANCE / QUALITY CONTROL (QA/QC)

Extreme care should be taken during all aspects of sample collection to ensure that sampling error is minimized and high quality data are obtained. The sampling team members should avoid actions (e.g., fueling vehicles, using permanent marking pens, and wearing freshly dry-cleaned clothing or personal fragrances), which can cause sample interference in the field. Appropriate QA/QC protocols must be followed for sample collection and laboratory analysis, such as use of certified clean sample devices, meeting sample holding times and temperatures, sample accession, chain of custody, etc. Samples should be delivered to the analytical laboratory as soon as possible after collection. In addition, laboratory accession procedures must be followed including field documentation (sample collection information and locations), chain of custody, field blanks, field sample duplicates, and laboratory duplicates, as appropriate.

Some methods require collecting samples in duplicate to assess errors. Duplicate and/or split samples should be collected in accordance with the requirements of the sampling and analytical methods being implemented.

For certain regulatory programs, a Data Usability Summary Report (DUSR) may be required to determine whether or not the data, as presented, meets the site or project specific criteria for data quality and data use. This requirement may dictate the level of QC and the category of data deliverable to request from the laboratory. Guidance on preparing a DUSR is available by contacting the NYSDEC's Division of Environmental Remediation.

New York State Public Health Law requires laboratories analyzing environmental samples collected from within New York State to have current Environmental Laboratory Approval Program (ELAP) certification for the appropriate analyte and environmental matrix combinations. If ELAP certification is not currently required for an analyte (e.g., trichloroethene); then the analysis should be performed by a laboratory that has ELAP certification for similar compounds in air and uses analytical methods with detection limits similar to background (e.g., tetrachloroethene via EPA Method TO-15).

ATTACHMENTS

Air Canister Field Record (sample)

REFERENCES

United States Environmental Protection Agency. *Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air*. Second Addition (EPA/625/R-96/010b). January 1999.

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AIR CANISTER FIELD RECORD

PROJECT INFORMATION:

Project:
Job No:
Location:
Field Staff:
Client:

SAMPLE I.D.:

Size of Canister:
Canister Serial No.:
Flow Controller No.:
Sample Date(s):
Shipping Date:
Sample Type: ☐ Indoor Air ☐ Outdoor Air
☐ Subslab, complete section below ☐ Soil Gas
Soil Gas Probe Depth:

WEATHER CONDITIONS:

Ambient Air Temp. - A.M.:
Ambient Air Temp. - P.M.:
Wind Direction:
Wind Speed:
Precipitation:

FIELD SAMPLING INFORMATION:

READING	TIME	VACUUM (inches Hg) or PRESSURE (psig)	DATE	INITIALS
Lab Vacuum (on tag)				
Field Vacuum Check [1]				
Initial Field Vacuum [2]				
Final Field Vacuum [3]				
Duration of Sample Collection				

LABORATORY CANISTER PRESSURIZATION:

Initial Vacuum (inches Hg and psia)		
Final Pressure (psia)		
Pressurization Gas		

SUBSLAB SHROUD:

Shroud Helium Concentration:
Calculated tubing volume: x 3 =
Purged Tubing Volume Concentration:
Is the purged volume concentration less than or equal to 10% in shroud?
☐ YES, continue sampling
☐ NO, improve surface seal and retest

COMPOSITE TIME (hours)	FLOW RATE RANGE (ml/min)
15 Min.	316 - 333
0.5 Hours	158 - 166.7
1	79.2 - 83.3
2	39.6 - 41.7
4	19.8 - 20.8
6	13.2 - 13.9
8	9.9 - 10.4
10	7.92 - 8.3
12	6.6 - 6.9
24	3.5 - 4.0

NOTES:

1 Vacuum measured using portable vacuum gauge (provided by Lab)
2 Vacuum measured by canister gauge upon opening valve
3 Vacuum measured by canister gauge prior to closing valve

Signed:

APPENDIX F

ELECTRONIC COPY