REMEDIAL INVESTIGATION/ALTERNATIVES ANALYSIS
FORMER ELECTRUK BATTERY SITE
(NYSDEC Site No. E932132)
4922 IDA PARK DRIVE, TOWN OF LOCKPORT
NIAGARA COUNTY, NEW YORK

FINAL WORK PLAN

Prepared for:

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RI/AA OF FORMER ELECTRUK BATTERY SITE
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1.0 INTRODUCTION

1.1 General Discussion

This Work Plan has been prepared by TVGA Consultants (TVGA) to provide a detailed description of the Remedial Investigation/Alternatives Analysis Report (RI/AA) program to be implemented at the Former Electruk Battery Site located at located at 4922 IDA Park Drive in the Lockport Industrial Park in Lockport, New York (project site). Figure 1 depicts the location of the project site. The RI/AA will be completed on behalf of the Town of Lockport (Town) and Niagara County (County) pursuant to the environmental restoration and redevelopment of the subject site under the Environmental Restoration, or Brownfield, Program component of Title 5 of the Clean Water/Clean Air Bond Act of 1996, administered by the New York State Department of Environmental Conservation (NYSDEC). The Town and County submitted a joint application to the NYSDEC for State financial assistance under this program and the Town will act as the lead agency for the RI/AA program and will take responsibility for municipal cost share required by this program. The Town has been selected to receive State financial assistance under this NYSDEC program for the investigation of this site, and ultimately intends to facilitate the restoration and redevelopment of this property. The purpose of the RI/AA program outlined herein is to characterize the nature and extent of contamination occurring on, and emanating from, the project site, and to develop and evaluate remedial alternatives, as appropriate.

This document has been developed in general accordance with the July 2004 NYSDEC Municipal Assistance for Environmental Restoration Project Procedures Handbook, and details the scope and objectives of the RI/AA program. The following supporting technical documents have also been prepared and appended to the Work Plan:

- Field Sampling Plan (FSP);
- Quality Assurance/Quality Control (QA/QC) Plan;
- Health and Safety Plan (HASP); and
- Community Participation Plan (CPP).

Collectively, these plans form one document that is intended to define the scope of tasks, technical approach and specific procedures to be utilized to complete the RI/AA for the project site.

The scope of the RI/AA program to be implemented at the project site is the product of a scoping process that involved the review of historical information concerning the property, meetings with NYSDEC and Town of Lockport representatives, and a limited site reconnaissance. Because the RI/AA process is dynamic and iterative, the Work Plan will be modified during the site characterization process to incorporate new information and refine project objectives, as necessary.

1.2 Work Plan Overview

This Work Plan presents an initial evaluation of existing data and background information compiled during the scoping process, a general description of the RI/AA tasks, a project schedule, staffing and management plan, and a detailed project budget. The scope and content of the supporting technical plans appended to the Work Plan are described in the following paragraphs.

The *Field Sampling Plan* (FSP) presented in Appendix A was prepared to identify and describe:

- Sampling objectives;
- Sampling equipment and methods;
- Sample types, locations and frequency;
- Sample identification system;
- Sample handling and analysis;
- Field documentation and record keeping procedures; and
- A schedule of events and deliverables.

The *Quality Assurance/Quality Control* (QA/QC) *Plan* presented in Appendix B addresses all elements of the site investigation and includes:

- A project description;
- A project organization chart illustrating the lines of responsibility of the sampling personnel;
- Quality assurance objectives for data;
- Sample custody procedures;
- The type and frequency of calibration procedures for field and laboratory instruments, internal quality control checks, and quality assurance performance audits and system audits;
- Preventative maintenance procedures and schedule and corrective action procedures for the field and laboratory instruments;
- Specific procedures to assess data precision, representativeness, comparability, accuracy, and completeness of specific measurement parameters; and
- Data documentation and tracking procedures.

Appendix C contains the site-specific *Health and Safety Plan* (HASP) that complies with 29 CFR 1910.120 and was prepared for implementation prior to the commencement of field activities. The HASP provides a site background discussion and describes personnel responsibilities, protective equipment, health and safety procedures and protocols, decontamination procedures, personnel training, and the type and extent of any necessary medical surveillance. Procedures for protecting third parties, such as visitors or the surrounding community, are also specified in the HASP.

The *Citizen Participation Plan* (CPP) presented in Appendix D describes the types of information to be provided to the public and outlines the opportunities for community comment and input during the RI/AA. This Plan includes a preliminary list of potentially interested parties, a list of information repositories, community outreach, and other appropriate citizen participation activities. Furthermore, the CPP describes the procedures to be used to ensure that:

- Pertinent documents will be readily available to the public;
- Communication with the public takes place at critical decision points in the remedial program;
- Informational notices are mailed out and/or announced in the local media;
- Project staff are identified and made accessible to the public; and
- Interested and/or affected parties are identified.

2.0 SITE BACKGROUND, PHYSICAL SETTING AND ENVIRONMENTAL HISTORY

2.1 Background of Project Site History

The Electruk Battery Enterprises site, located at 4922 IDA Park Drive in the Lockport Industrial Park in Lockport, New York, manufactured lead acid batteries from 1990 to 1996. The facility was damaged by a six-alarm fire in January 1995, which caused a significant disruption to the business. As a result, Electruk Battery was not able to recover from the damages and was forced into Chapter 7 bankruptcy in October 1996. The site is approximately 1.4 acres in size and is currently occupied by an approximately 14,000 square foot building. The remaining portions of the project site are comprised of an open field area consisting of weeds and brush and a concrete paved area.

The County commenced an in rem tax foreclosure proceeding in July 2003 and subsequently took ownership of the project site. The Town filed and was granted a Notice of Motion in the Niagara County Courthouse to obtain temporary incidents of ownership of the project site for the sole purpose of entering the project site and conducting an environmental investigation. Following the completion of the RI/AA and subsequent remedial tasks, if any, the County has agreed to transfer title to the project site free of any tax liens to the Town.

2.2 Environmental History

This section of the Work Plan details historical and environmental information about the site and surrounding properties collected from typical sources, as well as sources that may be unique to the project site.

In early October of 1996, Key Bank was permitted by order of the US Bankruptcy Court to secure the site to preserve the assets and collateral in which it had security interests.

Electruk Battery then abandoned the site, leaving behind numerous drums of acids, lead components, and solvents.

In October 1996, Key Bank retained a contractor who performed a Phase I Environmental Site Assessment of the property. A Phase II Environmental Site Assessment was then performed in June 1997 by the same contractor on behalf the Town of Lockport Industrial Development Agency. The Phase II investigation revealed approximately twenty 55-gallon drums and two vats identified as containing lead sludge located outside of the building and which were left open to the elements along with four 30-gallon drums of sulfuric acid, one of which was cracked open and only half full. The interior of the building was found to be covered with lead dust and several areas of surficial soil lead contamination were documented. The 1995 fire had exacerbated the spread of lead contamination throughout the facility, which apparently had already been contaminated with lead from the battery manufacturing process. Inside the building were drums of methyl ethyl ketone, sulfuric acid, and xylene along with many smaller containers of paint related items. Two bulk acid storage tanks were also present.

In June 1998, the Niagara County Health Department requested that the NYSDEC consider the site for an emergency removal action under the State superfund program. In July 1998, the NYSDEC requested that the U.S. Environmental Protection Agency (EPA) perform an emergency removal at the site. Under Superfund, EPA is charged with responding to the release or threatened release of contamination into the environment with enforcement responsibilities, including the recovery of costs associated with its response. After performing a removal assessment in August 1998, EPA confirmed the presence of hazardous materials on the property.

EPA subsequently commenced a Superfund removal action to address the contamination. That action was completed in June 1999. The removal action included the identification, removal, and disposal of all hazardous wastes from the property, with the exceptions noted below. Material removed from the property included 24 roll-off containers (695 cubic yards) of building debris and contaminated equipment, 99 drums of miscellaneous wastes, nine roll-off containers (180 cubic yards) of lead contaminated soil, three tanker loads (8,634 gallons) of hazardous liquids, and 3 cubic yards of spent sorbent and personal protective equipment. All materials were transported to permitted off-site disposal facilities.

EPA did not pursue any investigation into potential on-site groundwater contamination or soil contamination caused by potential solvent releases.

Wipe sampling data collected by EPA after the decontamination of the building floor and ceiling beams confirmed the removal of gross contamination. However, some residual lead concentrations that meet EPA's removal criteria but exceed the residential guidelines used by the U.S. Department of Housing and Urban Development remain on the floor and ceiling beams. The lead concentrations remaining are indicative of lead bonded to surfaces in a manner that would require extensive, repetitive cleaning for removal. It was therefore recommended that potential buyers or renters be informed that these surfaces should be encapsulated (e.g., by application of paint and/or insulation on the ceiling beams and either painting the floor or covering it with a fresh layer of concrete or other material) prior to utilizing the building.

EPA's action level for excavation of lead-contaminated soil at industrial sites was 750 parts per million (ppm). Although EPA removed all lead contaminated soil with concentrations above that level, it should be noted that lead contamination at concentrations exceeding the NYSDEC cleanup objective for unrestricted use, which is 63 ppm, remains in the on-site soils. The highest levels remaining are found against the building foundation and concrete storage pad. After reviewing the 1999 Final Report of the EPA, the NYS Department of Health (NYSDOH) concluded that the remaining lead levels should not pose any exposure problems as long as the site remains in its current intended use (commercial/industrial) and the areas remain undisturbed. Because the lead concentrations remain above residential cleanup guidelines, the NYSDOH also recommended the placement of a formal Deed restriction on the property to prevent the use of the site for residential or day care purposes.

EPA determined that no further Superfund action by EPA was needed and that it would not seek to recover the costs it incurred while performing the removal action.

2.3 Site Geology and Hydrology

The *Soil Survey of Niagara County, New York* identifies the soil underlying a majority of the subject property as Odessa Silty Clay Loam (OdA). This soil is a deep, somewhat poorly drained, moderately fine textured soil. These soils are formed in lacustrine deposits in which calcareous clay is dominant. The permeability of this soil is low. The *Surficial Geologic Map of New York – Niagara Sheet (1988)* indicates that the overburden material underlying the project site consists of a till moraine that is more variably sorted and more permeable than till. The *Geologic Map of New York, Niagara Section*, depicts the uppermost bedrock formation beneath the subject property as the Upper Silurian Period dolestone and limestone associated with the Lockport Group, which is approximately 150 to 200 feet thick.

A Flood Insurance Rate Map of the area indicates that the subject property is not within the boundaries of the 100-and/or 500-year floodplains.

The majority of the stormwater on the subject property is conveyed either by overland flow towards perimeter drainage ditches along the property lines or infiltrates into the subsurface of the subject property.

The direction of groundwater flow is not well defined, but fundamental hydrogeologic principles suggest that groundwater flow is likely to be north to northeast towards the Niagara Escarpment. However, localized variations in groundwater flow direction may occur in the vicinity of utility lines or other undefined subsurface features.

The New York State Department of Environmental Conservation (NYSDEC) Freshwater Wetland Map and the U.S. Department of Interior Fish and Wildlife Service National Wetlands Inventory Map for the Lockport and Cambria, New York Quadrangles indicate that no state or federally designated wetland areas are located on or adjoining the project site.

2.4 Areas of Potential Environmental Concern

Based upon previous documentation, the following environmental concerns were identified in connection with the subject site:

- Lead contamination remains on interior building surfaces;
- Lead contamination remains in on-site soils at concentrations exceeding the NYSDEC unrestricted use cleanup objective;
- There is the potential for soil contamination related to the past use of solvents at the site;
- There is the potential for on-site groundwater contamination; and
- There is the potential for the release of contaminated surface water runoff from the site.

3.0 INITIAL EVALUATION

3.1 Potential Contaminants, Affected Media and Receptors

Known and suspected sources of contamination include past spills and releases of chemicals and wastes used, generated and/or stored on-site; past discharges and spills of process wastewater; leaking underground piping; and past discharges and spills from chemical storage facilities. Types of known or suspected contaminants include:

- Lead residue on interior building surfaces
- Lead in on-site soils and/or groundwater
- Lead in sump sediments
- Solvents in on-site soils and/or groundwater

Affected on-site media potentially include surface and subsurface soil, building surfaces and groundwater. Soil contaminated as a result of past spills or releases may act as a source of groundwater and storm water contamination. The primary pathways for potential contaminant migration appear to be particulate emissions; groundwater transport; and storm water discharges. Potentially affected off-site media include soil and groundwater.

Potential human receptors include persons living and working in and visiting the area surrounding the project site as well as persons visiting, working or trespassing on the project site. Potential exposure routes for these receptors include:

- Inhalation of organic vapors; and
- Ingestion of and/or dermal contact with contaminated surface and subsurface soil, groundwater and surface water

In addition to household pets living in the vicinity of the project site, terrestrial wildlife occurring on the project site (e.g., rodents, birds, etc.) are considered potential environmental receptors.

3.2 Data Quality Objectives

The site-specific Data Quality Objectives (DQOs) for data collected during the site investigation are discussed in the QA/QC Plan, and are summarized below:

- To characterize the project site and determine the nature and extent of contamination occurring on or in soil, and groundwater;
- To evaluate potential risks to human health and the environment associated with current project site conditions and potential future use scenarios;
- To identify, evaluate and select long-term remedial actions that are environmentally sound and cost-effective;
- To maintain a state-of-the-art standard of scientific/professional practice for each procedure; and
- To assure the ultimate defensibility of the data generated.

3.3 Scope of Site Investigation

The Remedial Investigation program to be implemented at the project site will initially focus on determining the nature and extent of contamination within the following five areas of the project site

- Surface soil
- Subsurface soil
- Surface water
- Groundwater
- On-site structures

Representative grab samples of surface soil will be collected from previously identified areas of concern (e.g., locations of former drum or tank storage, areas of stained soil, etc.), as well as from points selected to represent conditions across the project site, and will be submitted for chemical analysis. Additionally, a surface soil sample will be collected at each location that a surface water sample is collected. Preliminary remedial action alternatives available to address impacted surface soils may include no action, containment or the removal and proper off-site disposal.

On-site subsurface soil and groundwater will be investigated as part of the subsurface investigation program developed for the project site. This program will involve the completion of test pits, advancement of test borings, and installation of groundwater monitoring wells to facilitate the collection and chemical analysis of samples from these media. Preliminary remedial action alternatives available to address these media include collection and treatment, excavation and disposal, containment or no action.

Surface water grab samples will be collected from perimeter drainage ditches, from the trench drain in the loading dock area and from low and/or depressed areas encountered on the project site. Preliminary remedial action alternatives available to address impacted surface water may include no action, collection and treatment or excavation and off-site disposal of identified contaminant sources.

The investigation of the on-site building will include the collection of sediment samples from sumps and drains within the building. Additionally, the pathway of these trenches from the building will be investigated. Preliminary remedial action alternatives available to address impacted surface water may include no action, containment, or excavation and off-site disposal.

Remedial Action Objectives (RAOs) will be defined for the affected media and contaminants of concern identified as a result of the remedial investigation. The RAOs will consider the contaminant and media of interest, the exposure pathways, and preliminary remediation goals that permit a range of treatment and containment alternatives to be developed. It is anticipated that the RAOs for the above-referenced media will be achieved by either reaching the acceptable concentration or by reducing the exposure, and that the acceptable concentrations will be based upon Standard Criteria and Guidance Values (SCGs) and the intended end use of the project site (eg. to redevelop the project site for commercial or light manufacturing use). A preliminary listing of potentially relevant SCGs is provided below:

- Soil and Sump Shipment: 6NYCRR Part 375-6.8 Soil Cleanup Objectives.
- Surface Water and Groundwater: NYSDEC *Technical and Operational Guidance Series* (TOGS) 1.1.1
- Air: Guidance for Evaluations Soil Vapor Intrusion in the State of New York, October 2006, New York State Department of Health

4.0 RI/AA TASKS

4.1 Scoping

This RI/AA Work Plan was developed based upon information complied during the initial scoping phase of the Former Electruk Battery Site that involved a review of historical information pertaining to the project site and operations occurring thereon; site reconnaissance; and meetings with representatives of the NYSDEC and the Town. In addition, data contained in environmental reports previously completed for the project site were also reviewed an evaluated.

Based upon this information, and in consultation with the NYSDEC, the remedial goals of the project will be designed consistent with 6 NYCRR Part 375 and reflective of the intended end use of the property, and will identify likely decisions, data requirements and the schedule for the project.

The scope and objectives of the RI/AA program detailed in this Work Plan and supporting technical documents were formulated based upon the evaluation of information compiled during the scoping phase. Scoping of the RI/AA will conclude with the approval of this Work Plan by the NYSDEC.

4.2 Citizen Participation Program

A program was designed to provide the community with information concerning the project as well as opportunities for their comment and input during the RI/AA. This program will be administered by the Town of Lockport with technical support from TVGA and the NYSDEC. This program is detailed in the CPP provided in Appendix D.

4.3 Field Investigation

The following subsections outline the scope of the field activities that will be conducted during the site investigation. This scope is intended to define the initial phase of remedial investigation activities and will be modified as necessary to account for information obtained during the investigation. Data gathered during these activities will also be utilized to determine the necessity for additional investigation of the project site. The methods to be employed during the execution of the field tasks outlined below are detailed in the FSP (Appendix A), while the procedures to be implemented to ensure the quality of the resulting field and laboratory data are described in the QA/QC Plan (Appendix B). Table 1 is included as a Sampling and Analysis Summary which details the number of samples planned for collection from each media and the proposed analysis. Figure 4 shows the proposed sampling locations.

4.3.1 Surveying and Title Search

The objective of this task will be to perform a title search in accordance with the requirements of the ERP and to complete a boundary and topographic survey with a meets and bounds description of the project site and to locate on-site structures with respect to site boundaries. The boundary and topographic survey will serve as the base map for the project site. Additionally, a survey will be completed to locate the actual location of the investigation locations. These locations will be superimposed on the base map prepared for the project site.

Coordinates will be established by a New York State-licensed land surveyor for the soil probes, soil vapor probes and monitoring wells. Elevations for the monitoring wells will be relative to a regional, local, or project-specific datum. United States Geological Survey (USGS) benchmarks will be used if located within 0.5 miles of the project site and will take precedence over the use of project-specific datum.

4.3.2 Subsurface Investigation

A subsurface investigation will be conducted to characterize soil and groundwater conditions occurring on the project site. The investigation will include the installation of test pits, test borings and monitoring wells to facilitate the collection and chemical analysis of soil and groundwater samples. The subsurface investigation will include the following:

- Test pits will be will be excavated in areas across the project site and will be the primary means to:
    - Characterize surficial geology across the site;
    - Investigate the thickness of material; and
    - Identify and delineate areas of subsurface contamination via the field screening and chemical analysis of soil samples.

  It is anticipated that this will include one day of test pit excavations. The Town of Lockport will provide an excavator and operator to complete the test pits.

- Three test borings will be drilled on the project site with an auger drilling rig to facilitate the classification, field screening and collection of subsurface soil samples for laboratory analysis. All three of the test borings will be completed with groundwater monitoring wells to enable the determination of groundwater flow direction and gradient, and the hydraulic conductivity of the upper-most water-bearing zone (if required), as well as the collection of groundwater samples for chemical analysis.

Test boring and monitoring well locations will be based upon the project objectives, ease of access, freedom from obstructions, and safety considerations (appropriate set backs from overhead wires and buried services). The depth to groundwater is estimated to be approximately 20 feet below ground surface (bgs). Therefore, it is assumed that the average depth of the monitoring wells will be 30 feet bgs. All test borings will be advanced using 4-1/4-inch I.D. hollow stem augers with continuous split spoon sampling. The wells will be constructed of 2-inch Schedule 40 screens and risers, and will be fitted with locking caps.

- All subsurface soil samples collected from test pits and test borings will be screened for Total Organic Vapors (TOVs) using a photoionization detector. Visual observations will also be made to identify discolored or stained soils. Field screening results will be used to select up to four subsurface soil samples for chemical analysis.

- The three newly installed monitoring wells will be developed and gauged to determine static water levels for the purpose of identifying groundwater flow direction and gradient.

- If significant contamination is identified in the groundwater, in-situ hydraulic conductivity tests will be completed on the three new monitoring wells to determine the permeability of the upper most water-bearing unit.

- Representative groundwater samples will be obtained from the three new wells for chemical analysis.

- Subsurface soil and groundwater samples will be submitted and analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), appearing on the Target Compound List (TCL) using NYSDEC Analytical Services Protocol (ASP) Method 2000. The samples will also be analyzed for the metals appearing on the RCRA-8 list using ASP methods. Additionally, two subsurface soil samples and all three groundwater samples will be analyzed for pesticides and polychlorinated biphenyls (PCBs) appearing on the TCL. All chemical analyses will be performed by a laboratory that is accredited under the New York State Environmental Laboratory Approval Program (ELAP) Contract Laboratory Program (CLP).

- Should soil or groundwater sample results reveal the presence of VOCs, a soil vapor investigation will be performed around the perimeter of the site to address off-site migration issues and potential migration of vapors into adjacent structures. The soil vapor investigation will be performed in general accordance with the October 2000 New York State Department of Health document entitled "Guidance for Evaluating Soil Vapor Intrusion in the State of New York".

The vapor investigation will include the installation of four temporary soil vapor implants or probes. The location and depth of these probes will be field determined and will be based upon groundwater levels. Two rounds of soil vapor samples will be collected from each probe location and analyzed using EPA Method TO-15 for a wide range of VOCs. When collecting the soil vapor samples, a tracer gas (e.g., helium) will be utilized at every sampling location, for each round of samples, as a quality assurance quality control measure to verify the integrity of the soil vapor probe seal. All analyses will be performed by an ELAP certified laboratory.

4.3.3 Surface Soil Investigation

A sampling and analysis program will be implemented to characterize the chemistry of surface soil and/or materials. Grab samples will be collected from previously identified areas of concern (e.g., locations of former drum or tank storage, areas of stained soil, etc.), as well as from points selected to represent conditions across the subject site. We have estimated that 12 surface soil samples will be collected from areas of concern for lead and pH analysis. Also, three surface soil/sediment samples will be collected from the same locations as the surface water samples (see 4.3.4) and will be analyzed for SVOCs, pesticides and PCBs appearing on the TCL and RCRA-8 metals. In addition, if appropriate, five background soil samples will be collected from appropriate locations for the purpose of defining local baseline soil conditions. These samples will be analyzed for SVOCs appearing on the TCL and the metals on the RCRA-8 metals list.

4.3.4 Surface Water Sampling and Analysis

Surface water grab samples will be collected from perimeter drainage ditches, from the trench drain in the loading dock area and from low and/or depressed areas encountered on the site. It is assumed that up to three samples will be collected and analyzed for pH, SVOCs, pesticides and PCBs appearing on the TCL and the metals on the RCRA-8 list.

4.3.5 Sump Sediment Sampling and Analysis

Sediment samples will be collected from the trench drains and/or sumps within the building. It is assumed that two samples will be collected and analyzed for pH, SVOCs, pesticides and PCBs appearing on the TCL and the metals on the RCRA-8 list.

4.4 Sample Analysis/Validation

4.4.1 Laboratory Analysis

A laboratory that is accredited under the New York State Environmental Laboratory Approval Program (ELAP) Contract Laboratory Program (CLP) will perform all chemical analyses in accordance with the Analytical Services Protocol. The target analytes and corresponding analytical methods to be utilized for the project are identified in Table 1. The data package will be in an Analytical Services Protocol (ASP) Category B format to facilitate data validation.

The four samples collected from the soil vapor survey, if applicable, will be submitted and analyzed for a list of volatile organic vapors using EPA Method TO-15.

4.4.2 Data Validation

A NYSDEC-approved independent data validator will perform the validation of the laboratory data in accordance with the *NYSDEC Guidance for the Development of Data Usability Summary Reports*. The data package will be reviewed for completeness and compliance relative to the criteria specified in the aforementioned NYSDEC document. The validator will then conduct a detailed comparison of the reported data with the raw data submitted as part of the supporting documentation package, and will apply protocol-defined procedures for the identification and quantification of the individual analytes to determine the validity of the data. The validation report will include a narrative summary discussing all quality issues and their impact on the reported results, and copies of laboratory case narratives.

4.5 Data Evaluation and Qualitative Risk Assessment

Once the accuracy and precision of the data has been verified, evaluation of the data will be performed. All remedial investigation data will be analyzed and the results of the analyses will be presented in an organized and logical manner so that the relationship between the results for each medium is apparent. Typical activities associated with data evaluation include:

- Data review, reduction and tabulation
- Comparison with applicable regulatory levels
- Environmental fate and transport modeling/evaluation

Using these data, a risk assessment will be performed to qualitatively assess the potential human health and environmental risks associated with the site. The following activities are typically associated with this task:

- Identification of contaminants of concern
- Exposure assessment
- Toxicity assessment
- Risk Characterization

4.6 Development and Analysis of Remedial Alternatives

The following sections describe the tasks associated with the development and analysis of alternatives that will be employed to address contamination at the project site.

4.6.1 Development of Remedial Alternatives

A range of remedial alternatives will be developed to address contaminated media at the project site, as deemed necessary in the RI Report, and to provide adequate protection of human health and the environment. The potential alternatives will encompass a range of alternatives including treatment, containment and removal options.

General response actions will be identified for each medium of interest. General response actions typically include containment, excavation, extraction, treatment, disposal or other actions, singly or in combination to satisfy remedial action objectives. Volumes or areas of media to which general response actions may apply will be identified. Subsequently, treatment technologies for each general response action will be identified and screened relative to their technical and economic feasibility for implementation at the site, and the potential technologies will be combined into media-specific or site-wide alternatives. The alternatives will be screened on a general basis with respect to their effectiveness, implementability, and cost, to limit the number of alternatives that undergo the detailed analysis and to provide consideration of the most promising options.

4.6.2 Detailed Analysis of Remedial Alternatives

A detailed analysis of each alternative will be completed in accordance with the requirements outlined in 6 NYCRR Part 375-6.8, Soil Cleanup Objective Section. An individual analysis of each alternative will be performed relative to the following criteria:

- Overall protection of human health and the environment
- Compliance with Standards, Criteria and Guidance
- Short-term effectiveness
- Long-term effectiveness and permanence
- Reduction of toxicity, mobility, or volume
- Feasibility

- Community Acceptance

Furthermore, a comparative analysis of all of the remedial alternatives with respect to each other will be completed in terms of the above listed criteria.

4.7 Remedial Investigation/Alternatives Analysis Report

A Remedial Investigation/Alternative Analysis (RI/AA) Report will be prepared which will:

- Summarizes and documents the investigative methods employed to characterize the site
- Describes the physical characteristics of the site
- Defines the nature and extent of contamination
- Presents the results of contaminant fate and transport modeling/evaluations
- Identifies potential health and environmental risks posed by the site
- Provides recommendations relative to future work requirements and remedial action objectives
- Describes the process utilized to develop and screen remedial alternatives
- Present the results to the detailed analysis of alternative
- Identify the most suitable remedy considering the remedial action objectives

The RI/AA Report will present sufficient information to enable the preparation of a *Proposed Remedial Action Plan* (PRAP), which summarizes the proposed remedy for public review and comment.

4.8 Proposed Remedial Action Plan

Based on the RI/AA Report, TVGA will prepare a Proposed Remedial Action Plan (PRAP) that summarizes the results of the investigation as well as the proposed remedy in a template document that will be provided by the NYSDEC.

5.0 PROJECT SCHEDULE

The anticipated schedule for completion of the RI/AA on a task-specific basis is depicted in Figure 5. Should changes to the scope of the site characterization program occur, or should the milestones change for any reason during the RI/AA program, TVGA will submit a revised schedule for approval.

6.0 PROJECT ORGANIZATION AND MANAGEMENT

6.1 Project Organization

TVGA will be the prime consultant providing the professional environmental and engineering services required for the project, and will perform all technical and administrative services for the project through our Elma and Sanborn, New York offices.

TVGA has assembled an in-house team for this project that allows for both a clear division of responsibility and authority, as well as a reasonable span of control for each of the key project scientists and engineers. We believe that it is vitally important to establish strong working groups with well-defined lines of authority and responsibility. One of the primary functions of the Project Manager will be to assure that such interaction is occurring in a timely fashion.

Our staff is comprised of an integrated group of scientists, engineers and surveyors. The firm is structured to provide a diverse menu of abilities including: Environmental, Civil, Structural, Geotechnical, Transportation Engineering as well as Surveying, Planning and Construction Inspection Services. From TVGA's staff of over 75, we have selected a team of project professionals that are experienced in site investigation and remediation and who have the time available to be committed to this project. Key project personnel have the credentials and extensive experience in similar projects to excel in their assigned tasks, and are identified on the organization chart provided as Figure 5.

Brief biographies of the key project team members are presented below, while professional resumes for these and other team members have been included in Attachment A.

Daniel E. Riker, P.G. will serve as the Project Manager for the project. Mr. Riker is a licensed professional geologist with over 14 years of experience conducting environmental assessment, investigation and remediation projects at both active and abandoned commercial and industrial properties. In the capacity of Project Manager, Mr. Riker will be directly responsible for client communications; the coordination and oversight of technical staff and subconsultants; the daily monitoring of all aspects of the project, and the final technical review of project deliverables. Mr. Riker has served in a similar role on a number of brownfield projects performed under NY State's ERP, including projects for the Cities of Buffalo, Dunkirk and Olean. He also has grant preparation experience under both State and Federal brownfield programs.

Robert R. Napieralski, C.P.G. will serve as the Quality Assurance Officer for the project. In this capacity, Mr. Napieralski will be responsible for oversight of all QA/QC activities for the project and will remain independent of day-to-day, direct project involvement. His duties will include reviewing and approving the QAPP; conducting project audits; recommending, implementing and/or reviewing actions taken in the event of QA/QC failures; and coordinating with the technical staff, Project Manager and subcontractors to ensure that QA objectives appropriate to the project are set and that all project personnel are aware of these objectives. Mr. Napieralski is a Certified Professional Geologist with 17 years of experience, during which time he has managed numerous assessments, investigations, redevelopment feasibility studies and remedial actions at brownfield sites in the context of site-specific and programmatic agendas. He has extensive ERP experience, having functioned as Project Manager or QA Officer on five projects advanced under this program. Mr. Napieralski also has EPA Brownfield Program experience and has prepared successful investigation and cleanup grant applications under both the state and federal programs.

James C. Manzella will serve as the Team Leader for the Remedial Investigation (RI). In this capacity he will coordinate and oversee all field activities; and be responsible for the scheduling and supervision of field personnel and subcontractors involved in the implementation of the Field Sampling Plan. He has over eight years of experience with the planning and execution of RI programs and has served in similar roles on many ERP investigation projects. Mr. Manzella has served in similar roles on several RI/AA projects. He will be the secondary contact for project-related communications with the client and will perform the initial technical review of all reports and plans generated for the project.

Michael J. Finn will serve as the Team Leader for the Alternatives Analysis (AA). In this capacity, he will be responsible for the coordination and supervision of technical staff involved in the development, screening and detailed analysis of remedial alternatives. Mr. Finn will interface extensively with the RI Team Leader to identify feasible alternatives and data requirements for the analysis of the alternate remedies. He has experience with brownfield projects, including the identification and evaluation of remedial alternatives as well as the planning of remediation programs. Mr. Finn has served in a similar capacity on a number of projects.

In addition to these key personnel, the project team will include technical and clerical support staff designated based upon their capabilities and performance on similar previously completed projects.

As reflected by Figure 6, TVGA will select four specialized subcontractors to provide drilling, analytical laboratory, data validation services, and possible soil vapor point installation. These subcontractors will be selected based upon their experience, capabilities and competitive pricing, as well as our experience with them on other projects of similar nature. Prior to selection, TVGA will submit to the Town of Lockport and the NYSDEC a list of subcontractors that submitted proposals for the project and provide recommendations for selection.

6.2 Project Management

TVGA has a standardized approach to project management that is chronicled in our *Project Development/Management Manual*. This approach focuses on the following issues:

- Communication
- Planning
- Scope Execution and Management
- Cost Control
- Schedule Management
- Quality Assurance and Control
- Staffing and Project Resources
- Delegation and Monitoring of Staff and Subconsultant Work
- Problem Resolution
- Project Close-Out
- Client Feedback

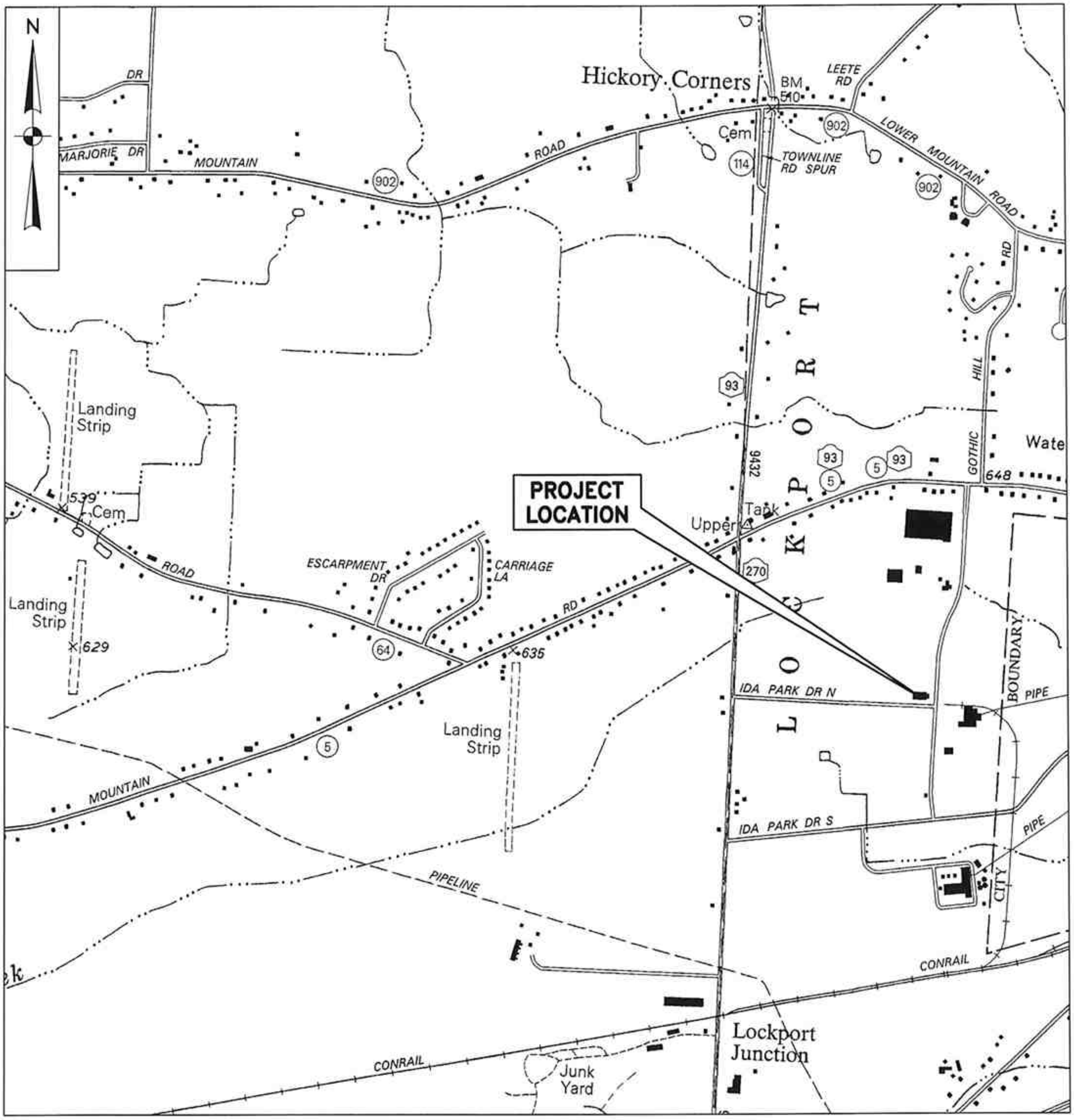
This process is initiated with the preparation of a project plan providing a task level breakdown of the project scope, staffing, budget, schedule, and management system. This plan is developed by the Project Manager and reviewed by all project team members, and provides a road map for the execution of the project scope. Throughout the course of the project, the management team, consisting of the Project Manager and Task Managers, will meet on a regular basis to review the technical approach and to coordinate the activities of the project. Other informal meetings between the management team and technical staff will also occur throughout the project on an as needed basis.

TVGA believes that successful project management also requires effective communications with the Client and other various parties involved in the project (e.g., regulatory agencies, community groups, etc.). Such communication is of paramount importance and must be established at project inception to define all goals, objectives, interrelationships, and technical requirements of the project. This will be accomplished through the designation of two key individuals at TVGA who will handle all communications with the Client and other involved parties, as well as the implementation of a program of periodic project meetings to provide a forum for discussing the progress of the project and other critical issues. For this project, all communications will be coordinated through the primary TVGA contact, the Project Manager, or the secondary TVGA contact, the RI Team Leader. Project management meetings will be held on a regular basis throughout the duration of the project.

7.0 PROJECT BUDGET

The table presented in Attachment B outlines the budget for the RI/AA program. The table identifies the level of effort to be expended per task by ASCE Grade; relates the level of effort to direct labor costs on a per task basis; details direct non-salary costs including reimbursable expenses and subcontractor fees; summarizes direct labor, overhead, and fixed fee values and sums them with the total other direct costs to yield the total project budget.

FIGURES



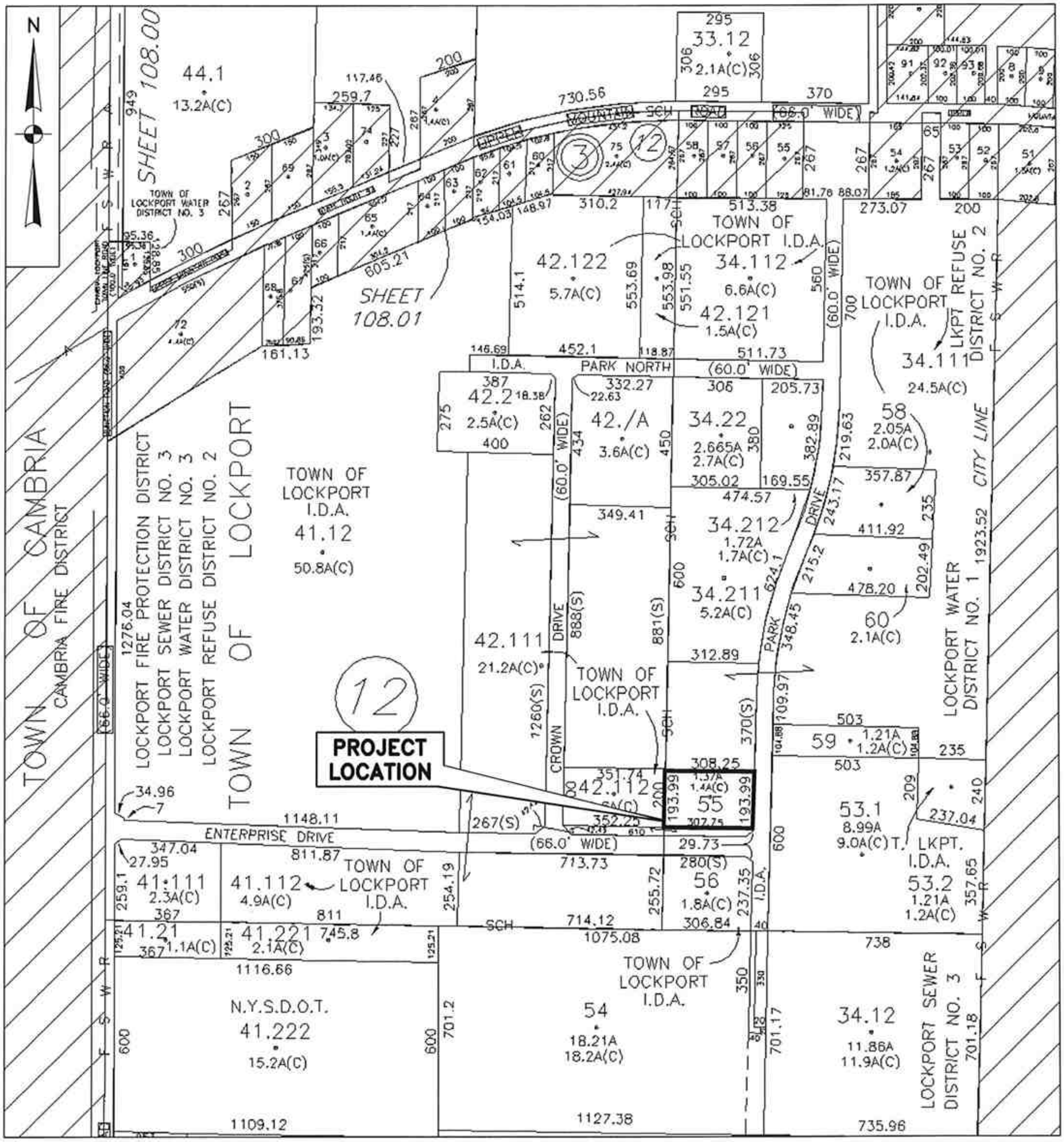
U.S.G.S LOCKPORT QUADRANGLE
CAMBRIA QUADRANGLE

PROJECT LOCATION MAP

TVGA
CONSULTANTS
1000 MAPLE ROAD
ELMA, NEW YORK 14059-9530
P. 716.655.8842
F. 716.655.0937
www.tvga.com

REMEDIAL INVESTIGATION/ALTERNATIVES ANALYSIS PROGRAM
FORMER ELECTRUK BATTERY SITE
4922 IDA DRIVE
LOCKPORT, NEW YORK 14094

PROJECT NO. 2007.0262.00	SCALE: 1" = 500'	DATE: JANUARY 2008	FIGURE NO. 1



SBL 108.00-1-55

TAX MAP

TVGA CONSULTANTS

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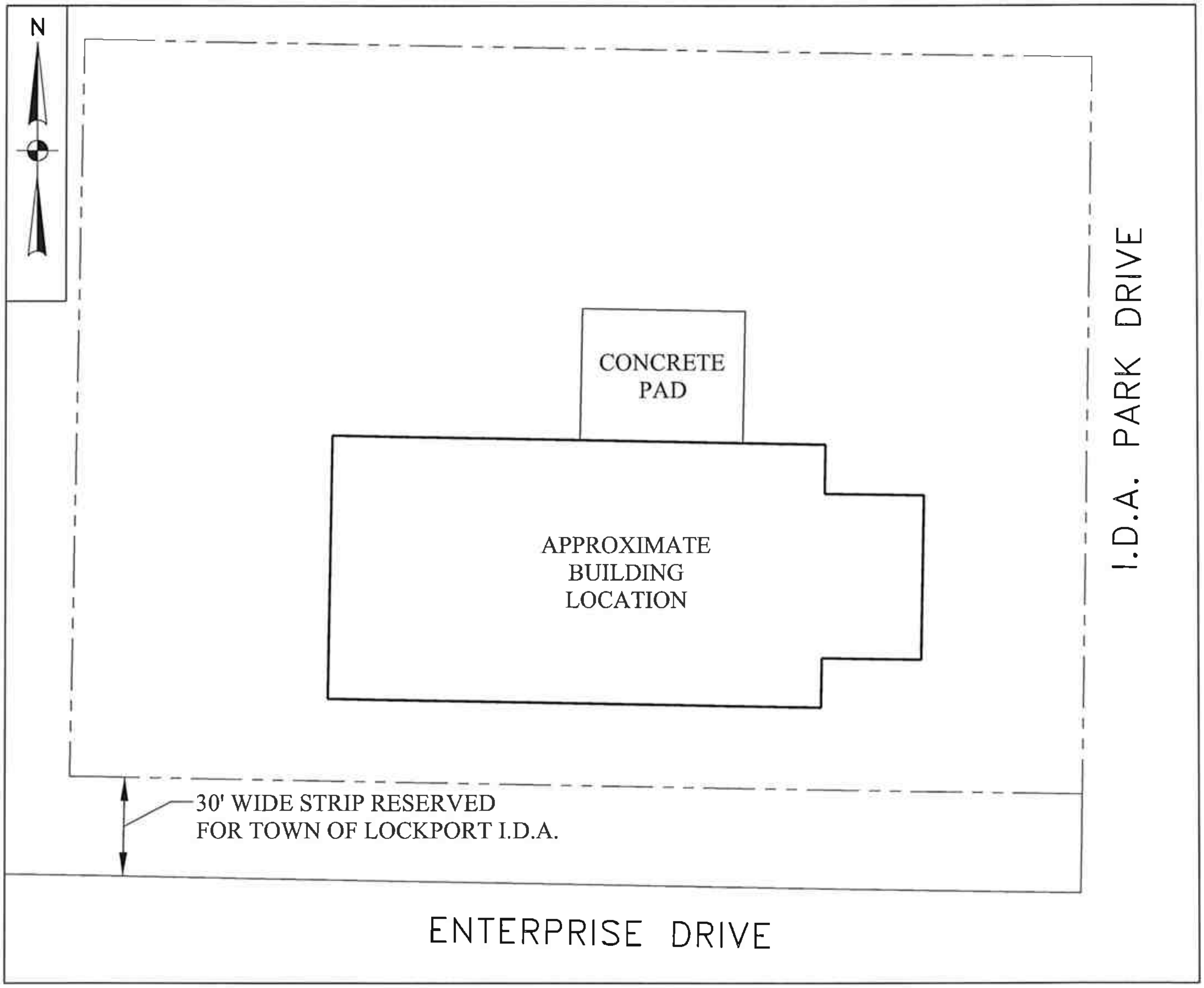
REMEDIAL INVESTIGATION/ALTERNATIVES ANALYSIS PROGRAM
FORMER ELECTRUK BATTERY SITE
4922 IDA DRIVE
LOCKPORT, NEW YORK 14094

PROJECT NO. 2007.0262.00	SCALE: 1" = 200'	DATE: JANUARY 2008	FIGURE NO. 2

N:\2007.0262.00-500 for Electruck Site Grant Application\Engineering\CADD\FIGURES 1 AND 2.dwg, 1/25/2008 2:14:07 PM, dshaffer



PROJECT SITE PLAN

TVGA CONSULTANTS
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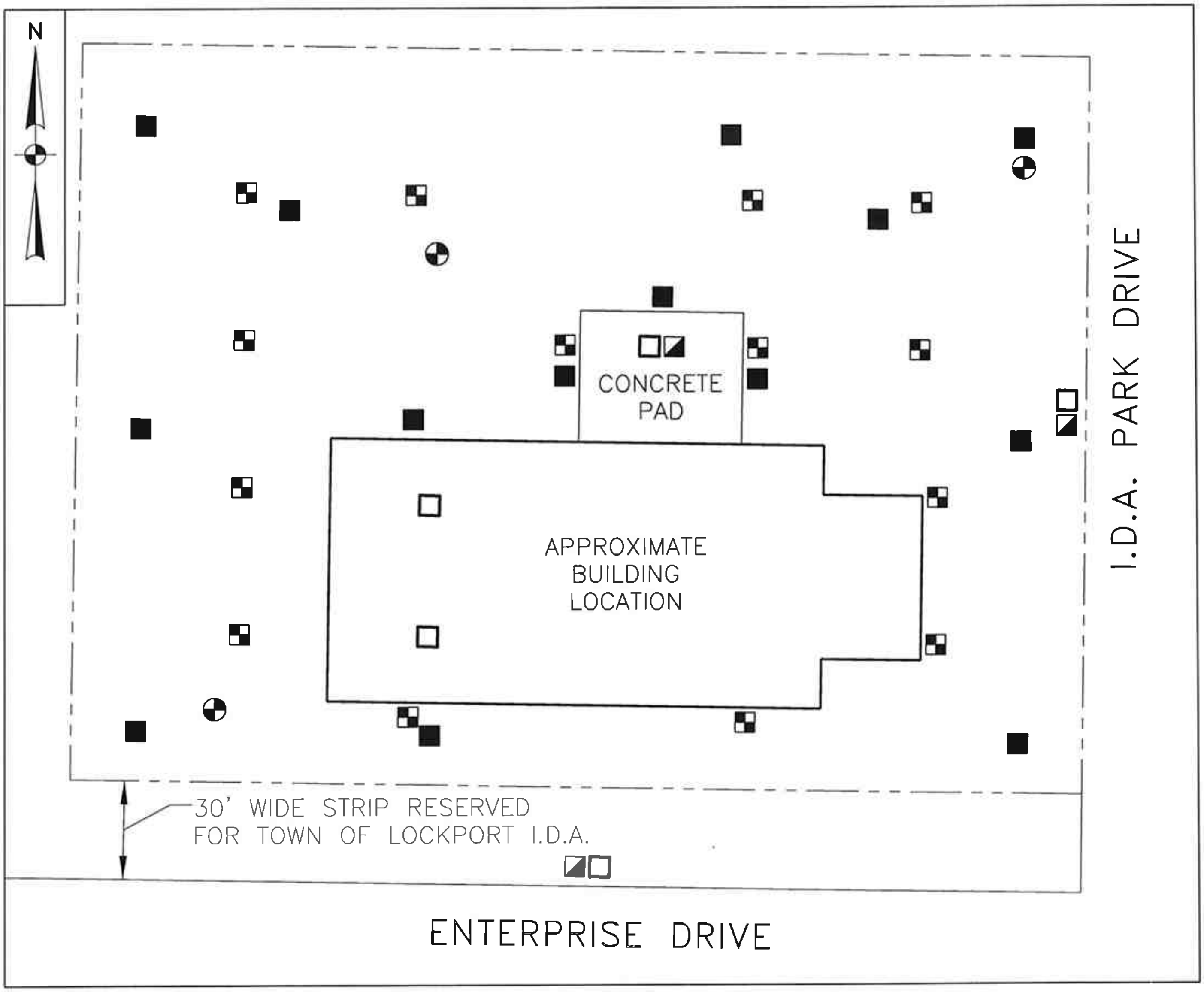
REMEDIAL INVESTIGATION/ALTERNATIVES ANALYSIS PROGRAM
FORMER ELECTRUK BATTERY SITE
4922 IDA DRIVE
LOCKPORT, NEW YORK 14094

PROJECT NO. 2007.0262.00	SCALE: 1" = 50'	DATE: JANUARY 2008	FIGURE NO. 3



LEGEND	
◕	TEST BORING/ MONITORING WELL
▣	TEST PIT
■	SURFACE SOIL
◪	SURFACE WATER
□	SEDIMENT

PROPOSED SITE INVESTIGATION MAP

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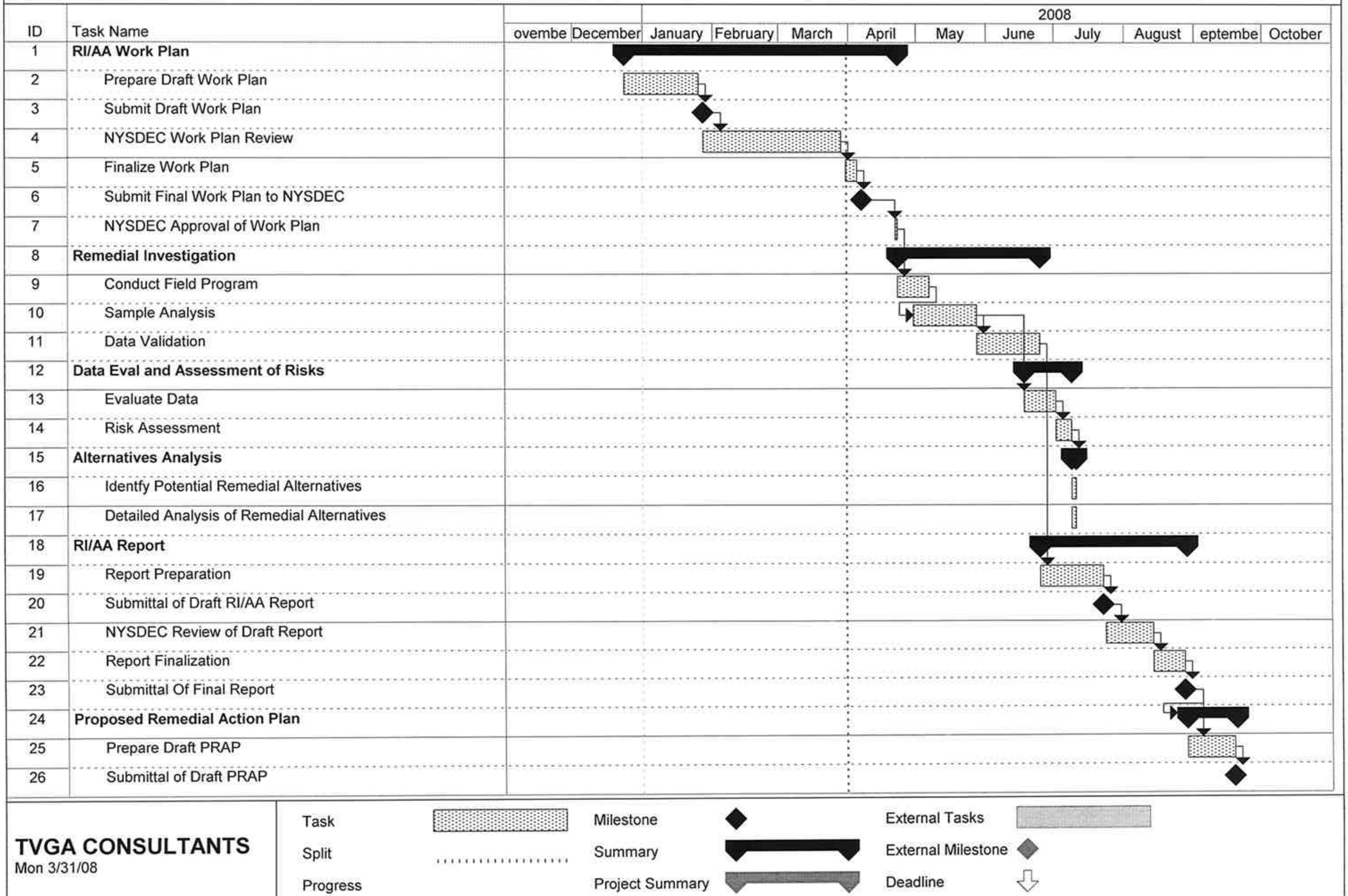
REMEDIAL INVESTIGATION/ALTERNATIVES ANALYSIS PROGRAM
FORMER ELECTRUK BATTERY SITE
4922 IDA DRIVE
LOCKPORT, NEW YORK 14094

PROJECT NO. 2007.0262.00	SCALE: 1" = 50'	DATE: JANUARY 2008	FIGURE NO. 4

FIGURE 5
FORMER ELECTRUK BATTERY SITE - RI/AA SCHEDULE



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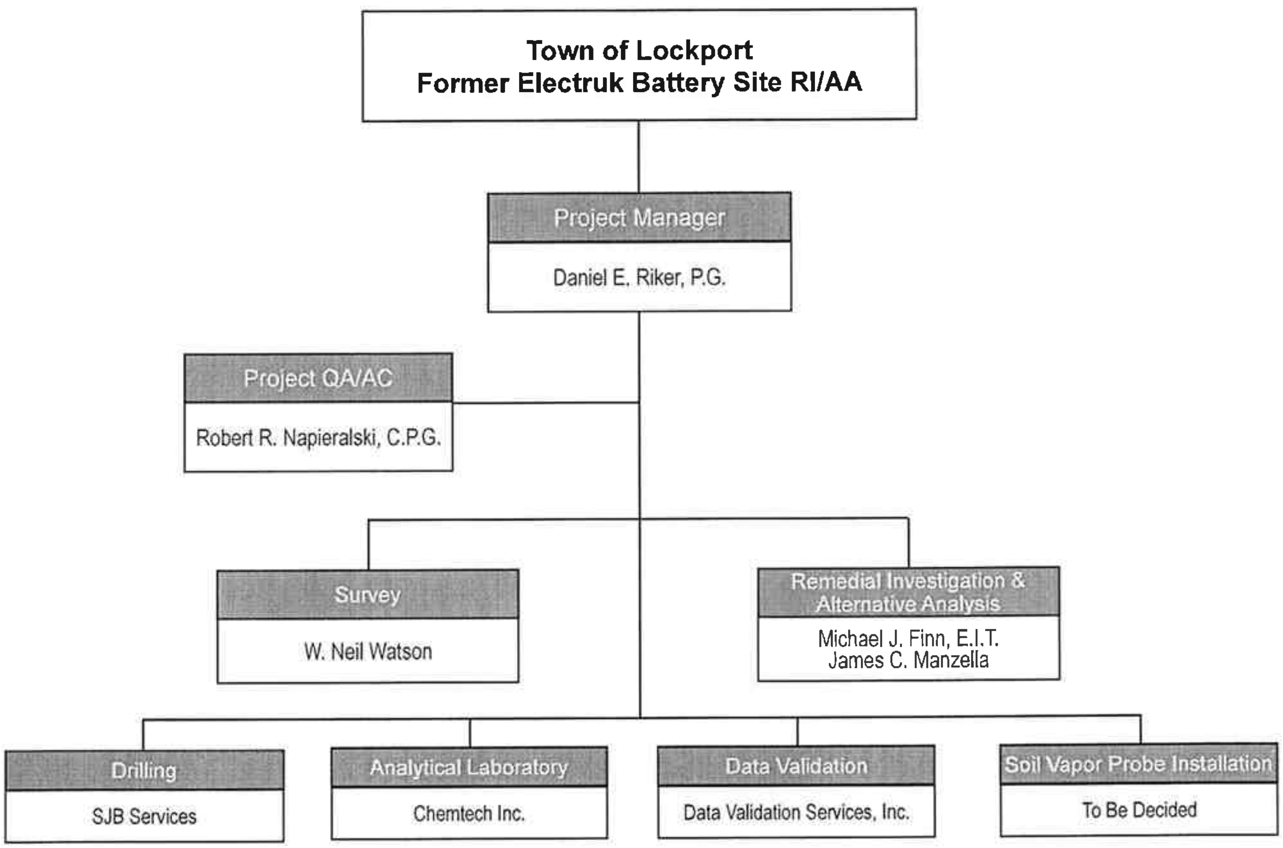
TVGA
CONSULTANTS

FIGURE No. 6



TABLES

Table 1
Sampling/Analysis Summary

RI/AA Former Electruk Battery Site

Lockport, New York

Parameter	Method	Source	Sample Type and Number							
			Samples	Field Duplicates	MS	MSD	Field Blanks	Rinseate Blanks	Trip Blanks	Total Samples
Groundwater / Surface Water										
TCL Volatiles	ASP 2000	3 New Monitoring Wells / 3 Ditches, Low Areas	6	1	1	1	-	-	1	10
TCL Semi Volatiles	ASP 2000	3 New Monitoring Wells / 3 Ditches, Low Areas	6	1	1	1	-	-	-	9
TCL Pest/PCBs	ASP 2000	3 New Monitoring Wells / 3 Ditches, Low Areas	6	1	1	1	-	-	-	9
pH	ASP 2000	3 New Monitoring Wells / 3 Ditches, Low Areas	6	-	-	-	-	-	-	6
RCRA-8 Metals	ASP 2000	3 New Monitoring Wells / 3 Ditches, Low Areas	6	1	1	1	-	-	-	9
Subsurface Soil										
TCL Volatiles	ASP 2000	Test Borings, Test Pits	4	-	1	1	-	1	-	7
TCL Semi Volatiles	ASP 2000	Test Borings, Test Pits	4	-	1	1	-	1	-	7
TCL Pest/PCBs	ASP 2000	Test Borings, Test Pits	2	-	1	1	-	1	-	5
pH	ASP 2000	Test Borings, Test Pits	4	-	-	-	-	1	-	5
RCRA-8 Metals	ASP 2000	Test Borings, Test Pits	4	-	1	1	-	1	-	7
Surface Soil										
TCL Semi Volatiles	ASP 2000	Grab Samples (3 on-site, 5 background)	8	-	-	-	-	1	-	9
TCL Pest/PCBs	ASP 2000	Grab Samples (3 on-site)	3	-	-	-	-	1	-	4
Lead	ASP 2000	Grab Samples (12 on-site)	12	-	-	-	-	1	-	13
RCRA-8 Metals	ASP 2000	Grab Samples (3 on-site, 5 background)	8	-	-	-	-	1	-	9
pH	ASP 2000	Grab Samples (12 on-site)	12	-	-	-	-	1	-	13
Sediment										
TCL Volatiles	ASP 2000	Interior sumps	2	-	1	1	-	1	-	5
TCL Semi Volatiles	ASP 2000	Interior sumps	2	-	1	1	-	1	-	5
TCL Pest/PCBs	ASP 2000	Interior sumps	2	-	1	1	-	1	-	5
RCRA-8 Metals	ASP 2000	Interior sumps	2	-	1	1	-	1	-	5
pH	ASP 2000	Interior sumps	2	-	1	1	-	1	-	5

* - The collection of background samples are contingent upon the results of the soil samples collected from the project site.

Total VOCs =	17
Total SVOCs =	30
PCB/Pesticides =	23
Lead =	13
RCRA Metals =	30
pH (soil only) =	23

ATTACHMENT A

RESUMES

TVGA CONSULTANTS

ROBERT R. NAPIERALSKI, C.P.G.

PRINCIPAL/MUNICIPAL MARKET SECTOR LEADER

INTRODUCTION

Mr. Napieralski has 18 years of professional environmental consulting experience for public and private sector clients and specializes in the management of multi-disciplined projects. His background includes extensive experience with Phase I and II Environmental Site Assessments, soil and groundwater remediation, Environmental Impact Statement (EIS) preparation, solid and hazardous waste management facility permitting, investigation, and remediation, and regulatory compliance issues. Mr. Napieralski has a working knowledge of State and Federal regulatory programs including Chemical and Petroleum Bulk Storage, CWA, RCRA, CERCLA, SARA, TSCA, SPDES, Voluntary Cleanup Programs, Brownfield and Recycling Grant Programs under the Clean Water/Clean Air Bond Act of 1996, and 6 NYCRR Parts 360, 420-426, 371-375, 617, and 621.

PROJECT EXPERIENCE

Site Investigation/Remedial Alternatives Report (SI/RAR), Flintkote Site, Lockport, NY – Project Manager for the SI/RAR of an abandoned six-acre site utilized for industrial purposes since the 1880s. Responsibilities include technical and administrative oversight of project staff and subcontractors involved in site characterization and remedial alternatives analysis, as well as client and regulatory communications. Duties also include technical review of project plans, reports and estimates, and analysis of potential funding opportunities via insurance asset recovery. Project also requires close communication with County planning agency to ensure integration of end use planning and remedial alternative selection.

Chautauqua County Department of Public Facilities, Term Environmental Services, Chautauqua County, NY – Program Manager for environmental services provided under nine consecutive one-year term contracts. He manages technical staff, subconsultants and subcontractors involved in environmental assignments including Phase I and II environmental site assessments, environmental impact assessment and analysis for business/industrial park developments, brownfield redevelopment, grant preparation and administration, and regulatory compliance. He is responsible for contract administration, technical review of project deliverables, Client consultation, public presentations and outreach, and regulatory communications.

Education:
- BA/1988/Geology/Hydrogeology/Boston University

Professional Registration:
- 1997/Certified Professional Geologist #10110
- Current OSHA 40-Hour HAZWOPER Certification
- OSHA 8-Hour HAZWOPER Supervisor Certification

Professional Associations:
- American Institute of Professional Geologists (AIPG)
- Association of Groundwater Scientists and Engineers (AGWSE)

Continuing Education:
- Risk Assessment for the Environmental Professional, NGWA
- Risk Based Corrective Action, ASTM
- Computer Enhanced Training for Groundwater Transport Simulations, Microengineering, Inc.
- Computer Modeling of Groundwater, SUNY Buffalo
- Environmental Impact Assessment, ALI/ABA
- Impact of Environmental Law on Real Estate Transactions ALI/ABA

Years Experience:

Total Experience: 18 Years
With TVGA 3 Years

Environmental Impact Assessment, Brownfield Restoration and Redevelopment, Falconer, NY – Project Manager responsible for assisting the Lead Agency, Chautauqua County Industrial Development Agency, with the environmental review pursuant to SEQRA of an environmental restoration and redevelopment project at a brownfield site. The project consisted of the environmental remediation of residual contamination at an abandoned industrial site under a Voluntary Cleanup Agreement between the NYSDEC and the developer, and the subsequent redevelopment of the property for manufacturing use. Prepared Parts 1, 2 and 3 of the full Environmental Assessment Form (EAF). Part 3 of the full EAF consisted of a detailed report describing the environmental setting of the project, the proposed remediation program, and the proposed 160,000 SF development. Assisted the Lead Agency in the preparation and filing of a Negative Declaration for the project signifying that the project would not result in any significant adverse impacts and that a DEIS would not be required.

Assessment, Remediation and Demolition of Brownfield Site, Jamestown, NY – Project Manager for the assessment and demolition of a 150,000 SF abandoned manufacturing facility. Project involved a Phase I ESA of the property and pre-demolition inspection of a building complex comprised of six structures. Responsibilities included the preparation of plans and specifications for environmental remediation, asbestos abatement and building demolition, bid administration, and monitoring of contractor activities.

Brownfield Redevelopment Feasibility Study, Former ALCO Complex, Dunkirk, NY – Project Manager for the analysis of redevelopment potential for the 30-acre site of a former locomotive manufacturing complex. Project involved the building condition assessment of a 300,000 SF building complex to determine potential for rehabilitation and/or adaptive reuse, as well as the comparative analysis of demolition and rehabilitation costs. Project also included the development of conceptual site plans for several reuse alternatives, and coordination of strategic planning process to identify critical issues (e.g., funding shortfalls, environmental liability, flow of ownership complications) and strategies for addressing said issues.

Brownfield Reuse Assessment, Flintkote Complex, Lockport, NY – Project Manager for the assessment of an abandoned manufacturing complex to determine the potential for reuse of the remaining structures. Project involved a structural evaluation and development of order of magnitude cost estimates for the rehabilitation of portions of the building complex. Recommendations and cost estimates for asbestos abatement and demolition were ultimately made.

Brownfield Cleanup and Demolition, Brownfield Site, Brocton, NY – Project Manager for the $1.2M cleanup and demolition of a former food processing facility. This project is being advanced under the New York State Environmental Restoration Program (ERP). The project entails the remediation of contamination identified in on-site fill and drainage systems, asbestos abatement, and the demolition of a 70,000 SF building complex.

Chautauqua County Brownfield Assessment Demonstration Pilot Program, Chautauqua County, NY – Responsible for the management of programmatic and technical services provided in support of this EPA Brownfield Pilot Program under a multi-year contract. Duties included the management of technical staff and subcontractors involved in the assessment, investigation, and remedial planning for multiple brownfield sites. Responsibilities also included participation in the County's Brownfield Task Force and community involvement program, as well as assisting the County with the preparation of quarterly progress reports for submittal to EPA. Project required extensive communication with regulatory personnel from EPA and NYSDEC, as well as public officials and agencies.

Chautauqua County Dept of Public Facilities, Site Investigation/Remedial Alternatives Report (SI/RAR), Brownfield Site, Dunkirk, NY – Project Manager for the SI/RAR of an abandoned 12-acre site utilized for heavy industrial purposes since the early 1900s. The scope of the SI program included a radiological survey and the characterization of fill, soil, groundwater, surface water, building components, and drainage systems contaminated with chlorinated solvents, PCBs and lead. The project involved the identification and detailed analysis of remedial alternatives available to address the affected media. Responsibilities included client and regulatory communications, implementation of community involvement plan, technical and administrative oversight of project staff and subcontractors, technical review of project plans and reports. Duties also included the coordination of efforts to obtain cleanup funding via insurance asset recovery.

Phase I/II Environmental Site Assessments of Brownfield Pilot Sites, Niagara Falls, NY – Project Manager for the Phase I/II ESAs of two brownfield sites funded via a Supplemental EPA Brownfield Assessment Demonstration Pilot. The Phase I ESAs were performed in accordance with ASTM E-1527, while the Phase II ESAs were in accordance with site-specific work plans prepared pursuant to EPA requirements. Responsible for client and regulatory communications, public meetings, management of technical staff and subcontractors, and technical review of project deliverables (e.g., work plans, health and safety plans, ESA reports).

Remedial Investigation/Alternatives Analysis Program (RI/AA), Former Niagara Motors Site, Dunkirk, NY – Quality Assurance Officer for the RI/AA of an abandoned four-acre site formerly utilized for the manufacture of marine engines. Project is being performed under the New York State Environmental Restoration Program (ERP). Responsibilities include review of project Quality Assurance Plan, implementation of project audits, Quality Assurance reviews of project staff and subcontractors involved in site characterization and remedial alternatives analysis, as well as client and regulatory communications. Duties also include technical review of project plans, reports and estimates.

Remedial Investigation/Alternatives Analysis Program (RI/AA), Former Felmont Oil Site, Olean, NY – Quality Assurance Officer for the RI/AA of a 22-acre former oil refining, storage, and distribution facility. The scope of the RI program includes a passive soil gas survey, a geophysical survey, and the characterization of potentially contaminated fill, soil, groundwater, surface water, and sediment. The project involves the identification and detailed analysis of remedial alternatives available to address the affected media. Responsibilities included client and regulatory communications, implementation of community involvement plan, coordination of project staff and subcontractors, and technical review of project plans and reports.

Remedial Action Summary Report, Buffalo Niagara International Airport (BNIA) Landside Expansion Project, Cheektowaga, NY – Responsible for managing the preparation of the post-construction, remedial action summary report for the BNIA east access improvements and parking expansion project, much of which was constructed on a NYSDEC Inactive Hazardous Waste Site, the former Westinghouse Site. The report was submitted to the NYSDEC to certify that remedial activities conducted in connection with soil and groundwater contamination encountered during construction of new access roads and parking areas were conducted in accordance with applicable standards, criteria and/or guidance.

Site Investigation/Remedial Alternatives Report (SI/RAR), Former Industrial Site, Buffalo, NY – Quality Assurance Officer for the SI/RAR of a 16-acre site formerly occupied by a fertilizer manufacturing facility and later developed as a public park. Responsibilities include technical and administrative oversight of project staff and subcontractors involved in site characterization and remedial alternatives analysis, as well as client and regulatory communications. Duties also include technical review of project plans, reports and estimates.

Site Investigation/Remedial Alternatives (SI/RAR) Report, Brownfield Site, Brocton, NY – Project Manager for the SI/RAR of a former food processing facility under the brownfield component of the Clean Water/Clean Air Bond Act. This project involved the investigation of soil, fill, groundwater, building surfaces and components, and drainage systems at this 70,000 SF facility, as well as the evaluation of appropriate remedial alternatives to address contamination identified in on-site fill and drainage systems. Responsibilities included client and regulatory communications, technical and administrative oversight of project staff and subcontractors, and technical review of project plans and reports.

Groundwater Remediation, Federal Leaking Underground Storage Tank (LUST) Sites, NY – Managed the design, installation and monitoring of several groundwater extraction and treatment systems at LUST sites owned and operated by the Federal Government. Systems utilized included a mobile unit equipped with oil/water separator, total suspended solids filtration, and liquid phase granular activated carbon components. Projects involved periodic monitoring of treatment system effluent and the procurement of applicable discharge approvals from State regulatory agencies.

Remedial Action Plan (RAP), Hamburg, NY – Prepared a RAP for regulatory review and negotiated clean-up requirements for the voluntary remediation of petroleum-contaminated soil at an automotive dealership, repair and service facility. Managed the implementation of the remedial program which involved the decommissioning and removal of 18 leaking belowground hydraulic lifts and the excavation and off-site disposal of over 3,000 tons of soil contaminated with hydraulic oil and waste oil. The project also involved the removal of an old oil/water separator and replacement with a new unit meeting current regulatory requirements for separation, as well as the removal of several previously undiscovered USTs. A field laboratory was utilized throughout the project to define the limits of contaminated soil and to verify that clean-up levels were achieved. The project was completed without suspending the daily operations of the facility.

Soil Remediation, Abandoned Industrial Facility, Cheektowaga, NY – Prepared a Remedial Action Plan (RAP) under the NYSDEC Voluntary Cleanup Program for the remediation of an inactive industrial site contaminated with chlorinated solvents. Following regulatory approval of the Remedial Action Plan, managed the remedial program consisting of the proper closure of an inactive UST, extraction and on-site treatment of contaminated groundwater in the area of concern, excavation of contaminated soil for off-site treatment and disposal, and the further investigation of down-gradient groundwater conditions. The program also involved the development and implementation of community and site-specific health and safety plans requiring continuous air monitoring for particulate and organic vapor levels.

Site Investigation/Remedial Alternatives Report (SI/RAR), Brownfield Site, Town of Ellicott, NY – Project Manager for the SI/RAR for an abandoned industrial site in Chautauqua County, NY under the Brownfield Program. Assisted municipal representatives with the preparation of a complete application for State financial assistance through the assembly of a Statement of Work (SOW) and detailed cost estimate that was approved by the NYSDEC, Division of Environmental Remediation. Also responsible for the design of the site investigation program and the management of technical staff involved in the preparation of the SI/RAR Work Plan, including the Field Sampling Plan, QA/QC Plan, Health and Safety Plan, and Citizen Participation Plan.

1996 Clean Water/Clean Air Bond Act Environmental Restoration (Brownfield) Program – Investigation Grant, Chautauqua County, NY – Prepared a successful grant application on behalf of Chautauqua County for the completion of a Site Investigation/Remedial Alternatives Report (SI/RAR) of an abandoned 12-acre heavy industrial site in Dunkirk, NY. This grant provided state funding assistance in the amount of $175,000 for the completion of the SI/RAR program.

USEPA Brownfields Assessment Demonstration Pilot Program, Chautauqua County, NY – Assisted the Chautauqua County Department of Public Facilities with the preparation of a successful grant application under this Federal brownfield redevelopment initiative to fund the development of a county-wide brownfield inventory, develop a site evaluation process, and investigate and perform remedial planning for seven high priority brownfield sites. This grant was awarded in the amount of $200,000.

1996 Clean Water/Clean Air Bond Act, 1998 Parks Grant Program, Chautauqua County, NY – Assisted the Chautauqua County Department of Public Facilities with the preparation of a successful grant application for the acquisition of 8.5 acres of land situated along the Chadakoin River in the Village of Falconer and the development of a public park. Prepared the project narrative and full Environmental Assessment Form (EAF) and supervised the development of a conceptual site plan depicting access and parking facilities, nature trails, and a canoe launch for the grant application.

Remedial Construction Administration and Oversight, Former Welch Foods Site, Brocton, NY – Principal-in-Charge responsible for the remediation and demolition of a former food processing facility. The $1.2M project is being completed under the New York State Environmental Restoration Program (ERP). The work includes the demolition of the existing building, the cleanup of contaminated sediments and soil, and the removal of asbestos-containing materials.

Remedial Design and Oversight, Franczyk Park, Buffalo, NY – Principal-in-Charge for the implementation of a Pre-Design Investigation; the preparation of the Remedial Action Work Plan, contract documents, and technical specifications; and the oversight and administration of the remediation of this 16-acre brownfield site. The work is being completed under a New York State Environmental Restoration Program (ERP) grant. The remediation includes soil excavation and off-site disposal, installation of an interceptor trench, the placement of a clean soil cover, and the design and installation of new park equipment.

DANIEL E. RIKER, P.G.

PROJECT MANAGER

TVGA CONSULTANTS

INTRODUCTION

In the role as Project Manager, Mr. Riker's duties include coordination with State and Federal regulatory agencies, oversight of technical staff, subconsultants and subcontractors involved in a variety of natural and human resource evaluations, as well as the preparation of environmental documentation and permits pursuant to State and Federal regulatory programs. Specific projects include environmental site assessment, investigation, and remediation activities performed on various transportation, industrial, and commercial projects.

TECHNICAL EXPERTISE

With over 13 years of experience in the field of environmental consulting, Mr. Riker's expertise includes contaminant characterization at brownfield sites and hazardous and solid waste facilities, including the development of project scopes, on-site implementation of characterization efforts, data evaluation and interpretation, identification and evaluation of remedial alternatives, final report preparation, and project management. Mr. Riker has developed a brownfield specialty that includes site characterization, remedial analysis and design, re-use planning, and funding procurement. He has been involved with assorted projects including preliminary site assessments, Phase I and II environmental site assessments, treatment technology assessments, remedial investigations, and remedial design projects.

PROJECT EXPERIENCE

Remedial Construction Administration and Oversight, Former Welch Foods Site, Brocton, NY – Project Manager responsible for the administration and oversight of the remediation at a former food processing facility. The $1.2M project is being completed under the New York State Environmental Restoration Program (ERP). The work includes the demolition of the existing building, the cleanup of contaminated sediments and soil, and the removal of asbestos-containing materials.

Remedial Design and Oversight, Roblin Steel Site, Dunkirk, NY – Project Manager responsible for the preparation of the Remedial Action Work Plan, contract documents, and technical specifications and the oversight and administration of the remediation of this 12-acre brownfield site. The work is being completed under a New York State Environmental Restoration Program (ERP) grant as well as a USEPA Brownfield Cleanup Grant. The remediation includes soil excavation and off-site disposal, in-situ treatment of groundwater, installation of a vapor barrier in the existing structure, and the placement of a clean soil cover.

Education:

- BA/1991/Geology/Colgate University
- MS/1994/Hydrogeology/Duke University

Professional Registration:

- 2000/Pennsylvania Professional Geologist License No. PG003816E
- Current OSHA 40-Hour Health and Safety Training
- OSHA 8-Hour Hazardous Waste Supervisor Course

Professional Associations:

- Buffalo Association of Professional Geologists (Past President)
- Buffalo Niagara Enterprise Brownfields Task Force
- New York State Council of Professional Geologists

Continuing Education:

- Fundamentals and Application of Geochemistry (NGWA 40-hour course)
- Groundwater Modeling System Training Course (Boss International 24-hour course)
- GIS Training Course (GISKey 24-hour course)

Publications:

- Daniel Riker, James Richert, Kent McManus, and Jeffrey Smith (2003). Mathematical Model Reduces Landfill Closure Costs. 18th International Conference on Solid Waste Technology and Management, Philadelphia, PA.
- Daniel Riker, Kent McManus, Peter Cammarata and Christopher Pawenski (2003). Overcoming Impediments to Redeveloping Brownfields: Two Case Studies in Buffalo, NY. RevTech Conference, Pittsburgh, PA

Years Experience:

Total Experience 14 Years
With TVGA 4Years

Remedial Investigation/Alternatives Analysis (RI/AA) Program, Youngstown Cold Storage, Youngstown, NY – Project Manager for the RI/AA of a former apple storage facility adjacent to a public park that is being advanced under the New York State Environmental Restoration Program (ERP). The scope of the RI program includes the characterization of fill, soil, and groundwater potentially contaminated with arsenic and PCBs, and building materials that contain asbestos. The project involves the identification and detailed analysis of remedial alternatives available to address the affected media. Responsibilities included client and regulatory communications, implementation of community involvement plan, coordination of project staff and subcontractors, and technical review of project plans and reports.

New York Power Authority, NAPL Investigation, NYPA Right-of-Way, Niagara Falls, NY – Project Manager for the delineation of non-aqueous phase liquids (NAPL) within the NYPA Lewiston Power Project conduit right-of-way in the vicinity of Royal Avenue. Work included the review of historical documents, drilling of overburden and bedrock test borings, collection of characterization samples, and preparation of work plan and final reports. Responsibilities included technical staff coordination, client and regulatory communications, and technical document review.

Remedial Investigation/Alternatives Analysis Program (RI/AA), Former Niagara Motors Site, Dunkirk, NY – Project Manager for the SI/AA of a four-acre former engine manufacturing facility. The scope of the SI program includes a passive soil gas survey, a geophysical survey, and the characterization of potentially contaminated fill, soil, groundwater, surface water, and sediment. The project involves the identification and detailed analysis of remedial alternatives available to address the affected media. Responsibilities include client and regulatory communications, implementation of community involvement plan, coordination of project staff and subcontractors, and technical review of project plans and reports.

Remedial Investigation/Alternatives Analysis Program (RI/AA), Former Felmont Oil Site, Olean, NY – Project Manager for the SI/AA of a 22-acre former oil refining, storage, and distribution facility. The scope of the SI program includes a passive soil gas survey, a geophysical survey, and the characterization of potentially contaminated fill, soil, groundwater, surface water, and sediment. The project involves the identification and detailed analysis of remedial alternatives available to address the affected media. Responsibilities include client and regulatory communications, implementation of community involvement plan, coordination of project staff and subcontractors, and technical review of project plans and reports.

Environmental Review, Mike Basil Toyota, Inc., Lockport, NY – Senior Hydrogeologist for a project involving the evaluation of information generated during due diligence activities relative to a property transaction at an automobile dealership. Duties included the review and evaluation of existing investigation and remediation information, and the preparation of a report documenting the review.

Remedial Design and Oversight, Franczyk Park, Buffalo , NY – Project Manager responsible for the implementation of a Pre-Design Investigation; the preparation of the Remedial Action Work Plan, contract documents, and technical specifications; and the oversight and administration of the remediation of this 16-acre brownfield site. The work is being completed under a New York State Environmental Restoration Program (ERP) grant. The remediation includes soil excavation and off-site disposal, installation of an interceptor trench, the placement of a clean soil cover, and the design and installation of new park equipment.

Site Investigation/Remedial Alternatives Report (SI/RAR), Brownfield Site, Buffalo, NY – Project Manager for the SI/RAR of a 16-acre former fertilizer manufacturing facility later developed as a public park. The scope of the SI program included a geophysical survey and the characterization of fill, soil, groundwater, and surface water potentially contaminated with arsenic and lead. The project involved the identification and detailed analysis of remedial alternatives available to address the affected media. Responsibilities included client and regulatory communications, implementation of community involvement plan, coordination of project staff and subcontractors, and technical review of project plans and reports.

Chautauqua County Brownfield Assessment Demonstration Pilot Program, Chautauqua County, NY – Senior Hydrogeologist responsible for the implementation of programmatic and technical services provided in support of this EPA Brownfield Pilot Program under a multi-year contract. Duties included the preparation of a work plan for the site investigation of a former dry cleaner facility in Jamestown, New York and the preparation of quarterly progress reports for submittal to EPA.

Remedial Investigation, Insulator Manufacturing Facility, Leroy, NY – Deputy Project Manager that implemented the investigation of a manufacturing facility to characterize the source and extent of chlorinated solvent contamination. Project work included development and implementation of investigation work plan, data interpretation, and reporting. Responsible for overall project management, scoping the investigation, procuring and coordinating subcontractors, budgeting, scheduling, and directing field teams. Media of concern included soil, groundwater in overburden and fractured bedrock, surface water, and sediment.

USEPA Brownfields Cleanup Program, Chautauqua County, NY – On behalf of the Chautauqua County Department of Public Facilities, prepared a grant application and supporting technical information for the completion of the remediation of the Former Roblin Steel Site in Dunkirk, New York.

Evaluation of Remedial Technologies, Brownfield Site, Tonawanda, NY – Deputy Project Manager that evaluated remedial technologies to address various types of contamination at a 42-acre former specialty plastics manufacturing facility. The soil and groundwater contamination issues at this brownfields site include petroleum products, PCBs, resins, and metals. In addition, coordinated the evaluation of options to address two landfills located on the property.

USEPA Brownfields Assessment Demonstration Pilot Program, City of Lackawanna, NY – Assisted the City of Lackawanna with the preparation of a successful grant application under this Federal brownfield redevelopment initiative to fund the development of a city-wide brownfield inventory, develop a site evaluation process, and investigate and perform remedial planning for three high priority brownfield sites. Prepared specific sections of the application pertaining to city history and demographics, site selection and environmental site assessment planning and implementation, reuse planning and funding mechanisms, long-term benefits and sustainability, and measures of success.

PCB Investigation and Remediation, Residential Property, Buffalo, NY – Planned and implemented a remedial investigation and remediation of a residential property containing PCB-contaminated wastes. The former owner routinely dumped the contents of transformers on the property and removed the contents to recover the scrap copper. Responsibilities included the oversight of drilling activities, collection of samples for test kit and laboratory analysis, performance of test kit analysis, development of the investigation report and remedial work plan, oversight of the excavation of PCB-contaminated soil, collection of post-excavation samples, and preparation of the remedial action report.

Site Remediation, Former Service Station and Equipment Storage Facility, Northbrook, IL – Implemented the removal of five underground storage tanks and contaminated soil at a former service station and equipment storage facility. Responsibilities included preparation of a Remedial Action Plan, coordination of the remediation subcontractor, oversight of the tank and soil removal, and collection of post-excavation samples.

NYSDEC Environmental Restoration Program Remediation Grant Application, Chautauqua County, NY – On behalf of the Chautauqua County Department of Public Facilities, prepared a grant application and supporting technical information for the completion of the remediation of the former Roblin Steel site in Dunkirk, NY.

Underground Storage Tank Removal Assistance, Fort Drum, Watertown, NY – Field staff responsible for providing assistance relative to the removal of USTs formerly used to store heating oil for individual barracks. Work included screening of potentially contaminated soil with a photoionization detector (PID), coordination with on-site and regulatory personnel, and collection of soil samples for analysis.

JAMES C. MANZELLA, CHMM
SCIENTIST II

TVGA CONSULTANTS

INTRODUCTION

Mr. Manzella's duties include field data collection, records review, data evaluation, remedial alternatives analysis and technical report preparation. He is also responsible for the preparation of request for proposals (RFPs) for subcontractor work, preparation of subcontractor agreements and coordination of subcontractors for field investigations.

TECHNICAL EXPERTISE

Mr. Manzella has eight years of experience with Federal and State regulatory requirements, remedial investigations, aboveground storage tank inspections and evaluations, underground storage tank closures and removal oversight, lead investigations, storm water discharge permits and pollution prevention plans, environmental site assessments, environmental data evaluation and field screening. He has participated in the sampling of soils, surface water, groundwater, and storm water at numerous hazardous and non-hazardous contaminated sites and is trained and experienced in the use of both Level-C safety equipment and monitoring instruments.

PROJECT EXPERIENCE

Niagara County Office of Planning Development and Tourism, Phase I Environmental Site Assessment, White Transportation, Lockport, NY – Scientist responsible for performing a Phase I ESA in accordance with ASTM Practice 1527-00 at a 2.6-acre inactive commercial truck terminal. Responsibilities included the preparation of an ESA report that was submitted to EPA Region 2 under the Niagara County Pilot, funded by EPA.

Niagara County Office of Planning Development and Tourism, Site Investigation/Remedial Alternatives Report (SI/RAR), Flintkote Site, Lockport, NY – Field Scientist responsible for the implementation of the Field Sampling Plan (FSP) of an abandoned six-acre site utilized for industrial purposes since the 1880s. The field program included direct-push soil sampling, hollow stem auger drilling, installation, sampling and hydraulic conductivity testing of overburden and bedrock groundwater monitoring wells, and the collection of soil, surface water, concrete and sediment samples. Additionally, was responsible for the preparation of a draft report to present the findings of field investigation including review and evaluation of analytical results. Also assisted in the development of remedial alternatives and remedial cost estimates as part of the RAR.

Education:
- BA 1997/Environmental Studies/Allegheny College

Continuing Education:
- 2002 X-MET and Niton Training Course Covering X-Ray Fluorescence Theory and Application
- 2002 ASTM Phase II ESA Training Course
- 2002 SUNY Buffalo School of Engineering/Environmental Civil Engineering

Years Experience:

Total Experience	8 Years
With TVGA	7 Years

New York State Office of Parks, Recreation and Historic Preservation, Groundwater Remediation/Quarterly Monitoring Program, Lakeside Beach State Park, Waterport, NY – Scientist for the performance of groundwater treatment and quarterly groundwater monitoring in response to a gasoline release from an underground storage tank. Work included the characterization of groundwater; identification and evaluation of treatment alternatives; the installation of oxygen-releasing compounds to stimulate biodegradation of contaminants; and quarterly monitoring. Responsibilities included the field determination of groundwater elevations, collection of groundwater samples for laboratory analysis; the installation of oxygen releasing compounds; and preparation of a quarterly reports to document findings and evaluate the effectiveness of the remedial program.

Chautauqua County Department of Public Facilities, Remedial Design and Oversight, Roblin Steel Site, Dunkirk, NY – Scientist involved with the preparation of the Remedial Action Work Plan for the remediation of this 12-acre brownfield site. The work is being completed under a New York State Environmental Restoration Program (ERP) grant as well as a USEPA Brownfield Cleanup Grant. The remediation includes soil excavation and off-site disposal, in-situ treatment of groundwater, installation of a vapor barrier in the existing structure, and the placement of a clean soil cover.

Village of Youngstown, Remedial Investigation/Alternatives Analysis (RI/AA) Program, Youngstown Cold Storage, Youngstown, NY – Scientist involved with the RI/AA of a former apple storage facility adjacent to a public park that is being advanced under the New York State Environmental Restoration Program (ERP). The scope of the RI program includes the characterization of fill, soil, and groundwater potentially contaminated with arsenic and PCBs, and building materials that contain asbestos. The project involves the identification and detailed analysis of remedial alternatives available to address the affected media. Responsibilities included client and regulatory communications, coordination of subcontractors, and preparation of project plans and reports.

City of Niagara Falls, Phase I/II Environmental Site Assessment, Highland Area Sites, Niagara Falls, NY – Scientist responsible for Field Scientist responsible for conducting the Phase I and II ESAs of two brownfield sites funded via a Supplemental EPA Brownfield Assessment Demonstration Pilot. The Phase I ESAs were performed in accordance with ASTM E-1527, while the Phase II ESAs were in accordance with site-specific work plans prepared pursuant to EPA requirements. Responsible for work plan preparation, field data collection and management, and report preparation.

New York Power Authority, NAPL Investigation, Niagara Falls, NY – Scientist responsible for implementation of the Field Sampling Plan (FSP) at the NYPA Lewiston Power Project within the conduit Right-of-Way. The field program included hollow stem auger drilling and air-rotary drilling to delineate non-aqueous phase liquids (NAPL) in the subsurface proximal to the NYPA conduits. Tasks included collecting auger spoil and decontamination fluid samples for disposal profiling purposes, and the preparation of a draft report to present the findings of the field investigation.

Jamestown Community College, James Avenue Groundwater Investigation, Jamestown, NY – Scientist responsible for investigation of potential groundwater contamination at a petroleum spill site. The investigation was designed to delineate the extent of soil and groundwater contamination. Duties included oversight and documentation of field activities including the excavation of test pits drilling and installation of test probes and monitoring wells, as well as the collection of soil and groundwater samples for chemical analysis.

City of Buffalo Office of Strategic Planning, Remedial Design and Oversight, Franczyk Park, Buffalo, NY – Scientist involved with the implementation of a Pre-Design Investigation and the preparation of the Remedial Action Work Plan for the remediation of this 16-acre brownfield site. The work is being completed under a New York State Environmental Restoration Program (ERP) grant. The remediation includes soil excavation and off-site disposal, installation of an interceptor trench, the placement of a clean soil cover, and the design and installation of new park equipment.

City of Buffalo Office of Strategic Planning, Site Investigation/Remedial Alternatives Report (SI/RAR) for Franczyk Park, Buffalo, NY – Field Scientist responsible for the preparation and implementation of the Field Sampling Plan (FSP) for the site investigation of a 16-acre public park that was historically operated as an agricultural fertilizer manufacturing facility. The field program included direct-push soil sampling, hollow stem auger drilling, installation sampling and hydraulic conductivity testing of overburden groundwater monitoring wells, and the collection of soil samples. Additionally, was responsible for the preparation of a draft report to present the findings of field investigation including review and evaluation of analytical results. Also assisted in the development of remedial alternatives and remedial cost estimates as part of the RAR.

Chautauqua County Department of Public Facilities, On-Call Environmental Services Term Agreement, Various Locations, Chautauqua County, NY – Scientist responsible for performing various environmental services on an as needed basis. Duties included assisting in the preparation of a Phase II ESA site-specific work plan in accordance with the requirements outlined in EPA's Region 2 generic Sampling, Analysis, and Monitoring Plan (SAMP); assisting in the preparation of environmental site assessments and transaction screenings; as well as other miscellaneous environmental tasks.

Ansuini & Pohlman, Phase I Environmental Site Assessment Update for Auto Dealership, Lockport, NY – Scientist responsible for conducting a Phase I ESA update in accordance with the procedures outlined in ASTM Practice E 1527-00. Responsible for identifying conditions at the subject property that may have changed materially since the completion of the previous Phase I/II ESA, and ultimately to identify recognized environmental conditions associated with the subject property.

Town of Hamburg Department of Public Works, Underground Storage Tank Assessment, Hamburg, NY – Performed an assessment of an underground storage tank petroleum spill to estimate the extent of subsurface petroleum contamination. Responsibilities included coordination of onsite sampling activities, sampling of suspect areas, and the preparation of cost estimates.

Environmental Assessment Forms (EAF), Multiple Projects, NY – Prepared short and full EAFs pursuant to SEQRA for numerous projects across New York State ranging from transportation related projects to commercial development sites.

Chautauqua County Department of Public Facilities, Site Investigation/Remedial Alternatives Report (SI/RAR), Brownfield Site, Dunkirk, NY – Field Scientist responsible for the preparation and implementation of the Field Sampling Plan (FSP) for the site investigation of a 12-acre brownfield site. The field program included a radiological survey, direct-push soil sampling, drilling, installation and sampling of overburden and bedrock monitoring wells, field screening of soil and fill samples for metals using an XRF unit, and the collection of surface water and sediment samples. Additionally, was responsible for the preparation of a draft report to present the findings of field investigation including review and evaluation of analytical results. Also assisted in the development of remedial alternatives and remedial cost estimates as part of the RAR.

Chautauqua County Department of Public Facilities, Site Investigation/Remedial Alternatives Report (SI/RAR), Brownfield Site, Brocton, NY – Conducted a supplemental field sampling program in order to investigate potential off-site sediment contamination, establish local background levels for metals soils, and confirm initial sampling results. Responsibilities included groundwater well development, collection of soil, sediment and groundwater samples for laboratory analysis, and revision of the draft site investigation report based on a review of laboratory data and field investigation work.

Phase II Environmental Site Investigation, Niagara Falls, NY – Performed a Phase II ESA at a vacant heating oil distribution facility. Responsible for coordination with the client, subcontractors and NYSDEC. Activities at the site included geoprobe soil borings, field screening of samples, and collection of soil samples for laboratory analysis.

Town and Village of Hamburg Bioremediation Projects, Hamburg, NY – Prepared a Remedial Action Plan (RAP) for regulatory review and outlined the cleanup requirements for the remediation of petroleum-contaminated soil and groundwater at several town and village operated sites. Managed the implementation of the remediation plan that involved the closure and removal of six leaking underground storage tanks and the excavation and off-site disposal of over 1,000 tons of contaminated soil. The project also included the installation of monitoring/injection wells that were used to establish baseline groundwater contamination levels and to inject the bioremediation organisms.

MICHAEL J. FINN, E.I.T.

ENGINEER

TVGA CONSULTANTS

Education:
- BS/2006/Civil Engineering/ SUNY at Buffalo

Professional Registration:
- EIT/New York/Certificate Number 083005

Years Experience: 3 Years

INTRODUCTION

Mr. Finn is responsible for the analysis, design and construction oversight for municipal infrastructure and brownfield redevelopment projects. He has experience with the preparation of engineering reports, contract plans, specifications and cost estimates for water, wastewater and transportation projects, and has provided construction oversight for projects involving roadway, sidewalk and utility construction. Additionally, Mr. Finn has conducted remedial alternatives analyses and assisted with remedial design and construction efforts on brownfield projects funded under the New York State Environmental Restoration Program (ERP) and USEPA Brownfield Program. Prior to joining TVGA, Mr. Finn was employed for several years by a major contractor in western New York while he completed his engineering studies. This provided him with practical experience in the review of design plans, cost estimating, bidding and construction practices that has proven beneficial relative to his design and construction management skills.

TECHNICAL EXPERTISE

Mr. Finn has experience with computer modeling, cost estimates, development of budgets, and coordination of subcontractors. He is familiar with engineering software packages including WATERCAD, Computer Aided Hydrology and Hydraulics (CAHH), and Microsoft Office. He is also familiar with design standards/regulations including 2003 NY State Storm Water Management Design, 10 States Standards for Water and Wastewater, and NYSDOT Design Standards.

PROJECT EXPERIENCE

Chautauqua County Department of Public Facilities, Remedial Design and Oversight of Roblin Steel Site, Dunkirk, NY – Engineer involved with the preparation of the Remedial Action Work Plan, contract documents, and technical specifications and the oversight and administration of the remediation of this 12-acre brownfield site. The work is being completed under a New York State Environmental Restoration Program (ERP) grant as well as a USEPA Brownfield Cleanup Grant. The remediation includes soil excavation and off-site disposal, in-situ treatment of groundwater, installation of a vapor barrier in the existing structure, and the placement of a clean soil cover.

Town of Royalton, Barden Homes Public Improvement Permit (PIP) Inspection, Middleport, NY – Engineer responsible for the construction oversight of a public road to be dedicated to the Town of Royalton. Construction included watermain, storm sewer, concrete curb, and asphalt pavement.

City of Buffalo Office of Strategic Planning, Remedial Design and Oversight, Franczyk Park, Buffalo, NY – Engineer involved with the preparation of the Remedial Action Work Plan, contract documents, and technical specifications; and the oversight and administration of the remediation of this 16-acre brownfield site. The work is being completed under a New York State Environmental Restoration Program (ERP) grant. The remediation includes soil excavation and off-site disposal, installation of an interceptor trench, the placement of a clean soil cover, and the design and installation of new park equipment.

Olean Urban Renewal Agency, Remedial Investigation/Alternatives Analysis Program (RI/AA), Former Felmont Oil Site, Olean, NY – Engineer involved in the preparation of the Site Investigation/Remedial Alternatives Report. Evaluated different alternatives to remediate petroleum contamination including environmental technologies such as in-situ air sparging with soil vapor extraction, and in-situ thermal desorption. Alternatives analysis included performing preliminary engineering calculations to determine the feasibility and order of magnitude scope of the remediation as well as preparing a cost estimate for each alternative.

NY State Department of Transportation, Route 240 (Harlem Road) Reconstruction, Cheektowaga, NY – Engineer responsible for the stormwater management design and preparation of a Stormwater Pollution Prevention Plan (SWP3) in accordance with SPDES, NYSDEC, and NYSDOT requirements. He also assisted in the storm sewer design, including resolving utility conflicts, preparing plans, profiles, tables and cost estimates in accordance with NYSDOT requirements. The stormwater management design included the use of Vortechnics stormwater treatment structures to be installed within the new storm sewer. SPDES General Permit Coverage was obtained for the project.

City of Buffalo Dept of Public Works, Grider Street Reconstruction Project, Buffalo, NY – Engineer responsible for researching the feasibility of water main reconstruction alternatives and the design of in-kind combined sewer replacement within the project. The water main reconstruction alternatives include installation of a temporary bypass waterline to provide service while the new main is installed or installing a new main in a shallow bedrock situation. Feasibility was determined by both cost and scheduling constraints. Field inspections were conducted to determine the location and depth of the existing water main, and measurements were taken to maintain continuous service to a major regional hospital. The tasks for the combined sewer replacement include completion of a spread calculation to determine spacing of new drainage inlets, overseeing plan and detail preparation, and completing a cost estimate.

Town of Grand Island, Grand Island Bike Trail, Grand Island, NY – Engineer responsible for the stormwater management design, preparation of a Stormwater Pollution Prevention Plan (SWP3) in accordance with SPDES and NYSDEC requirements, as well as a project cost estimate. The project included approximately 12,000 LF of new bike trail construction as well as road milling and resurfacing. SPDES General Permit Coverage was obtained for the project.

NY State Department of Transportation, Route 18 Pump Station Performance Evaluation, Somerset, NY – Engineer responsible for the evaluation of an existing stormwater pump station at a road depression under a railroad bridge in Somerset, NY. Duties included performing hydrologic and hydraulic analysis, determining the existing stage storage relationship in the pump station, developing proposed alternatives, preparing a detailed cost estimate, and writing an engineering report. Hydrologic analysis included gathering topographic mapping and aerial photographs, determining the area tributary to the pump station, a field investigation to confirm the drainage area and determine the condition of the channels downstream of the pump station, and developing a hydrograph to model the run-off flow into the pump station. Determining the existing stage storage relationship included creating a spreadsheet model that determined the amount of storage required in the system based on changing inflow rates. This model was also used to efficiently evaluate alternative pump configurations to optimize a proposed alternative. The cost estimate included proposed costs for the total pump reconstruction including new pumps, piping, and additional storage. The engineer's report included a summary of the findings of the analysis and the process of alternative development.

Town of Urbana, Bully Hill Water Study, Hammondsport, NY – Engineer responsible for development of the water study for the proposed Water District No 3. Duties included developing mapping for the parcels within the water district, calculating fire flow and domestic demands for commercial properties, preparing a detailed cost estimate, writing a preliminary engineering report, and aiding in the modeling of the proposed water system using WATERCAD. The cost estimate included construction costs, annual operation, maintenance, and management costs, and broke the costs down into user fees that could be used to finance part of the project. The preliminary engineering report explained the design parameters used in modeling of the proposed water district and described the financing options available to fund the project.

Gordon Jones and Associates, Cuba Memorial Hospital Senior Housing and Care Facility, Cuba, NY – Engineer responsible for preliminary study of infrastructure improvements required to support 100-acre patio home and independent senior housing facility. Study investigated the economic feasibility of providing improvements to the existing water and sanitary sewer systems within the Village of Cuba for the proposed development. Preliminary calculations were performed to determine capacity requirements and a cost estimate was prepared.

Chaintreuil, Jensen, Stark Architects, LLC, Dunn Tire Park French Drain Design, Buffalo, NY – Engineer responsible for CAD design of the plan and detail for a proposed French drain in the outfield-warning track. Developed technical specifications for all aspects of French drain installation including pipe material, geotechnical fabric, drainage stone, and other components.

David Home Builders, Ashwood Subdivision Phase 2, Detention Pond Outlet Structure, Wheatfield, NY – Engineer responsible for the design of a detention pond outlet structure at a proposed 95-lot subdivision. Duties included developing an inflow hydrograph to the pond and designing a structure to regulate the flow in accordance with the NYSDEC 2003 Stormwater Management Design Manual. The design considered the 2-, 10- and 100-year storms, all under tailwater conditions created by nearby Sawyer Creek.

David Home Builders, Ashwood Subdivision Phase 1, Sanitary Lift Station, Wheatfield, NY – Engineer responsible for the design of a lift station to service a proposed 95-lot subdivision. Duties included estimating average and maximum daily sewerage flows, sizing the wet well to balance septic conditions and pump stats, and designing CAD details for the final product. An alternative consideration was developed to allow for retrofitting of the pump motor should 180± acres of farmland tributary to the pump station be developed. A fire flow analysis for the subdivision was performed, recorded fire flow information was researched, and a model of the proposed water main was developed using WATERCAD.

American Consulting Professionals, I-190 and Route 198 Traffic Study, Niagara Falls, NY – Engineer trained on and installation of JAMAR Technologies Trax Pro Traffic Counters for six locations on the I-190/Route 198 Interchange. Responsible for removing the traffic counters after a 48-hour data collection period.

Village of Springville, Main Street Watermain Replacement, Springville, NY – Engineer responsible for the stormwater management design and preparation of a Stormwater Pollution Prevention Plan (SWP3) in accordance with SPDES and NYSDEC requirements. The stormwater management design pertained to the construction of a new prestressed concrete water tank for the project. The project also included waterline replacement as well as new waterline construction to improve the village's water service. SPDES General Permit Coverage was obtained for the project.

Erie County Water Authority, Lackawanna Watermain Replacement Project, Contract T-19, Lackawanna, NY – Construction Inspector responsible for monitoring water service installation and restoration of asphalt roadway, concrete sidewalks, and lawn areas.

Village of Youngstown, Waterfront Park Site Improvements, Youngstown, NY – Engineer responsible for the stormwater management design in accordance with New York State Department of State (NYSDOS) Department of Coastal Zone Management requirements. The stormwater management design included the use of an infiltration basin to recharge stormwater from a proposed parking lot back into the ground.

Village of Andover, Main Street Enhancement, Andover, NY – Construction Inspector responsible for monitoring the installation of new concrete sidewalk, curb, driveways, as well as the installation of a new lighting system. Aided in construction management tasks including reviewing pay requests, coordinating schedules, and addressing concerns of business owners within the site area.

ATTACHMENT B

BUDGET

EXHIBIT B - 1

RI/AA Former Electruk Site

Budget Estimate

Labor

Level		Fee	Mult	Average Direct Labor Rate	Task 1		Task 2		Task 3		Task 4 - Investigation										Task 5				Task 6		Task 7				Task 8		Task 9		Project Totals	
					RI Scoping		RI Work Plan Prep		CPP Implementation		Soil Vapor Study		Test Pits		Borings/MWs		GW Sampling/K Test		Surface Soils/Sediment		Data Rev/Analysis		Risk Assessment		RI Report		ID/Eval RAs		AA Preparation		Final RI/AA		PRAP Prep			
					Hrs	Amount	Hrs	Amount	Hrs	Amount	Hrs	Amount	Hrs	Amount	Hrs	Amount	Hrs	Amount	Hrs	Amount	Hrs	Amount	Hrs	Amount	Hrs	Amount	Hrs	Amount	Hrs	Amount	Hrs	Amount	Hrs	Amount	Hrs	Amount
Principal				55.00	1	$ 55.00		$ -		$ -	1	$ 55.00		$ -		$ -		$ -		$ -		$ -		$ -	1	$ 55.00		$ -		$ -	1	$ 55.00		$ -	4	$ 220.00
Project Manager				38.00	1	$ 38.00	2	$ 76.00	8	$ 304.00		$ -		$ -		$ -		$ -		$ -	4	$ 152.00	2	$ 76.00	4	$ 152.00	4	$ 152.00	4	$ 152.00	2	$ 76.00	1	$ 38.00	32	$ 1,216.00
Senior Scientist/Engineer				37.00	8	$ 296.00	8	$ 296.00		$ -	2	$ 74.00	3	$ 111.00	3	$ 111.00	2	$ 74.00	4	$ 148.00	10	$ 370.00	10	$ 370.00	20	$ 740.00	6	$ 222.00	14	$ 518.00	10	$ 370.00	8	$ 296.00	108	$ 3,996.00
Project Scientist / Engineer				26.00		$ -		$ -		$ -		$ -		$ -		$ -	20	$ 520.00		$ -		$ -		$ -		$ -		$ -		$ -		$ -	16	$ 416.00	36	$ 936.00
Scientist / Engineer				23.00	12	$ 276.00	38	$ 874.00	2	$ 46.00	20	$ 460.00	24	$ 552.00	22	$ 506.00	20	$ 460.00	16	$ 368.00	38	$ 874.00	18	$ 414.00	48	$ 1,104.00	10	$ 230.00	36	$ 828.00	10	$ 230.00		$ -	314	$ 7,222.00
CADD Technician				19.00	4	$ 76.00	6	$ 114.00	2	$ 38.00		$ -		$ -		$ -		$ -		$ -	2	$ 38.00	2	$ 38.00	3	$ 57.00	2	$ 38.00	4	$ 76.00	2	$ 38.00	2	$ 38.00	29	$ 551.00
Technical Typist				17.00	4	$ 68.00	6	$ 102.00		$ -		$ -		$ -		$ -		$ -		$ -	1	$ 17.00	2	$ 34.00	5	$ 85.00	1	$ 17.00	4	$ 68.00	2	$ 34.00	2	$ 34.00	27	$ 459.00
Labor Total					30	$ 809.00	60	$ 1,462.00	12	$ 388.00	23	$ 589.00	27	$ 663.00	25	$ 617.00	42	$ 1,054.00	20	$ 516.00	55	$ 1,451.00	34	$ 932.00	81	$ 2,193.00	23	$ 659.00	62	$ 1,642.00	27	$ 803.00	29	$ 822.00	550	$ 14,600.00

Expenses

Desc.	Unit	Fee	Mult	Rate	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount
Mileage	$/mi			0.485	80	$ 38.80	80	$ 38.80	160	$ 77.60		$ -	240	$ 116.40	160	$ 77.60	160	$ 77.60	80	$ 38.80		$ -		$ -	80	$ 38.80		$ -		$ -	80	$ 38.80		$ -	1120	$ 543.20
Fed Ex	$/ea.			15.00	2	$ 30.00	4	$ 60.00		$ -	14	$ 210.00		$ -		$ -		$ -		$ -		$ -		$ -	4	$ 60.00	2	$ 30.00	4	$ 60.00	4	$ 60.00		$ -	34	$ 510.00
Per Diem	$/day			75.00		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -	1	$ 75.00		$ -	1	$ 75.00
Office Telephone	$/wk.			10.00	2	$ 20.00	2	$ 20.00	2	$ 20.00		$ -	1	$ 10.00	1	$ 10.00	1	$ 10.00	1	$ 10.00		$ -		$ -		$ -		$ -		$ -		$ -		$ -	10	$ 100.00
Portable Telephone	$/day			10.00	1	$ 10.00		$ -		$ -	2	$ 20.00	2	$ 20.00	2	$ 20.00	2	$ 20.00	1	$ 10.00		$ -		$ -		$ -		$ -		$ -		$ -		$ -	10	$ 100.00
Expenses Subtotal						$ 98.80		$ 118.80		$ 97.60		$ 230.00		$ 146.40		$ 107.60		$ 107.60		$ 58.80		$ -		$ -		$ 98.80		$ 30.00		$ 60.00		$ 173.80		$ -		$ 1,328.20

Equipment and Supplies

Desc.	Unit	Fee	Mult	Rate	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount
Copies	$/pg.			0.2	800	$ 160.00	400	$ 80.00	400	$ 80.00	200	$ 40.00	50	$ 10.00	50	$ 10.00	50	$ 10.00	50	$ 10.00	150	$ 30.00	400	$ 80.00	1000	$ 200.00	300	$ 60.00	300	$ 60.00	1000	$ 200.00	500	$ 100.00	5650	$ 1,130.00
Plan Copies/Mtg. Boards	$/ea.			15.00		$ -		$ -	5	$ 75.00		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -	5	$ 75.00
PID	$/week			175.00		$ -		$ -		$ -	1	$ 175.00	1	$ 175.00	1	$ 175.00		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -	3	$ 525.00
In-Situ MiniTroll	$/week			200.00		$ -		$ -		$ -		$ -		$ -		$ -	1	$ 200.00		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -	1	$ 200.00
Water Level Meter	$/week			50.00		$ -		$ -		$ -		$ -		$ -	1	$ 50.00	1	$ 50.00		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -	2	$ 100.00
Disp. Bailers w/VOC Device	$/each			10.00		$ -		$ -		$ -		$ -		$ -		$ -	3	$ 30.00		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -	3	$ 30.00
Horiba U-22	$/wk.			250.00		$ -		$ -		$ -		$ -		$ -		$ -	1	$ 250.00		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -	1	$ 250.00
Tank of Helium	$/day			30.00		$ -		$ -		$ -	2	$ 60.00		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -	2	$ 60.00
Protective Gloves	$/box			15.00		$ -		$ -		$ -	1	$ 15.00	1	$ 15.00	1	$ 15.00	1	$ 15.00	1	$ 15.00		$ -		$ -		$ -		$ -		$ -		$ -		$ -	5	$ 75.00
Dust Monitor (personal)	$/wk.			280.00		$ -		$ -		$ -		$ -	1	$ 280.00		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -	1	$ 280.00
Misc. Sampling Supplies	$/event			50.00		$ -		$ -		$ -	2	$ 100.00	1	$ 50.00	1	$ 50.00	1	$ 50.00	1	$ 50.00		$ -		$ -		$ -		$ -		$ -		$ -		$ -	6	$ 300.00
Equipment and Supplies Subtotal						$ 160.00		$ 80.00		$ 155.00		$ 390.00		$ 530.00		$ 300.00		$ 605.00		$ 75.00		$ 30.00		$ 80.00		$ 200.00		$ 60.00		$ 60.00		$ 200.00		$ 100.00		$ 3,025.00

Laboratory Costs

Desc.	Unit	Fee	Mult	Rate	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount
TCL Volatiles	$/smp	85.00	1.00	85.00		$ -		$ -		$ -		$ -	4	$ 340.00	3	$ 255.00	10	$ 850.00		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -	17	$ 1,445.00
TCL Semi-Volatiles	$/smp	185.00	1.00	185.00		$ -		$ -		$ -		$ -	4	$ 740.00	3	$ 555.0	9	$ 1,665.00	14	$ 2,590.00		$ -		$ -		$ -		$ -		$ -		$ -		$ -	30	$ 5,550.00
TCL Pest/PCBs	$/smp	135.00	1.00	135.00		$ -		$ -		$ -		$ -	4	$ 540.00	1	$ 135.0	9	$ 1,215.00	9	$ 1,215.00		$ -		$ -		$ -		$ -		$ -		$ -		$ -	23	$ 3,105.00
Lead	$/smp	35.00	1.00	35.00		$ -		$ -		$ -		$ -		$ -		$ -		$ -	13	$ 455.00		$ -		$ -		$ -		$ -		$ -		$ -		$ -	13	$ 455.00
pH	$/smp	10.00	1.00	10.00		$ -		$ -		$ -		$ -	5	$ 50.00		$ -		$ -	18	$ 180.00		$ -		$ -		$ -		$ -		$ -		$ -		$ -	23	$ 230.00
RCRA 8 Metals	$/smp	85.00	1.00	85.00		$ -		$ -		$ -		$ -	4	$ 340.00	3	$ 255.00	9	$ 765.00	14	$ 1,190.00		$ -		$ -		$ -		$ -		$ -		$ -		$ -	30	$ 2,550.00
TO-15 (Air)	$/smp	210.00	1.00	210.00		$ -		$ -		$ -	8	$ 1,680.00		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -	8	$ 1,680.00
TO-13 (Air)	$/smp	210.00	1.00	210.00		$ -		$ -		$ -	8	$ 1,680.00		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -	8	$ 1,680.00
Helium (Air)	$/smp	85.00	1.00	85.00		$ -		$ -		$ -	8	$ 680.00		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -	8	$ 680.00
Summa Canister Rental	$/ea. Per two weeks	50.00	1.00	50.00		$ -		$ -		$ -	8	$ 400.00		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -	8	$ 400.00
Flow Controler Rental	$/ea. Per two weeks	25.00	1.00	25.00		$ -		$ -		$ -	8	$ 200.00		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -	8	$ 200.00
Data Package	%/analysis			0.15		$ -		$ -		$ -	$2,360	$ 354.00		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -	2360	$ 354.00
Laboratory Costs Subtotal						$ -		$ -		$ -		$ 4,994		$ 2,010		$ 1,200		$ 4,495		$ 5,630		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ 18,329.00

Data Quality/Usability Review

Desc.	Unit	Fee	Mult	Rate	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount
TCL Volatiles	$/smp	18.00	1.00	18.00		$ -		$ -		$ -		$ -	4	$ 72.00	3	$ 54.00	10	$ 180.00		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -	17	$ 306.00
TCL Semi-Volatiles	$/smp	20.00	1.00	20.00		$ -		$ -		$ -		$ -	4	$ 80.00	3	$ 60.00	9	$ 180.00	14	$ 280.00		$ -		$ -		$ -		$ -		$ -		$ -		$ -	30	$ 600.00
TCL Pest/PCBs	$/smp	22.00	1.00	22.00		$ -		$ -		$ -		$ -	4	$ 88.00	1	$ 22.00	9	$ 198.00	9	$ 198.00		$ -		$ -		$ -		$ -		$ -		$ -		$ -	23	$ 506.00
Lead	$/smp	3.00	1.00	3.00		$ -		$ -		$ -		$ -		$ -		$ -		$ -	13	$ 39.00		$ -		$ -		$ -		$ -		$ -		$ -		$ -	13	$ 39.00
pH	$/smp	0.00	1.00	0.00		$ -		$ -		$ -		$ -	5	$ -		$ -		$ -	18	$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -	23	$ -
RCRA 8 Metals	$/smp	15.00	1.00	15.00		$ -		$ -		$ -		$ -	4	$ 60.00	3	$ 45.00	9	$ 135.00	14	$ 210.00		$ -		$ -		$ -		$ -		$ -		$ -		$ -	30	$ 450.00
TO-15 (Air)	$/smp	16.00	1.00	40.00		$ -		$ -		$ -	8	$ 320.00		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -	8	$ 320.00
Helium (Air)	$/smp	16.00	1.00	10.00		$ -		$ -		$ -	8	$ 80.00		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -	8	$ 80.00
TO-13 (Air)	$/smp	16.00	1.00	40.00		$ -		$ -		$ -	8	$ 320.00		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -	8	$ 320.00
Data Quality/Usability Review Subtotal						$ -		$ -		$ -		$ -		$ 300		$ 181		$ 693		$ 727		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ 1,901.00

Title Search

Desc.	Unit	Fee	Mult	Rate					Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount
Title Search	lump sum			900.00	1.00	$ 900.00		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -	1	$ 900.00
Title Search Subtotal						$ 900		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ 900.00

Boundary/Topo Survey and Record Survey

Desc.	Unit	Fee	Mult	Rate	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount
Boundary/Topo	lump sum			4000.00	1	$ 4,000.00		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -	1	$ 4,000.00
Survey PM	$/hr			110.00		$ -		$ -		$ -		$ -		$ -		$ -		$ -	2	$ 220.00		$ -		$ -		$ -		$ -		$ -		$ -		$ -	2	$ 220.00
Senior Tech	$/hr			55.00		$ -		$ -		$ -		$ -		$ -		$ -		$ -	4	$ 220.00		$ -		$ -		$ -		$ -		$ -		$ -		$ -	4	$ 220.00
Survey Crew (2 person)	$/hr			120.00		$ -		$ -		$ -		$ -		$ -		$ -		$ -	10	$ 1,200.00		$ -		$ -		$ -		$ -		$ -		$ -		$ -	10	$ 1,200.00
Survey Subtotal						$ 4,000		$ -		$ -		$ -		$ -		$ -		$ -		$ 1,640		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ 5,640.00

Soil Probing Cost

Desc.	Unit	Fee	Mult	Rate	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount
Mobilization	$/ea.	100.00	1.00	100.00		$ -		$ -		$ -	1	$ 100.00		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -	1	$ 100.00
Probing Equip. & Crew	$/half day	900.00	1.00	900.00		$ -		$ -		$ -	1	$ 900.00		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -	1	$ 900.00
Soil Gas Vapor Points	$/ea.	160.00	1.00	160.00		$ -		$ -		$ -	4	$ 640.00		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -	4	$ 640.00
Glass Beeds	$/ea.	10.00	1.00	10.00		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -	0	$ -
Soil Probing Cost Subtotal						$ -		$ -		$ -		$ 1,640.00		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ 1,640.00

Drilling and Excavation Costs

Desc.	Unit	Fee	Mult	Rate	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount
Mobilization	$/ea.	300.00	1.00	300.00		$ -		$ -		$ -		$ -		$ -	1	$ 300.00		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -	1	$ 300.00
4-1/4" HSA w/ cont. ssp	$/foot	12.00	1.00	12.00		$ -		$ -		$ -		$ -		$ -	90	$ 1,080.00		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -	90	$ 1,080.00
2" PVC Well Installation	$/foot	14.00	1.00	14.00		$ -		$ -		$ -		$ -		$ -	90	$ 1,260.00		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -	90	$ 1,260.00
Protective Casings	$/ea.	150.00	1.00	150.00		$ -		$ -		$ -		$ -		$ -	3	$ 450.00		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -	3	$ 450.00
Decontamination	$/hr	150.00	1.00	150.00		$ -		$ -		$ -		$ -		$ -	3	$ 450.00		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -	3	$ 450.00
Decontamination Pad	$/ea.	200.00	1.05	210.00		$ -		$ -		$ -		$ -		$ -	1	$ 210.00		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -	1	$ 210.00
55-gallon Drums	$/foot	3.00	1.05	3.15		$ -		$ -		$ -		$ -		$ -	3	$ 9.45		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -	3	$ 9.45
Drilling and Excavation Costs Subtotal						$ -		$ -		$ -		$ -		$ -		$ 3,759.45		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ -		$ 3,759.45

Project Totals

Level	Task 1	Task 2	Task 3	Task 4 - Investigation					Task 5		Task 6	Task 7		Task 8	Task 9	Project Totals	
Description	RI Scoping	RI Work Plan Prep	CPP Implementation	Soil Vapor Study	Test Pits	Borings/MWs	GW Sampling/K Test	Surface Soils/Sediment	Data Rev/Analysis	Risk Assessment	RI Report	ID/Eval RAs	AA Preparation	Final RI/AA	PRAP Prep		
LABOR	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount		Amount
Labor Total	$ 809.00	$ 1,462.00	$ 388.00	$ 589.00	$ 663.00	$ 617.00	$ 1,054.00	$ 516.00	$ 1,451.00	$ 932.00	$ 2,193.00	$ 659.00	$ 1,642.00	$ 803.00	$ 822.00	0	$ 14,600.00
																Total Direct Labor	$ 14,600.00
																Indirect Labor (1.65%)	$ 24,090.00
																Fixed Fee (7.5%)	$ 2,902.00
																Labor Subtotal	$ 41,592.00
DIRECT COSTS																	
Expenses	$ 98.80	$ 118.80	$ 97.60	$ 230.00	$ 146.40	$ 107.60	$ 107.60	$ 58.80	$ -	$ -	$ 98.80	$ 30.00	$ 60.00	$ 173.80	$ -	0	$ 1,328.20
Equipment	$ 160.00	$ 80.00	$ 155.00	$ 390.00	$ 530.00	$ 300.00	$ 605.00	$ 75.00	$ 30.00	$ 80.00	$ 200.00	$ 60.00	$ 60.00	$ 200.00	$ 100.00	0	$ 3,025.00
Laboratory	$ -	$ -	$ -	$ 4,994.00	$2,010.00	$ 1,200.00	$ 4,495.00	$ 5,630.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ 18,329.00
Data Quality/Usability	$ -	$ -	$ -	$ -	$ 300.00	$ 181	$ 693	$ 727	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ 1,901.00
Title Search	$ 900.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ 900.00
Boundary/Topo Survey and Record Survey	$ 4,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,640	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ 5,640.00
Probing/Drilling/Excavation	$ -	$ -	$ -	$ 1,640.00	$ -	$ 3,759.45	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ 5,399.45
Direct Costs Total	$ 5,158.80	$ 198.80	$ 252.60	$ 7,254.00	$2,986.40	$ 5,548.05	$ 5,900.60	$ 8,130.80	$ 30.00	$ 80.00	$ 298.80	$ 90.00	$ 120.00	$ 373.80	$ 100.00		$ 36,522.65
COST/TASK (labor and direct)	$ 7,463.44	$ 4,383.67	$ 1,357.92	$ 8,931.91	$4,875.12	$ 7,305.73	$ 8,903.18	$ 9,600.76	$ 4,163.54	$ 2,735.04	$ 6,546.11	$ 1,967.33	$ 4,797.65	$ 2,661.35	$ 2,441.67	**PROJECT TOTAL**	**$ 78,110.00**

Notes and Assumptions:
1) 10 hour work day
2) Town or County to provide equipment and operator to complete test pits.
3) Groundwater depth at 20 ft. bgs, Advance 4 borings to 30 ft. bgs.
4) Two days to complete test pits.
5) 80 miles round trip.
6) Two days to install wells.

APPENDIX A

FIELD SAMPLING PLAN

REMEDIAL INVESTIGATION/ALTERNATIVES ANALYSIS
FORMER ELECTRUK BATTERY SITE
(NYSDEC Site No. E932132)
4922 IDA PARK DRIVE, TOWN OF LOCKPORT
NIAGARA COUNTY, NEW YORK

FINAL FIELD SAMPLING PLAN

Prepared for:

Town of Lockport
6560 Dysinger Road
Lockport, New York 14094

Prepared by:

TVGA CONSULTANTS

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Elma, NY 14059-0264 (fax) (716) 655-0937

2007.0262.00 APRIL 2008

RI/AA OF FORMER ELECTRUK BATTERY SITE
(NYSDEC Site No. E932132)
4922 IDA PARK DRIVE, TOWN OF LOCKPORT
NIAGARA COUNTY, NEW YORK

FINAL FIELD SAMPLING PLAN

TABLE OF CONTENTS

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ATTACHMENTS

1.0 INTRODUCTION

This Field Sampling Plan (FSP) contains procedural directives to guide the execution of the field activities outlined in the Work Plan for the Remedial Investigation/Alternatives Analysis (RI/AA) program to be implemented at the Former Electruk Battery Site. This FSP identifies the scope and objectives of the field sampling program, and provides detailed step-by-step procedures for field activities required for the procurement, collection, handling and documentation of field samples and data. Adherence to these procedures will ensure the quality and usability of the field data collected. This FSP is intended for use in conjunction with the RI/AA Work Plan, Quality Assurance/Quality Control (QA/QC) Plan, and Health and Safety Plan (HASP) developed for the project site.

2.0 SCOPE AND OBJECTIVES OF FIELD SAMPLING PROGRAM

The site-specific Data Quality Objectives (DQOs) for data collected during the remedial investigation are discussed in the QA/QC Plan, and are summarized below:

- To characterize the site and determine the nature and extent of contamination occurring on or in soil, and groundwater.
- To evaluate potential risks to human health and the environment associated with current site conditions and potential future use scenarios.
- To identify, evaluate and select a long-term remedial action that is environmentally sound and cost-effective.
- To maintain a state-of-the-art standard of scientific/professional practice for each procedure.
- To assure the ultimate defensibility of the data generated.

The Remedial Investigation program to be implemented at the project site will initially focus on determining the nature and extent of contamination within the following five areas of the project site:

- Surface soil
- Subsurface soil
- Surface water
- Groundwater
- On-site structures

Representative grab samples of surface soil will be collected from previously identified areas of concern as well as from points selected to represent conditions across the site, and these samples will be submitted for laboratory analyses. Additionally, a surface soil sample will be collected at each location that a surface water sample is collected. Depending on the results of the soil samples collected from the project site, background soil samples may be collected from up to five locations around the project site for the purpose of defining local baseline soil conditions.

Subsurface soil and groundwater contamination will be investigated as part of the subsurface investigation program developed for the site. This program will involve the excavation of test pits, drilling of test borings, and the installation of groundwater monitoring wells to facilitate the collection and chemical analysis of samples from these media.

The number of samples to be collected from each of the above-referenced media, including QA/QC samples, and the corresponding analytical methods are summarized in Table 1.

3.0 FIELD DOCUMENTATION

The documentation of field activities will entail the recording of project information, observations and measurement in a field logbook, the completion of applicable field log forms, and the compilation of a photographic record of site conditions and the field program.

3.1 Field Logbook and Forms

All pertinent field survey and sampling information shall be recorded in a logbook during each day of the field activity. No general rules can specify the extent of information that must be entered in a logbook. However, logbooks shall contain sufficient information so that someone can reconstruct the field activity without relying on the memory of the field crew.

A Daily Field Report Form shall be completed for each day of field activities. The form shall be filled out with all relevant information in the appropriate spaces on the form. Other field log forms that relate to specific site investigation tasks (e.g., soil probe and test boring logs; well installation, soil vapor survey, development and sampling logs; etc.), shall also be completed in accordance with the procedures specified in the applicable sections of this document. Examples of these forms have been provided in Attachment A.

Procedure

All entries shall be made in indelible ink. At the conclusion of each day, the author will initial the day's entries, and a line will be drawn through the remainder of the page. All corrections shall consist of line-out deletions that are initialed. At a minimum, entries shall include:

- Date and Time of starting work
- Names of all personnel at site
- Purpose of proposed work effort
- Sampling equipment to be used and calibration of equipment

- Description of work area
- Location of work area, including map reference
- Details of work effort, particularly any deviation from the field operations plan or standard operating procedures
- Field observations
- Field measurements
- Personnel and equipment decontamination procedures
- Daily health and safety entries, including levels of protection
- Type and number of samples
- Sampling method, particularly deviations from the Work Plan
- Sample location and number
- Sample handling, packaging, labeling, and shipping information (including destination)

3.2 Photographs

Photographs will be taken to provide the most accurate depiction of the field worker's observations. The photographs provide significant assistance to the field team in future inspections, informal meetings, and hearings.

Procedure

Photographs should be taken with a digital camera, which will offer the most reasonable observation point in relation to what was observed by the naked eye. A photograph must be documented if it is to be a valid representation of an existing situation. For each photograph taken, several items shall be recorded in the field logbooks:

- Date and Time
- Name of the photographer
- Direction faced and description of the subject
- Sequential number of the photograph

Immediately following the performance of the field activity, the photographs will be downloaded and saved in an appropriate directory in TVGA's computer system.

4.0 TEST PIT EXCAVATION

Test pits will be will be excavated in areas across the project site and will be the primary means to characterize surficial geology across the site; investigate the thickness of fill material; and identify and delineate areas of subsurface contamination via the field screening and chemical analysis of soil samples. It is anticipated that this will include one day of test pit excavations. The test pits will be completed following the procedures outlined below.

Procedure

- Downward excavation will take place in one-foot increments until the subsurface (i.e. tank, piping, bedrock, impassable fill material) is encountered or to the maximum reach of the backhoe (which will be a minimum of ten feet), whichever occurs first.
- Material removed from the test pit will be temporarily staged adjacent to the excavation. Material removed from the test pit that displays visual, olfactory and/or photoionic evidence of contamination will be temporarily staged on plastic adjacent to the excavation and will be segregated from materials that do not display any evidence of contamination.
- The excavated material will be characterized as described in Section 5.5, and a Test Pit Log will be completed. An example Test Pit Log is included in Attachment A.
- Screening and sampling of excavated soil will be performed in accordance with the applicable provisions of Section 9.1.2.
- Photographs of the completed test pit and excavated material will be collected.
- All soil/fill will be returned to the excavation in the same general order it originated and the area will be graded.

5.0 TEST BORINGS AND MONITORING WELL INSTALLATION

A total of three test borings will be drilled on the project site with a rotary drill rig to facilitate the classification, field screening and collection of subsurface soil samples for laboratory analysis. All of the test borings shall be completed with groundwater monitoring wells to enable the determination of groundwater flow direction and gradient, the hydraulic conductivity of the water-bearing zones, and the collection of groundwater samples for chemical analysis. These wells will be constructed of two-inch Schedule 40 polyvinyl chloride (PVC) screens and riser.

Test boring and monitoring well locations will be based upon the project objectives, ease of access, freedom from obstructions, and safety considerations (appropriate set backs from overhead wires and buried services). Proposed boring and well locations were selected to facilitate the characterization of the project site and to focus the investigation on areas of potential environmental concern identified during project scoping.

The following sections define the applicable drilling and monitoring well installation procedures to be implemented at the site, including:

- Hollow-Stem Auger Drilling
- Split-Spoon Sampling
- Soil Classification
- Monitoring Well Installation/Construction

5.1 Hollow-Stem Auger Drilling

The test borings will be advanced to up to an average depth of 30 feet using hollow-stem augers with continuous split-spoon samples collected throughout the total depth of each borehole. Hollow-stem auger drilling is the standard method of subsurface drilling which enables the recovery of representative subsurface samples for identification and laboratory analysis and the installation of monitoring wells in the overburden.

Procedure

- Mobilize the drill rig to the project site, ensure that the driller has appropriate equipment and that the rig and equipment has been decontaminated and are in good working condition.
- Drilling will utilize 4.25-inch I.D. hollow-stem augers (HSAs) which are turned into the subsurface under hydraulic downpressure to allow continuous sampling of the subsurface and also the installation of the groundwater monitoring equipment.
- Assemble auger and drill rods, and advance the boring the desired distance into the subsurface by rotating and applying down pressure with the rig hydraulics.
- The borings will be advanced incrementally to permit continuous split-spoon sampling as described in Section 5.4.
- Remove drill rods and center plug from augers and sample subsurface soils per Section 5.4, or, if the boring has been advanced to sampling refusal depth, commence rock coring or roller-bit drilling to penetrate the obstruction. Bedrock coring is not part of the anticipated RI. However, it may be necessary to core or roller-bit into bedrock to reach the upper-most water bearing zone.

5.2 Rock Coring

Rock coring is a standard drilling method used for rock formations where undisturbed core samples are required. Rock coring will be performed when required as outlined below, in accordance with ASTM D2113-83 and will be classified as per Section 5.3. Rock coring will commence after refusal with the split spoon sampler, and will proceed into the bedrock to the required depth to allow conversion of the boreholes into bedrock monitoring wells.

Procedure

- The hollow stem auger will be advanced to the top of the bedrock surface and 1 to 2 feet into the bedrock.
- Advance a double tube core barrel with a diamond bit or equivalent into the rock formation. The bit cuts a core out of the rock, which rises into an inner barrel mounted with an outer barrel. Water circulates down the outer barrel and up the borehole.
- Core runs will be a maximum of ten feet in length, utilizing HQ size barrels, yielding a 3-7/8 inch rock core.
- Observe and record the rate of water use and the rate of core barrel advance.

- Retrieve the core barrel; classify the sample pursuant to Section 5.3 and place a representative portion of the sample in a clean splits spoon jar(s), install a monitoring well as per Section 5.6.

5.3 Rock Core Description

Rock classification procedures and descriptive terminology for rock core samples collected by standard bedrock coring methods are presented below.

Procedure

1. Place the core sample in good light, remove any extraneous material and wash the sample to clean it of drilling fluid, residue or mudcake.
2. Describe the wetted rock according to the following hierarchy:
    - Rock Type
    - Color
    - Bedding Thickness
    - Hardness
    - Fracturing
    - Weathering
    - Other Characteristics
3. Provide further detail for cored samples based on following steps:
    - Recombine the core and measure its length;
    - Calculate recovery percentage
    - Count the natural discontinuities and artificial (drilling related) core breaks;
    - Calculate rock quality designation; and
    - Calculate fracture frequency.
4. Document descriptions in field notebook and on the appropriate field form.

5.4 Split-Spoon Sampling

Split-spoon sampling is a standard method of subsurface soil sampling to obtain representative samples for identification and laboratory analysis, and as a measure of resistance of soil to sample penetration. Split-spoon sampling will be performed as outlined below, in accordance with ASTM D1586-84, Standard Method for Penetration Test and Split Barrel Sampling of Soils. Subsurface samples obtained via split-spoon sampling will be classified per Section 5.5; field screened for organic vapors as per Section 9.1.2, and may be submitted for chemical analysis pursuant to Section 9.1.1 in an effort to define the horizontal and vertical extent of contamination, if any, occurring on the project site. The samples will be collected at boring locations with the use of a drill rig under the direct supervision of an experienced TVGA scientist or engineer.

Procedure

- Measure the sampling equipment lengths to ensure that they conform to specifications.
- Select additional components as required (i.e., leaf spring core retainer for clays or a sand trap for non-cohesive sands).
- Clean out the auger flight to the bottom depth prior to sampling.
- Remove the drill rods and lower a two-inch I.D. split-spoon sampler to the bottom of the auger column and check the depth against the length of the rods and the sampler.
- Attach the drive head sub and hammer to the drill rods without the weight resting on the rods.
- Mark four six-inch intervals on the drill rods relative to a drive reference point on the rig.
- With the sampler resting on the bottom of the hole, drive the sampler a total of 24 inches using a 140-pound hammer free falling 30 inches.
- Record the number of blows per six-inch interval on a Test Boring Log (Attachment A) and determine the "N" value by adding the blows for the six- to twelve- inch and twelve- to 18- inch interval of each sample attempt.
- Remove the sampler and screen the contents immediately after opening using a PID and the procedures presented in Section 9.1.2. Record the PID measurement on the Test Boring Log.
- Classify the sample pursuant to Section 5.5 and place a representative portion of the sample in a clean soil jar(s), ensuring that sufficient sample volume is collected to satisfy sample volume requirements for laboratory analysis (See Table 2 for volume requirements). If the list of possible analytes includes VOCs and/or SVOCs, place a portion of the sample directly into the laboratory provided sample container.
- Additionally, a representative portion of the sample should be placed in a drillers jar or a ziplock bag for headspace screening. The opening of drillers jar sample for headspace screening should be lined with aluminum foil prior to closing the lid.
- Secure the lid(s), and label the jar with the project code (FEB), date, test boring/monitoring well number, sample number, sample interval (feet bgs), and blow counts.
- Document all soil properties and sample locations on the Test Boring Log.
- Once the sample is logged, containerized and labeled, the measurement of "headspace" can be completed in accordance with the procedures outlined in Section 9.1.2.

5.5 Soil Classification (USCS)

This procedure is presented as a means for insuring proper field identification and description of soil collected from the soil probes and test borings. The lithology and moisture content of each soil sample will be visually and physically characterized according to the Unified Soil Classification System (USCS). This method of soil classification describes the soil types on the basis of grain size and the liquid and plastic limits. The soil logging procedures are based on ASTM D 2487-00 Standard Classification of Soils for Engineering Purposes (USCS).

Procedure

According to the USCS, all soils are divided into three major groups: coarse-grained, fine-grained and highly organic (peat). The distinction between the coarse- and fine-grained soils can be seen with the unaided eye. The soil is considered coarse-grained if more than 50 percent of the soil by weight is judged to consist of grains that can be distinguished separately.

The coarse-grained soils are divided into gravelly (G) or sandy (S) soils, depending on whether more or less than 50 percent of the visible grains are larger than the No. 4 sieve (3/16 inch). Gravelly and sandy soils are each further divided into four groups:

W – Well graded; fairly clean (< 5% finer than 0.074 mm)
P – Poorly graded (gap-graded); fairly clean (< 5% finer than 0.074 mm)
C - Clayey (> 12% finer than 0.074 mm), plastic (clayey) fines.
M - Silty (> 12% finer than 0.074 mm), non-plastic or silty fines.

Soils are represented by symbols such as GW or SP and borderline materials are represented by double symbols as GW-GC.

The fine-grained soils are divided into three groups: inorganic silts (M), inorganic clays (C), and organic silts and clays (O). The soils are further divided into those having liquid limits lower (L), or higher (H) than 50 percent.

Soil Properties and other observed characteristics normally identified in the field, using the USCS, are defined below:

- Color
- Moisture content
- Grain size (estimated maximum grain size and estimated percent by weight of fines)
- Gradation
- Plasticity
- Predominant soil type
- Secondary soil type

- Classification symbol
- Other features including: organic; chemical or metal content; compactness; consistency; cohesiveness; dry strength and source

5.6 Monitoring Well Installation

Monitoring well installations will be designed and constructed according to ASTM D 5784-00. The newly installed groundwater monitoring wells will be screened across the uppermost water-bearing zone that is believed to exist at the overburden/bedrock interface. Should no groundwater be present at the interface, bedrock wells will be installed. Typical construction details for overburden, interface and bedrock monitoring wells are presented as Figures 1 through 3, respectively.

Design Materials

- Well Screen and Riser – Only new flush threaded, Schedule 40 PVC screen (machine slotted) and riser of a minimum 2-inch I.D. will be used. Screen slot opening size and length to be approximately 10 feet or less as required by formation characteristics. A vented cap shall be placed over the riser and a V-slot cut in the top edge of the riser as a monitoring reference point.
- Filter Pack – Only non-reactive granular material of known chemistry and particular graduation should be used. The filter pack should be suitable for use with the selected screen slot size.
- Bentonite Well Seal – The bentonite should be from a commercial source free of chemical additives (granular or powdered for grout and pelletized for seal).
- Cement – Low heat of hydration cement for grout and cementing protective casing such as ASTM Type II or Type IV Portland.
- Water – From a potable source of known chemistry and free of chemical constituents that may compromise integrity of installation.
- Grout – Mixture of bentonite, cement and water according to the following specifications by weight: 1.5%-3.0% bentonite, 40%-60% cement, and 40%-60% water.
- Protective Casing, Locking Cap and Lock – Protective casing with a lockable cap should be cemented in place around the riser. The inside diameter should be two to four inches larger than the outside diameter of the riser. The annular space between the casing and riser should be filled with pea gravel or coarse sand. All locks should be keyed alike.

Construction Procedures

- Advance borehole to the desired depth by means of HSA drilling.
- Remove drill rods from augers and verify borehole depth using weighted measuring tape.

- Add pre-washed medium graded sand as needed, up to one-foot in depth, to the base of the borehole through the augers. If dense non-aqueous phase liquids are present, this step may be omitted.
- Insert well screen and riser pipe into the borehole through the HSAs.
- Add appropriately graded sand to the annulus of the screen section of the well while slowing removing HSAs. Measure the depth of the sand pack frequently with the weighted tape while adding sand. Sand pack should extend one to two feet above the screen section within the borehole.
- Add bentonite pellets to seal the borehole while slowly removing the augers. The bentonite seal should extend at least two feet above the top of the sand pack. Measure the depth with the weighted tape before, during and after adding the bentonite pellets. If the bentonite seal is placed above the water table level, then potable water should be added to hydrate the bentonite pellets. The pellets should be allowed to hydrate for a minimum of two hours.
- Mix cement/bentonite grout and add to the borehole annulus from the top of the bentonite seal to the approximately two-feet below the surface.
- Remove remaining HSAs.
- Cut well riser pipe to about two feet above ground surface for stick-up type well installation. Cut well riser pipe just below ground surface for flush-mount well installation.
- Install protective casing, cap and lock, and cement in place.
- Drill a weep hole at the bottom, near the base, of the protective casing to allow accumulated water from between the well riser and casing to drain.
- Seal riser with a J-Plug and lock plug for flush-mount installation and tighten bolts, securing lid to the casing. For stick-up type casings, seal riser with a J-Plug and lock the protective casing cap.
- Document well design and construction data in the field logbook and on a Monitoring Well Installation Report Form (included in Attachment A).

6.0 WELL DEVELOPMENT, GAUGING AND IN-SITU HYDRAULIC CONDUCTIVITY TESTING

6.1 Well Development

Following the completion of test borings and monitoring well installation, each newly installed well will be developed until the discharged water is relatively sediment free and the indicator parameters (turbidity, pH, temperature, conductivity) have stabilized. Well development not only removes any sediment, but may improve the hydraulic properties of the filter pack. The effectiveness of the development procedures will be closely monitored in an effort to keep the volume of development fluids to the minimum necessary to obtain low turbidity samples. The stabilization of indicator parameters will be used as a guide for the discontinuation of well development.

Procedure

- An appropriate well development method should be selected based on well depth, length of water column, well productivity and sediment content of water. Well development options include bailing, manual pumping, powered suction-lift or submersible pumping, and air-lift method.
- Equipment should be assembled, decontaminated, if necessary and installed in the well while taking precautions not to introduce contaminants.
- Well development should proceed by the repeated removal of water from the well until the discharged water is relatively sediment free and/or indicator parameters have stabilized.
- Development effectiveness should be monitored at regular intervals using the Horiba U-10 portable water quality meter, which is capable of measuring turbidity, pH, temperature, and conductivity.
- The Horiba U-10 meter shall be calibrated in accordance with the SOP for this in Attachment B at the beginning of each operating period.
- Both the volume of water removed and the field water quality measurements should be recorded on a "Well Development Log" form (Attachment A).
- Well development may be discontinued either when the turbidity of the discharged water is less than 50 NTU or when the indicator parameter measurements stabilize.

6.2 Water Level Monitoring

The groundwater levels measured in the wells can be used to determine the groundwater gradient and flow direction. Water levels in all wells will be measured using an electronic water level indicator and/or an oil/water interface probe. For newly installed wells, measurements should be taken frequently following well development until the well has recovered to anticipated static conditions. The procedures in Section 9.5.2 will be followed when non-aqueous phase liquids (NAPLs) are present. The following procedures apply when NAPL is not present in the wells.

Procedure

- Pre-clean water level probe and lower portion of cable following the standard decontamination procedures described in Section 12.0.
- Test water level meter to check batteries and adjust sensitivity.
- Lower probe slowly into the well until the audible alarm sounds, indicating water.
- Read depth to the nearest 0.01-foot from the graduated cable using the V-notch on the well riser as a reference point.
- Repeat the measurement for confirmation and record the water level.
- Remove the cable and probe from the well, drying the cable and probe with a clean paper towel or disposable wipe.
- Replace J-Plug, protective casing cap or casing lid and lock.

6.3 In-Situ Hydraulic Conductivity Testing

If significant groundwater contamination is encountered, in-situ hydraulic conductivity tests will be completed to determine the permeability of the water-bearing units in which the wells are screened. Three of the newly installed monitoring wells will be field tested, using the slug test method, to estimate the hydraulic conductivity of the aquifer material surrounding the well screen. Wells selected for hydraulic conductivity testing will provide an even areal distribution across the project site. The hydraulic conductivities will be used to estimate the groundwater flow and contaminant transport rates, if applicable.

Procedure

- Water level fluctuations in each well will be induced by rapidly introducing a solid PVC slug or a known volume of water, into the water column.
- The rate at which the displaced water falls and returns to equilibrium is measured (falling head) and then the slug is removed and the rate at which the well water rises and returns to equilibrium (rising head) is measured.
- Procedures and equipment requirements are expected to vary depending on the rapidity of the water level response.
- In-Situ MiniTroll data logger, in combination with a pressure transducer will record induced water level changes (Standard Operating Procedures for the Calibration, use and maintenance of the In-Situ MiniTroll data pressure logger and transducer are presented in Attachment B).
- During the slug tests, water level readings will be obtained on a logarithmic scale (such that readings are made more frequently at the beginning of the test) every two-tenths of a second and recorded by the data logger.
- Data from the slug test will be evaluated using an appropriate method based on the borehole diameter for unconfined aquifers that are partially penetrated by a monitoring well.

7.0 SOIL VAPOR SURVEY

Should soil or groundwater sample results reveal the presence of VOCs a soil vapor investigation will be performed around the perimeter of the site to address off-site migration issues and potential migration of vapors into adjacent structures. Four temporary soil vapor probe installations will be completed. A typical soil vapor probe detail is included as Figure 4.

The advancement of soil probes will be completed using direct-push soil probing equipment (e.g., geoprobe or earthprobe) with an expendable point and two-inch core barrel. The location and depth of these probes will be field determined and will be based upon groundwater levels. The installation of the soil vapor monitoring points will be in accordance with the procedures outlined below.

Design Materials

- Vapor probe screen and tubing – Only new flush threaded 21-inch slotted stainless steel vapor screen will be used. Total well depth will be approximately 15 feet or less as required by site characteristics. An inert sampling tube (e.g., polyethylene, stainless steel, nylon, Teflon, etc.) that can securely connect to the screen.
- Filter pack – Only non-reactive granular material of known chemistry and particular graduation should be used. The filter pack should be suitable for use with the selected screen slot size.
- Bentonite seal – The bentonite should be from a commercial source free of chemical additives (granular or powdered for grout and pelletized for seal).
- Water – From a potable source of known chemistry and free of chemical constituents that may compromise integrity of installation.
- Grout – Mixture of bentonite, cement and water according to the following specifications by weight: 1.5%-3.0% bentonite, 40%-60% cement, and 40%-60% water.

Procedure

- Mobilize the probe rig to the project site, ensure that the probe technician has appropriate equipment and that the rig and equipment have been decontaminated and are in good working condition.
- For soil vapor probes around a building with no surrounding surface confining layer (e.g, pavement or sidewalk), samples should be located in native or undisturbed soils away from fill material surrounding the building (approximately 10 feet away from the building) to avoid sampling in an area that may be influenced by the building's operations. For example, operation of HVAC systems, fireplaces, or mechanical equipment (e.g. clothes dryers or exhaust fans/vents) in a building may exacerbate the infiltration of outdoor air into the vadose zone adjacent to the building.
- The soil vapor probe must be at a depth comparable to the depth of foundation footings (determined on a building-specific basis) or at least one foot above the water table in areas where the groundwater table is less than six feet below grade;
- If in the vicinity of a building's foundation, a sample must be taken between the building's foundation and the source of contamination;
- Place expendable point on end of direct push equipment.
- Advance borehole to the desired depth by means of direct push drilling. Depth will be comparable to the depth of nearby foundation footings or excavation depths determined during test pitting or at least one foot above the water table in areas where the groundwater table is less than six feet below grade. When depth of sampling area is achieved, insert a 21-inch stainless steel screen and attach to the expendable point. The 21-inch stainless steel screen will be attached to a 1/4-inch diameter inert sampling tube through the hollow core of the geoprobe to the bottom of the hole.
- Add porous backfill material (e.g., coarse sand, glass beads, washed #1 crushed stone, etc.) while removing the geoprobe. Measure the depth of the backfill pack frequently with

a weighted tape while adding backfill material. Porous backfill material should extend to just above screen.

- Add bentonite powder to seal the porous material while slowly removing the geoprobe. The bentonite seal should extend at least three feet above the top of the porous material pack. If possible measure the depth with the weighted tape before, during and after adding the bentonite pellets. Potable water should be added to hydrate the bentonite pellets and the pellets should be allowed to hydrate for a minimum of two hours.
- Add clean backfill into the hole while slowly removing the geoprobe until backfill material is near the surface.
- Seal the surface of the vapor probe hole with a non-VOC emitting surface sealing material (e.g., modeling clay, grout or beeswax for temporary probes).
- Tube should be capped with an inert valve.
- Document soil vapor probe design and construction data in the field logbook.
- If bentonite is used, wait a minimum of two hours before sampling.

8.0 SURVEYING AND TITLE SEARCH

The objective of this task will be to perform a title search in accordance with the requirements of the ERP and to complete a boundary and topographic survey with a meets and bounds description of the project site and to locate on-site structures with respect to site boundaries. The boundary and topographic survey will serve as the base map for the project site. Additionally, a survey will be completed to locate the actual location of the investigation locations. These locations will be superimposed on the base map prepared for the project site.

Coordinates will be established by a New York State-licensed land surveyor for the soil probes, soil vapor probes and monitoring wells. Elevations for the monitoring wells will be relative to a regional, local, or project-specific datum. United States Geological Survey (USGS) benchmarks will be used if located within 0.5 miles of the project site and will take precedence over the use of project-specific datum.

9.0 ENVIRONMENTAL SAMPLING

Subsurface soil and, if necessary, groundwater samples will be collected for chemical analysis to determine the magnitude and extent of contamination, if any, occurring in these media. A summary of the samples to be collected from these media, including the number and type of QA/QC samples, and the corresponding analytical methods is presented in Table 1. The following sections describe the sampling procedures that apply to these media.

9.1 Subsurface Soil Sampling

Four subsurface soil samples will be collected from test pits and test borings for chemical analysis. The goal of the subsurface soil sampling is to obtain analytical data from the various soil types and a range of contaminant concentrations. Factors that will be considered when selecting soil samples for analysis include TOV levels, visual and olfactory observations of contamination, the lack of visible or olfactory contamination, the soil type (i.e., fill or native), and the areal and vertical distribution of other soil samples.

9.1.1 Test Borings and Test Pits

Continuous soil samples collected from the test borings and test pits will be reviewed and evaluated for the purpose of selecting samples for chemical analysis. Sample selection will focus on soil samples that exhibit elevated organic vapor levels or visual evidence of contamination. The procedures for sample selection are detailed below. In addition, one matrix spike/matrix spike duplicate (MS/MSD) pair from a test pit and one equipment rinseate blank from the split-spoon sampler will be collected for laboratory analysis.

Procedure

- Measure and record the organic vapor levels in the headspace of all of the samples from the test borings using the procedures outlined in Section 9.1.2.
- Select the samples that exhibit the highest headspace concentration of organic vapors and/or display visual or olfactory evidence of contamination for chemical analysis.
- Material for VOCs analyses will be placed directly into the appropriate sample containers identified in Table 2.
- Transfer the remainder of the selected sample to a stainless steel mixing bowl. Homogenize soil in the mixing bowl with the same stainless steel trowel or scoop used to collect the sample.
- Place homogenized sample in the appropriate sample containers identified in Table 2.
- Sample handling, labeling, custody and shipping shall be in accordance with the procedures outlined in Section 10.0.
- Decontaminate stainless steel spatula prior to each use following the procedures outlined in Section 12.0.

9.1.2 Soil Screening

The MiniRAE 2000 photoionization detector (PID) will be utilized to screen soil for organic vapors.

Procedure

Upon successful unit zeroing and calibration (refer to Attachment B), the PID is ready for use. Prior to screening soil, background readings should be determined in the vicinity of the sampling area by holding the probe tip at shoulder level and noting any readings on the digital meter. Record any sustainable background readings noted in the logbook and the appropriate log form. Vinyl tubing, measuring approximately one-inch long (onequarter inch outer diameter), should be placed on the end of the aluminum or plastic probe tip to avoid contaminating the PID.

Direct sample screening:

- With a spatula or spoon, the soil will be moved apart to reveal soil previously unexposed to the atmosphere.
- The tip of the PID will be placed as close to the top of the newly exposed soil sample as possible without contacting it.
- The digital meter will record the largest concentration detected and that number should be recorded in the field logbook and on the appropriate log form as well.

Sample headspace screening:

- Allow the samples to warm in the sealed split-spoon jars or zip-lock bags to room temperature for an appropriate duration depending upon ambient temperatures.
- Remove the lid from the split-spoon jar, taking care not to remove the underlying foil or carefully open one corner of the zip-lock bag.
- Immediately pierce the foil with the PID probe.
- The digital meter will record the largest concentration detected and that number should be recorded in the field logbook and on the soil boring or soil probe log.
- Secure the appropriate lid onto the sample jar.

9.2 Surface Soil

Up to 12 surface soil samples will be collected from the areas concern on the project site and will be analyzed for lead and pH. . Additionally, three surface soil/sediment samples will be collected from the same locations as the surface water samples (see Section 9.3) and will be analyzed for TCL SVOCs, pesticides/PCBs and RCRA-8 metals. Surface soil and/or fill samples will be collected from previously identified areas of concern (e.g., locations of former drum or tank storage, areas of stained soil, etc.), as well as from points selected to represent conditions across the subject site. Additionally, depending on the results of soil samples collected from the project site, up to five background soil samples may be collected in the general vicinity of the project site for the purpose of defining local baseline soil conditions. Also, one equipment rinseate blank will be collected for laboratory analysis.

Sampling Procedure

- Remove the overlying vegetation.
- Excavate approximately two inches of soil using a decontaminated stainless steel trowel or disposable plastic scoop and collect a sample from the selected location and screen for organic vapors using the procedure outlined in Section 9.1.2.
- The soil will be placed in a stainless steel mixing bowl.

- Homogenize soil in the mixing bowl with the same stainless steel trowel or scoop used to collect the sample.
- Place homogenized sample in the appropriate sample containers identified in Table 2.
- Sample handling, labeling, custody and shipping shall be in accordance with the procedures outlined in Section 10.0.
- Decontaminate mixing bowl and trowel prior to each use following the procedures outlined in Section 12.0.

9.3 Surface Water

Up to a total of three surface water grab samples will be collected from perimeter drainage ditches, from the trench drain in the loading dock area and from low and/or depressed areas encountered on the site. A reconnaissance of project site will be performed in an attempt to locate any point source discharges from the site to these ditches.

Sampling Procedure

- The sampler will complete the work in a downstream position from the collection container so as to limit turbidity, and will remain in place until all sampling is complete.
- With proper protective equipment (e.g., latex gloves), collect the grab samples by slowly submerging the sample container with minimal surface disturbances using the appropriate sample containers identified in Table 2.
- To obtain samples from point source discharge locations, hold the sample bottle within the discharge source prior to the surface water entering its destination, using the appropriate sample containers identified in Table 2.
- Sample handling, labeling, custody and shipping shall be in accordance with the procedures outlined in Section 10.0.

9.4 Sediment

Two sediment samples will be collected from the trench drains and/or sumps within the building. Additionally, one MS/MSD pair will be collected for laboratory analysis.

Sampling Procedure

- Collect a sample from the selected location using a decontaminated stainless steel trowel or disposable plastic scoop and screen for organic vapors using the procedure outlined in Section 9.1.2.
- Material for VOCs analysis will be placed directly into the appropriate sample containers identified in Table 2.
- The remainder of the sample will be placed in a stainless steel mixing bowl.

- Homogenize soil in the mixing bowl with the same stainless steel trowel or scoop used to collect the sample.
- Place homogenized sample in the appropriate sample containers identified in Table 2.
- Sample handling, labeling, custody and shipping shall be in accordance with the procedures outlined in Section 10.0
- Decontaminate mixing bowl and trowel prior to each use following the procedures outlined in Section 12.0.

9.5 Groundwater

9.5.1 Well Purging

In order to collect representative groundwater samples, wells must be adequately purged prior to sampling. Purging requires the removal of at least one well volume of water from wells with slow recharge rate, and the removal of three to five volumes of standing water in rapidly recharging wells.

Procedure

- Remove and unlock the well cover and carefully remove the J-Plug to avoid foreign material from entering the well.
- The interior of the riser pipe should be monitored for organic vapors with a PID. If a reading greater than five parts per million (ppm) is recorded, allow the well to vent until levels drop below five ppm before proceeding with purging.
- Using an electronic water level indicator, determine the static water level below the top of the riser according to the procedure detailed in Section 6.2. If non-aqueous phase liquids (NAPLs) are suspected, use an oil/water interface probe to determine the NAPL thickness, water levels, and well depths in accordance with the procedures detailed in Section 9.5.2.
- Determine the depth of the well and subtract the depth to the water level to determine the length of the water column.
- Determine the volume of water in the well by multiplying the length of the water column by the appropriate conversions found on the Well Sampling Log form (Attachment A).
- Calibrate the Horiba U-10 field water quality meter in accordance with the procedures outlined in Section 11.0.
- Chose a purging technique outlined below (e.g. HDPE bailer or peristaltic pump). A peristaltic pump will generally not work in wells with water levels greater than 20 feet below grade.
- Purge water will be placed into graduated five-gallon buckets to assist in measuring volumes removed.
- Use the Horiba U-10 to periodically measure the pH, temperature, conductivity, salinity and turbidity of the purge water.

- Record the field parameter measurements on the Well Sampling Log (Attachment A).
- Record the volume removed and succeeding field parameter measurements on the Well Sampling Log form.
- Decontaminate the Horiba U-10 following the procedures outlined in Section 12.0 prior to use at each well location.
- Purging shall continue until three to five well volumes of water have been removed, or, in the case of wells with slow recharge rates, until the well is evacuated to dryness.
- In the event a well is purged to dryness, purging should be stopped and the well allowed to recharge to near static water level before sampling.
- All well purging data shall be recorded on a Well Sampling Log form (Attachment A) and in the field notebook.

9.5.1.1. Purging with a Peristaltic Pump

The groundwater monitoring wells may be purged utilizing USEPA low-flow purging techniques and a peristaltic pump with polyethylene tubing. Low-flow purging is a technique to obtain samples with minimal alterations to water chemistry and will be accomplished utilizing the procedures outlined in the USEPA Region 1 *Low Stress (low flow) Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells* (Attachment C).

9.5.1.2. Purging with an HDPE Bailer

The wells may be purged using a dedicated, disposable high density polyethylene (HDPE) bailer. The dedicated, disposable HDPE bailer will have a one-liter capacity and a new section of nylon rope that will be discarded after use. The use of bailers may be necessary because the peristaltic pumps are physically limited to lifting water from depths of 20 feet or less.

9.5.2 Groundwater Sampling

Groundwater sampling should be performed as soon as practical after purging has been completed and the well has recovered sufficiently to sample, or within 24 hours after evacuation if the well recharges slowly. If a well does not contain or yield sufficient volume for all required laboratory analytical testing (including quality control), a decision will be made to prioritize analyses.

<u>Procedure</u>

If Non-Aqueous Phase Liquid (NAPL) is suspected to be present, a discrete sample from this phase must be obtained prior to purging. The determination of NAPL will be made through the use of an oil/water interface probe. The probe typically emits two different types of signals or tones; one for NAPL (free product) and one for water.

The procedure to measure the thickness of Light Non-Aqueous Phase Liquid (LNAPL) is initiated by lowering the probe until the first signal indicates the interface between air and free product has been reached. Then continue to slowly lower the probe until the second signal indicates the interface between free product and water. The probe is then lowered to the bottom of the well for the detection of Dense Non-Aqueous Phase Liquid (DNAPL). In this case, the probe will first encounter the interface between water and DNAPL, and then will encounter the contact between the DNAPL and the bottom of the well. All measurements will be recorded to the nearest 0.01-foot.

If a LNAPL is detected floating on the water surface in the well, sampling may be accomplished by the following manner:

- Using an oil/water interface probe, determine the LNAPL thickness and the static water level according to the procedure detailed above.
- Slowly lower a single check valve bailer (i.e., a bailer with a single ball valve on the bottom) down the well into the immiscible layer of NAPL. Care should be taken to lower the bailer just through the NAPL layer, but not significantly down into the underlying groundwater.
- Remove the bailer from the well, while being sure not to agitate the sample. Allow the bailer with sample to stand for a few minutes so the immiscible phases will separate.
- Decant the denser groundwater portion of the bailer into a wastewater barrel through the stopcock on the bottom of the bailer. The less dense immiscible NAPL layer may be emptied into the proper sampling containers by the same method

Sampling DNAPL may be accomplished by the following procedure:

- Using an oil/water interface probe, determine the DNAPL thickness and the static water level according to the procedure detailed above.
- Slowly lower a double check valve bailer (i.e., a bailer with a ball valve on top and bottom of the bailer) down the well until it reaches the bottom of the well.
- Slowly raise and lower the bailer in a controlled manner to collect the dense NAPL layer in the lower portion of the well.
- Slowly remove the bailer from the well, being sure not to agitate the sample. Allow the bailer with sample to stand for a few minutes so the immiscible phases separate.
- Carefully attach a threaded stopcock to the bottom of the bailer and discharge the dense immiscible layer through the stopcock into the proper sampling containers.

If LNAPL or DNAPL is not detected in the well, sampling may be accomplished by the following manner:

- Using an electronic water level indicator, determine the static water level below the top of the riser according to the procedure detailed in Section 6.2.
- The samples will be collected either from a peristaltic pump or a dedicated bailer. The samples will be collected directly from the peristaltic pump if the water level is less than 20 feet below grade. A bailer will be used when the water level is greater than 20 feet below grade.
- If a peristaltic pump is used to collect the samples, the sampling containers will be placed directly under the discharge outlet of the dedicated peristaltic tubing.
- If a bailer is used to collect the samples, the following method will be employed:
    - Slowly submerge a disposable, single check valve HDPE bailer into the water column to collect a groundwater sample.
    - Allow sufficient time for the bailer to sink and fill with water, and then retrieve it to the surface in a manner that minimizes sample agitation.
    - Transfer the sample from the bailer directly into the appropriate sample containers identified in Table 2 in a manner that minimizes agitation and aeration of the sample to the greatest extent possible.
- During sampling, field parameters (pH, temperature, conductivity, and turbidity) will be measured through the use of a Horiba U-10. This information will be recorded on the Well Sampling Log (Attachment A) and compared the resulting measurements with those taken at the conclusion of purging to ensure that representative groundwater samples are being collected.
- Samples will be collected in decreasing order of volatilization sensitivity (i.e., VOCs then SVOCs).
- If the turbidity level exceeds 50 nephalometric turbidity units (NTUs), implement the field filtration protocols described in the following subsection for the collection of groundwater samples for metals analysis.
- Samples will be collected in verifiably clean sample bottles (containing required preservatives) provided by the laboratory.
- All sample bottles will be labeled in the field using a waterproof permanent marker following the procedures outlined in Section 10.0.
- Sample handling, labeling, custody and shipping shall be performed in accordance with the procedures outlined in Section 10.0.
- After all sample containers have been filled at the well location (including QA/QC samples), measure and record the field parameters of the water using the Horiba U-10 meter to ensure that representative groundwater samples have been collected.
- Record all sampling data in the field notebook and on the Well Sampling Log (Attachment A).

9.6 Air Monitoring

Real-time air monitoring for volatile organic compounds (VOCs) within the work area and at the perimeter of the exclusion zone will be conducted during intrusive activities. Ground intrusive activities include, but are not limited to, the advancement of soil borings and the installation of monitoring wells.

VOCs must be monitored within the work zone and at the downwind perimeter of the immediate work areas (i.e., the exclusion zone) as described below and as specified in the site-specific HASP (Appendix C). Field monitoring of all intrusive excavation activities with the MiniRAE 2000 photoionization detector (PID) will be performed in accordance with the procedures outlined below.

Procedure

Upon successful unit zeroing and calibration, the PID is ready for use.

- Background readings should be determined upwind of the sampling area by holding the probe tip at shoulder level and noting any readings on the digital meter.
- Record any sustainable background readings noted in the logbook and the Direct Air Monitoring Form included as an attachment to the HASP.
- The PID meter should be operated on a continuous basis during any intrusive activities conducted during the site investigation.
- Readings should be recorded in 15-minute intervals on Direct Air Monitoring Form.
- Readings over the action levels listed in Section 5.2 of the HASP should be recorded in the log book and the health and safety procedures listed in this section should be implemented.

9.7 Soil Vapor Sampling

Soil vapor sampling will be performed in accordance with the October 2006 NYSDOH guidance document entitled "Guidance for Evaluating Soil Vapor Intrusion in the State of New York" and as described in the general procedures below.

To obtain representative samples and to minimize possible discrepancies, soil vapor samples should be collected in the following manner at all temporary soil vapor probe locations:

- A minimum of two hours after the installation of temporary probes, one to three implant volumes (i.e., the volume of the sample probe and tube) should be purged (i.e. using a disposal syringe or industrial hygiene pump) prior to collecting the samples.

- Flow rates for both purging and collecting should not exceed 0.2 liters per minute to minimize outdoor air infiltration during sampling. This is accomplished using the CS1200P High Purity Flow Regulation System.
- Samples should be collected using conventional sampling methods in an appropriate container that:
  - 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).
  - Is consistent with the sampling and analytical methods (e.g., low flow rate; Summa canisters analyzed by EPA Method TO-15).
  - Is certified clean by the laboratory.
- Sample size depends upon the volume that will achieve minimum reporting limits. A minimum reporting limit of one microgram per cubic meter (1 mcg/m^3) or less is sufficient for this study; and
- A tracer gas (e.g., helium, butane, etc.) will be used at every sample location when collecting soil vapor samples to verify that adequate sampling techniques are being implemented (i.e., to verify infiltration of ambient air is not occurring). The usage of tracer gas is described in Section 9.7.1.

In some cases, weather conditions may present certain limitations on soil vapor sampling. For example, condensation in the sampling tube may be encountered during winter sampling due to low outdoor air temperatures. Devices, such as tube warmers, may be used to address these conditions. Anticipated limitations to the sampling should be discussed prior to the sampling event so appropriate measures can be taken to address these difficulties and produce representative and reliable data.

When soil vapor samples are collected, the following actions should be taken to document local conditions during the 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 air sampling locations (if applicable), and compass orientation (north);
- Weather conditions (e.g., precipitations and outdoor temperature) 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.

Additional information that could be gathered to assist in the interpretation of the results includes barometric pressure, wind speed and wind direction.

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

- Sample identification,
- Date and time of sample collection,
- Sampling methods and devices,
- Purge volumes,
- Volume of soil vapor extracted,
- If canisters are used, the vacuum before and after the samples were 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.

9.7.1 Tracer Gas

When collecting soil vapor samples, a tracer gas serves as quality assurance/quality control measure 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 outdoor air. Since temporary probes are being used, a tracer gas should be used at every sampling location, every time samples are collected.

Depending on the nature of the contaminants of concern, a number of different compounds can be used as a tracer. Typically, helium is used as a tracer because it is readily available, has low toxicity, and can be monitored with portable measurement devices. Butane and propane (or other gases) could also be used as tracers in some situations. Where applicable, steps should be taken to ensure that the gas used by the laboratory to clean the air sampling container is different from the gas used as a tracer during sampling.

Protocol for using a tracer gas:

- Use a laboratory supplied silonite-coated dome and enrich the atmosphere in the immediate vicinity of the area where the probe intersects the ground surface with the tracer gas.
- Measure a vapor sample from the probe for the presence of high concentrations (>10%) of the tracer. A cardboard box, a plastic pail, or the laboratory supplied dome can serve to keep the tracer gas in contact with the probe during the testing. If there are concerns about infiltration of ambient air through the other parts of the sampling train (such as around the fittings, not just at the probe/ground interface), the consideration should be given to ensuring that the tracer gas is in contact with the entire sampling apparatus. In these cases, field personnel may prefer to use a liquid tracer by soaking paper towels with a liquid tracer

and placing the towels around the probe/ground interface, around the fittings, and/or in the corner of a shroud.

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.
- Use a PID to analyze a sample of soil vapor for the tracer gas prior to and after the sample collection.

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.

The schematics of tracer gas applications seen in Figure 4 depict common methods for using tracer gas. The same tracer gas application should be used for all vapor probes at the same site. In schematics (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. Schematic (A) may be the most effective at preventing tracer gas infiltration; however, it may not be appropriate in some situations depending on site-specific conditions. Schematics (B) and (C) may be sufficient for permanent soil vapor probes installed in tight soils. Schematic (D) provides an example of using a liquid tracer.

Minor leakage around the probe seal should not materially affect the usability of the soil vapor sample results. If the PID detects the tracer gas at a concentration greater than ten percent, measures should be taken to enhance the probe seal to reduce infiltration of outdoor air.

10.0 SAMPLE HANDLING

Proper sample labeling, handling, packing and shipping will help ensure collected samples are accurate, secure and intact upon arrival at the laboratory for analysis.

10.1 <u>Sample Labeling</u>

Proper labeling is required to prevent sample misidentification of samples collected in the field and will be performed using the procedures detailed below.

Procedure

- Affix a non-removable (when wet) label to each sample container.
- Cover the label with 2-inch cellophane or mylar tape.
- Write the following information on the label with a permanent waterproof marker:
    - Site Name
    - Sample Identification Code
    - Project Number
    - Date/Time
    - Sampler's Initials
    - Sample Preservative
    - Analysis Required

- Each sample of each matrix will be assigned a unique alpha-numeric identification code consisting of four (4) sequential components: (1) project site code, (2) sample location, (3) sample matrix, and (4) sample type. Each of these components is defined below:

    - Project Site Code: FEB (Former Electruk Battery)

    - Sample Location:

      Test Pit Designation: TP#D
      # = Soil Probe Number
      D= Depth Interval: D02 = 0-2 feet
      D24 = 2-4 feet
      D46 = 4-6 feet, etc.

      Test Boring Designation: TB#D
      # = Test Boring Number
      D = Depth Interval: D02 = 0 – 2 feet
      D24 = 2 – 4 feet
      D46 = 4 – 6 feet, etc.

      Monitoring Well Designation: MW#XX
      # = Well Number
      XX = Well Type:IN - Interface
      XX = Well Type: BR – Bedrock

      Soil Vapor Probe: SVP#D
      # = Soil Vapor Probe Number
      D = Depth Interval D02 = 0-2 feet
      D24 = 2-4 feet

D46 = 4-6 feet, etc.

- Sample Matrix:
  GW = Groundwater
  SW = Standing/Surface Water
  WW = Waste Water
  S = Soil
  SED = Sediment
  SLD = Sludge
  SV = Soil Vapor

- Sample Type:
  O – Original
  FD – Field Duplicate
  MS – Matrix Spike
  MSD – Matrix Spike Duplicate
  MD – Matrix Duplicate
  TB – Trip Blank
  RB – Rinseate Blank

1. Examples of this code are provided below

- FEB -MW4-GW-O
  FEB = Former Electruk Battery
  MW4 = Monitoring Well No. 4
  GW = Groundwater Sample
  O = Original

- OBA-TB5-D46-S-O
  FEB = Former Electruk Battery
  TB5-D46 = Test Boring No. 5 (4-6 foot depth)
  S = Soil Sample
  O = Original

- FEB-SVP3-D510-SV-O
  FEB = Former Electruk Battery
  SVP3-D5-10 = Soil Vapor No. 3 (5-10 foot depth)
  SV = Soil Vapor
  O = Original

10.2 <u>Chain-Of-Custody</u>

The documentation of sample collection and the method used to standardize the action is referred to as a chain-of-custody (COC). The COC is a legally defensible document that may be utilized as evidence in litigation or administrative hearings by regulatory agencies. The COC procedure is based on the American Standards and Testing Materials (ASTM) Standard Guide for Sampling Chain-of-Custody Procedures (ASTM D 4840-99).

Procedure

COC procedures are essential for the presentation of sample analytical chemistry in the form of an analytical report. Proper COC procedure will minimize the loss or misidentification of samples and may ensure unauthorized persons do not tamper with collected samples.

- The COC should be filled out with all relevant information in the appropriate space on the form. Information required at a minimum:

    - Site Name
    - Sample Identification
    - Project Number
    - Date And Time
    - Sampler's Signature
    - Sample Preservation
    - Required Analysis

- COCs should be completed in indelible ink.
- The COC is typically a carbon copy, which requires the preparer to apply sufficient pressure to mark all other pages.
- The top copy, usually a white original, should be sent to the laboratory with the samples.
- The preparer should retain the bottom copy, and any other carbon copies should be sent to the laboratory with the samples.
- The top copy of the COC should be placed in a zip-type plastic bag and placed in the cooler along with the samples and sealed according to the procedure outlined in next section.

10.3 Sample Shipping

The proper shipping of samples will help ensure sample security, by limiting access, integrity, by avoiding breakage, and validity, by maintaining temperature conditions.

Procedure

- Place about three inches of cushioning material in the bottom of the cooler.
- Place bottles in the cooler with VOA vials in the center of the cooler within zip-type bags.
- Separate bottles from one-another with foam, cardboard or bubble-wrap plastic.

- Pack top of bottles with ice in plastic zip-type bags. Ice should originate from a potable water source.
- Place additional cushioning material in cooler as needed.
- Place COC in zip-type plastic bag inside cooler on to the top of packing material and sample bottles.
- Wrap cooler with strapping tape at two locations and secure lid, complete with two custody labels on the cooler.
- Be sure any drain plugs on cooler are closed and sealed with tape.
- Place "this side up" and "fragile" labels on cooler
- Samples should be shipped the same day they are collected to a New York State Department of Health (NYSDOH) ELAP-certified (Environmental Laboratory Approval Program) laboratory for analysis.

11.0 FIELD INSTRUMENTATION CALIBRATION

Numerous field instruments will be utilized during completion of the RI that require periodic calibration and routine maintenance in order to function properly.

Procedure

Calibration and maintenance procedures for the following field instruments are presented in Attachment B.

- MiniRAE 2000 Photoionization Detector (PID)
- Solinist Model 101Water Level Indicator
- Horiba U-10 Water Quality Meter
- Solinist Model 122 Oil-Water Interface Probe
- In-Situ MiniTroll Logger Hydraulic Conductivity Meter

The MiniRAE 2000 PID should be calibrated at the beginning of each day of use as well as in the event ambient air temperatures vary by 15°F from the time of initial calibration. Calibration of the PID should be recorded in the field logbook and the air monitoring form (found in the HASP). The Solinst water level meter and oil/water interface probe are factory calibrated and should not require any calibration as long as the probes remain clean. Decontamination of the meters should be recorded in the field logbook. The Horiba water quality meter will be calibrated at the beginning and end of each operating period. The initial, and any subsequent calibrations, should be documented in the field logbook. The CS1200P High Purity Flow Regulation System will be calibrated by the laboratory.

12.0 SAMPLING EQUIPMENT DECONTAMINATION

Sampling methods and equipment have been chosen to minimize decontamination requirements and prevent the possibility of cross-contamination. All drilling and excavating equipment that comes in contact with soils will be decontaminated prior to each use at new locations. Special attention will be given to the drilling assembly, augers, and shovels. Split-spoons, soil probes and other non-disposable sampling equipment (e.g., mixing bowls, trowels, etc.) will be decontaminated prior to each use. Field instruments, such as the water level meter, and the field water quality meter will be decontaminated prior to use at new well locations, and will be triple rinsed prior to each use at a specific well location.

Procedure

Drilling and Excavating Equipment (e.g., direct-push probes, hollow-stem augers, shovels):

- Position equipment on heavy plastic sheeting.
- Manually remove foreign matter.
- Steam clean equipment and allow to air dry.
- Unless it is apparent that there may be contamination present, based upon visual and/or photoionic evidence, decontamination fluids will be allowed to infiltrate the ground surface of the site.
- Should evidence of contamination be observed, decontamination fluids will be contained for characterization and proper future management in accordance with Section 13.0.

Non-Disposable Sampling Equipment (e.g., split-spoons, stainless steel mixing bowls, etc.) and field instruments (e.g., water level meter and field water quality meter):

- Position equipment on plastic sheeting or within wash tub or bucket.
- Manually remove foreign matter.
- Wash equipment with brushes in an alconox or liquinox and potable water mixture.
- Triple rinse with deionized water.
- Allow equipment to air dry.

13.0 MANAGEMENT OF INVESTIGATION-DERIVED WASTE

This section addresses the minimization and management of investigation-derived waste generated as a result of subsurface investigation activities. Wastes expected to be generated include expendable sampling-related equipment, soil and/or fill removed during the excavation of test pits, auger cuttings from test boring and well drilling, well development and purge water, and decontamination fluids.

Efforts will be made by the field team to minimize the quantity of waste generated by re-using expendable sampling equipment whenever possible, by purging only the quantity of well water necessary, and by using the least amount of decontamination fluids practicable. The field team will also attempt to minimize the quantity of waste generated by segregating clean materials from potentially contaminated materials.

It is anticipated that most waste generated during excavating, drilling and sampling activities will not require containment. All decontamination water, surplus geologic material and auger cuttings will be returned to the soil probe and test boring from which they originated, or spread on the ground surface within the interior of the site if:

- Free product is not observed; and
- Direct TOV readings are below 5 ppm.

Similarly, development and purge water will be discharged to the ground surface within the interior of the site if:

- Free product is not observed on the water; and
- TOV readings from above the water are below 5 ppm.

If containment is required, excess soil materials will be placed on and covered with polyethylene sheeting in a central portion of the site. Surplus water will be placed into 55-gallon drums and staged in a central portion of the site and handled appropriately

TABLES

Table 1
Sampling/Analysis Summary

RI/AA Former Electruk Battery Site

Lockport, New York

Parameter	Method	Source	Sample Type and Number							Total Samples
			Samples	Field Duplicates	MS	MSD	Field Blanks	Rinseate Blanks	Trip Blanks	
Groundwater / Surface Water										
TCL Volatiles	ASP 2000	3 New Monitoring Wells / 3 Ditches, Low Areas	6	1	1	1	-	-	1	10
TCL Semi Volatiles	ASP 2000	3 New Monitoring Wells / 3 Ditches, Low Areas	6	1	1	1	-	-	-	9
TCL Pest/PCBs	ASP 2000	3 New Monitoring Wells / 3 Ditches, Low Areas	6	1	1	1	-	-	-	9
pH	ASP 2000	3 New Monitoring Wells / 3 Ditches, Low Areas	6	-	-	-	-	-	-	6
RCRA-8 Metals	ASP 2000	3 New Monitoring Wells / 3 Ditches, Low Areas	6	1	1	1	-	-	-	9
Subsurface Soil										
TCL Volatiles	ASP 2000	Test Borings, Test Pits	4	-	1	1	-	1	-	7
TCL Semi Volatiles	ASP 2000	Test Borings, Test Pits	4	-	1	1	-	1	-	7
TCL Pest/PCBs	ASP 2000	Test Borings, Test Pits	2	-	1	1	-	1	-	5
pH	ASP 2000	Test Borings, Test Pits	4	-	-	-	-	1	-	5
RCRA-8 Metals	ASP 2000	Test Borings, Test Pits	4	-	1	1	-	1	-	7
Surface Soil										
TCL Semi Volatiles	ASP 2000	Grab Samples (3 on-site, 5 background)	8	-	-	-	-	1	-	9
TCL Pest/PCBs	ASP 2000	Grab Samples (3 on-site)	3	-	-	-	-	1	-	4
Lead	ASP 2000	Grab Samples (12 on-site)	12	-	-	-	-	1	-	13
RCRA-8 Metals	ASP 2000	Grab Samples (3 on-site, 5 background)	8	-	-	-	-	1	-	9
pH	ASP 2000	Grab Samples (12 on-site)	12	-	-	-	-	1	-	13
Sediment										
TCL Volatiles	ASP 2000	Interior sumps	2	-	1	1	-	1	-	5
TCL Semi Volatiles	ASP 2000	Interior sumps	2	-	1	1	-	1	-	5
TCL Pest/PCBs	ASP 2000	Interior sumps	2	-	1	1	-	1	-	5
RCRA-8 Metals	ASP 2000	Interior sumps	2	-	1	1	-	1	-	5
pH	ASP 2000	Interior sumps	2	-	1	1	-	1	-	5

* - The collection of background samples are contingent upon the results of the soil samples collected from the project site.

Total VOCs =	17
Total SVOCs =	30
PCB/Pesticides =	23
Lead =	13
RCRA Metals =	30
pH (soil only) =	23

Table 2
Sampling/Analysis Summary

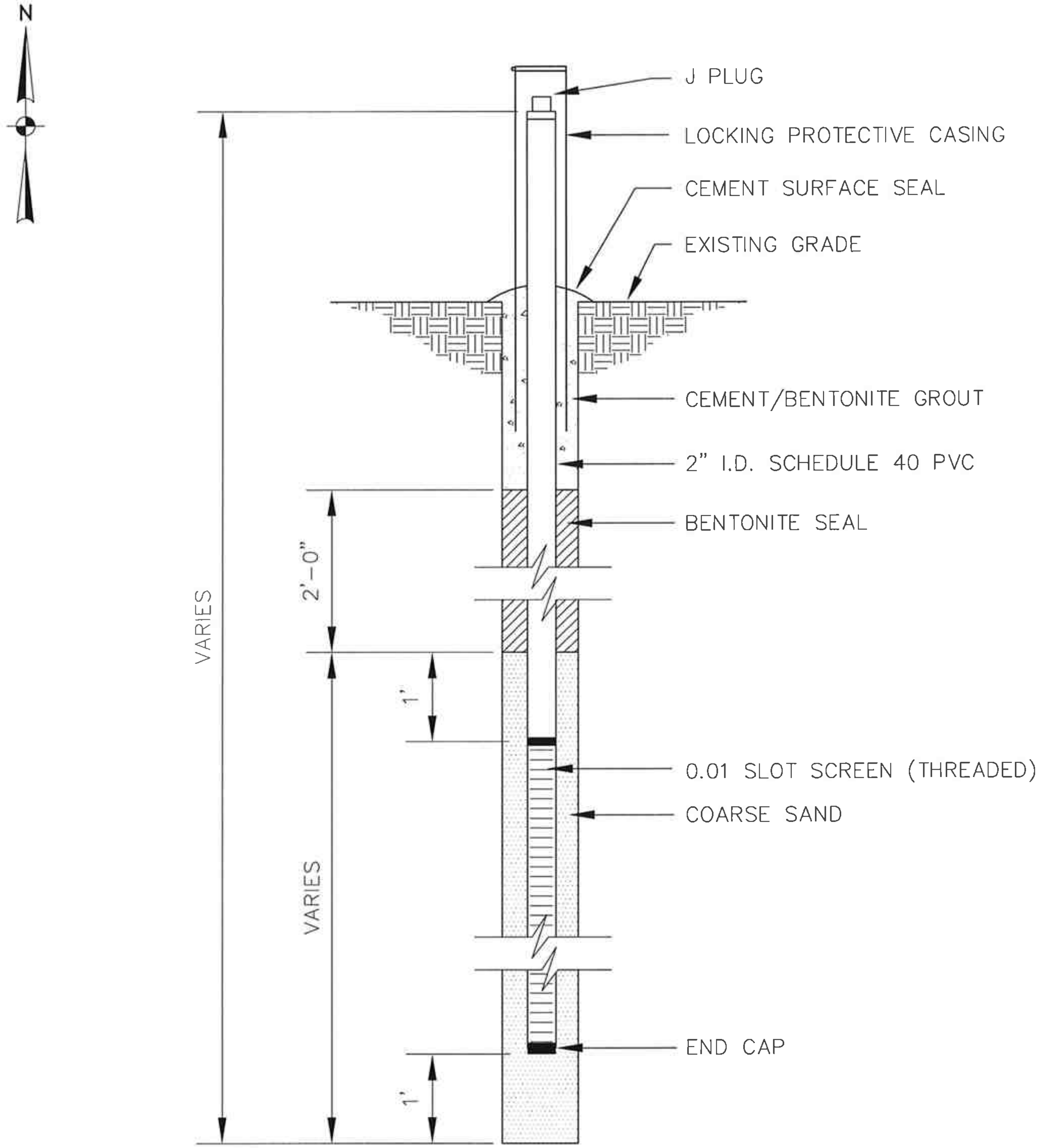
RI/AA Former Electruk Battery Site

Lockport, New York

			Sample						
Parameter	**Method [1]**	**Source**	**Containers**	**Size**	**Amount**	**Type [2]**	**Lid**	**Preservation [3]**	**Hold Time [4]**
Groundwater/Surface Water									
TCL Volatiles	ASP 2000	Monitoring Wells / Ditches, Low Areas	2	40 mL	40 mL	VOA	Septum	HCL	10 Days
TCL Semi Volatiles	ASP 2000	Monitoring Wells / Ditches, Low Areas	2	1 L	1 L	Amber	Non-septum	-	5 days
TCL Pest/PCBs	ASP 2000	Monitoring Wells / Ditches, Low Areas	2	1 L	1 L	Amber	Non-septum		5 days
pH	ASP 2000	Monitoring Wells / Ditches, Low Areas	1	4 oz	4 oz	HDPE	Non-septum	-	2 days
RCRA-8 Metals	ASP 2000	Monitoring Wells / Ditches, Low Areas	1	500 mL	500 mL	HDPE	HDPE	HNO_3, pH <2	6 mos.
Soils/Sediments									
TCL Volatiles	ASP 2000	Test Borings, Test Pits, Grab Samples, Interior sumps	2	4 oz.	5 grams	CWM	Non-septum	-	10 days
TCL Semi Volatiles	ASP 2000	Test Borings, Test Pits, Grab Samples, Interior sumps	2	8 oz.	50 grams	CWM	Non-septum	-	5 days
TCL Pest/PCBs	ASP 2000	Test Borings, Test Pits, Grab Samples, Interior sumps	2	8 oz.	50 grams	CWM	Non-septum	-	7 days
Lead	ASP 2000	Grab Samples	1	2 oz.	50 grams	CWM	Non-septum	-	180 days
pH	ASP 2000	Test Borings, Test Pits, Grab Samples, Interior sumps	1	2 oz.	50 grams	CWM	Non-septum	-	2 days
RCRA-8 Metals	ASP 2000	Test Borings, Test Pits, Grab Samples, Interior sumps	2	8 oz.	30 grams	CWM	Non-septum	-	6 mos.

1. NYSDEC Analytical Services Protocol (2000)
2. VOA= Volatile Organic Analysis Vial, HDPE = High Density Polyethylene, CWM = Clear Wide Mouth, AWM = Amber Wide Mouth
3. Cool samples to 4 degrees celcius.
4. The holding time for mercury for both aqueous and soil/sediment samples is 26 days

FIGURES



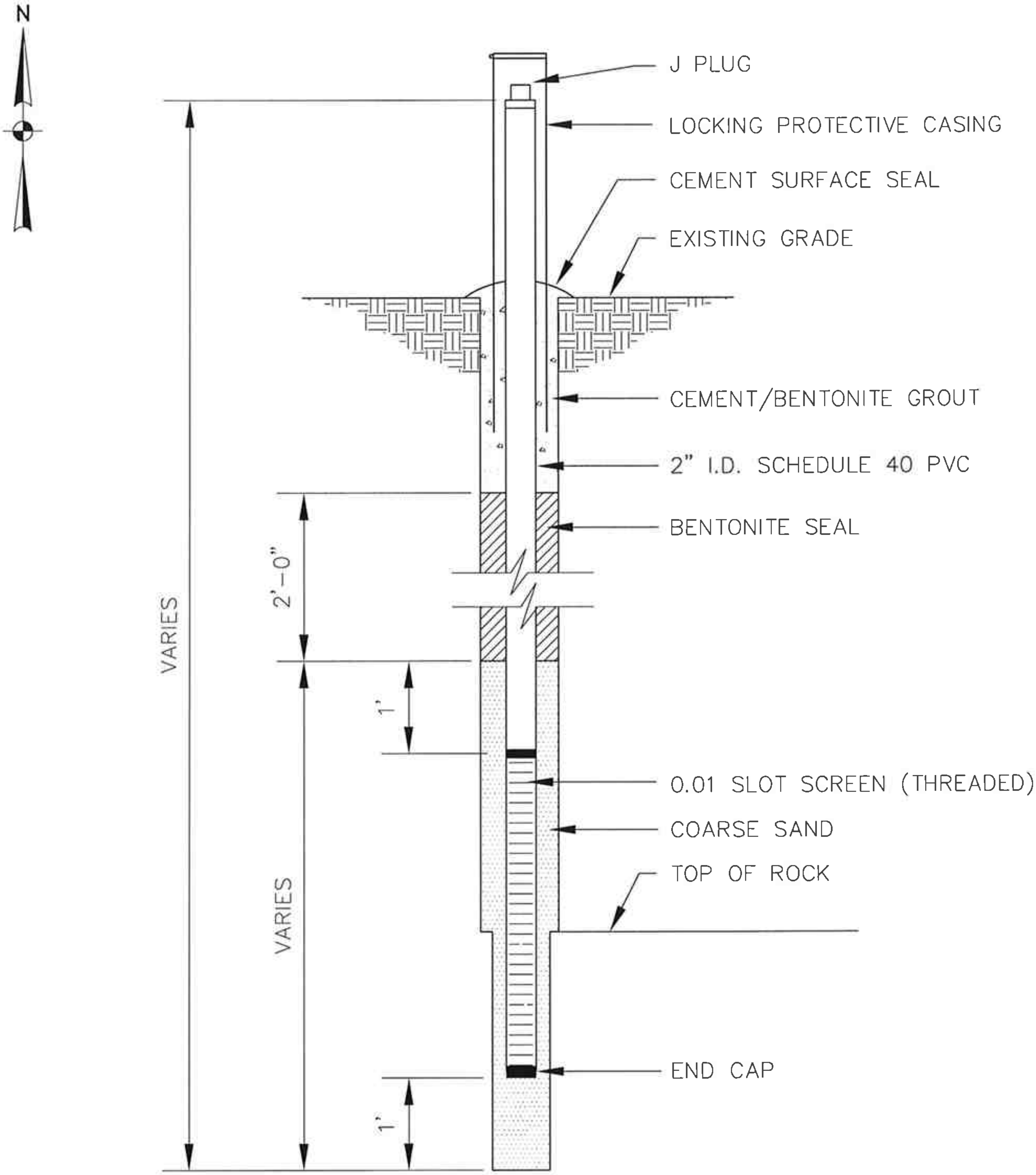
TYPICAL OVERBURDEN MONITORING WELL DETAIL

TVGA CONSULTANTS
1000 MAPLE ROAD
ELMA, NEW YORK 14059-9530
P. 716.655.8842
F. 716.655.0937
www.tvga.com

REMEDIAL INVESTIGATION/ALTERNATIVES ANALYSIS PROGRAM
FORMER ELECTRUK BATTERY SITE
4922 IDA DRIVE
LOCKPORT, NEW YORK 14094

PROJECT NO. 2007.0262.00	NOT TO SCALE	DATE: JANUARY 2008	FIGURE NO. 1

N:\2007.0262.00-500 for Electruck Site Grant Application\Engineering\CADD\MON WELL DETAIL.DWG, 3/31/2008 11:45:12 AM, dshaffer



TYPICAL INTERFACE MONITORING WELL DETAIL

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ELMA, NEW YORK 14059-9530
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F. 716.655.0937
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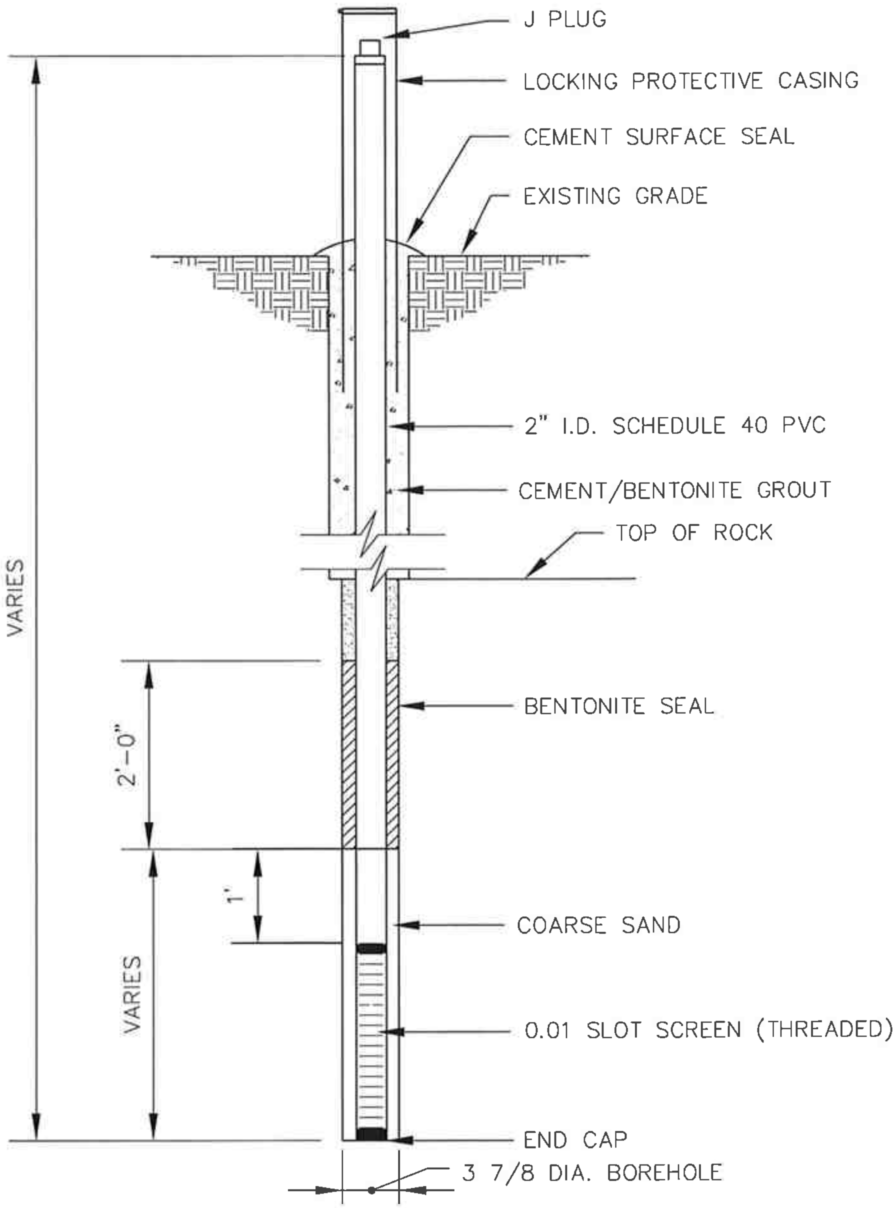
FORMER ELECTRUK BATTERY SITE
4922 IDA DRIVE
LOCKPORT, NEW YORK 14094

PROJECT NO. 2007.0262.00	NOT TO SCALE	DATE: JANUARY 2008	FIGURE NO. 2



TYPICAL BEDROCK MONITORING WELL DETAIL

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ELMA, NEW YORK 14059-9530
P. 716.655.8842
F. 716.655.0937
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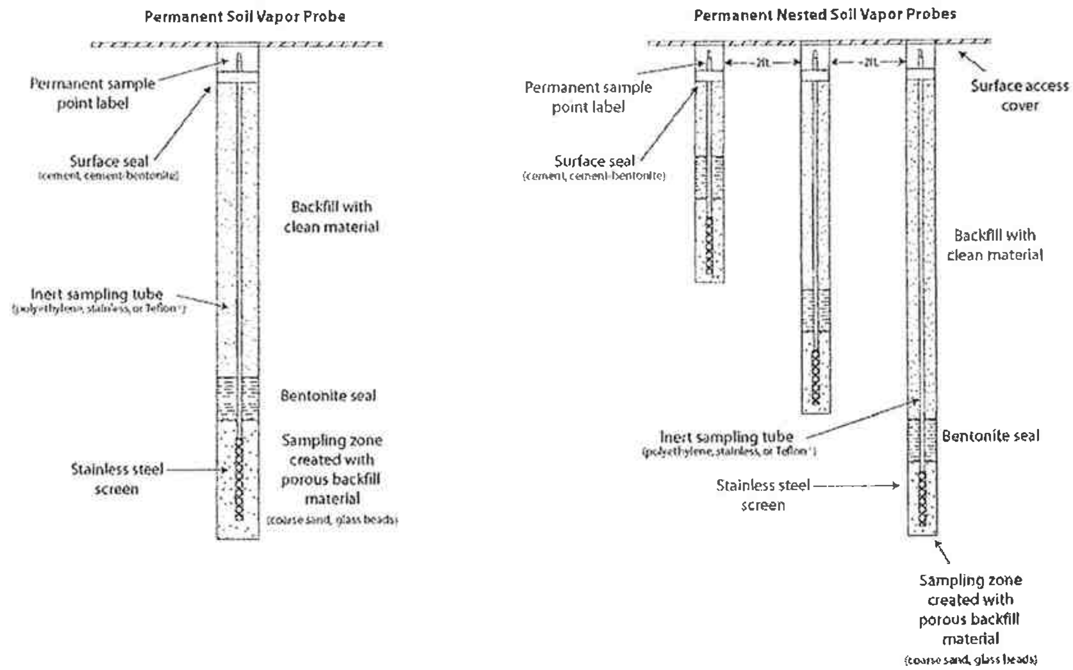
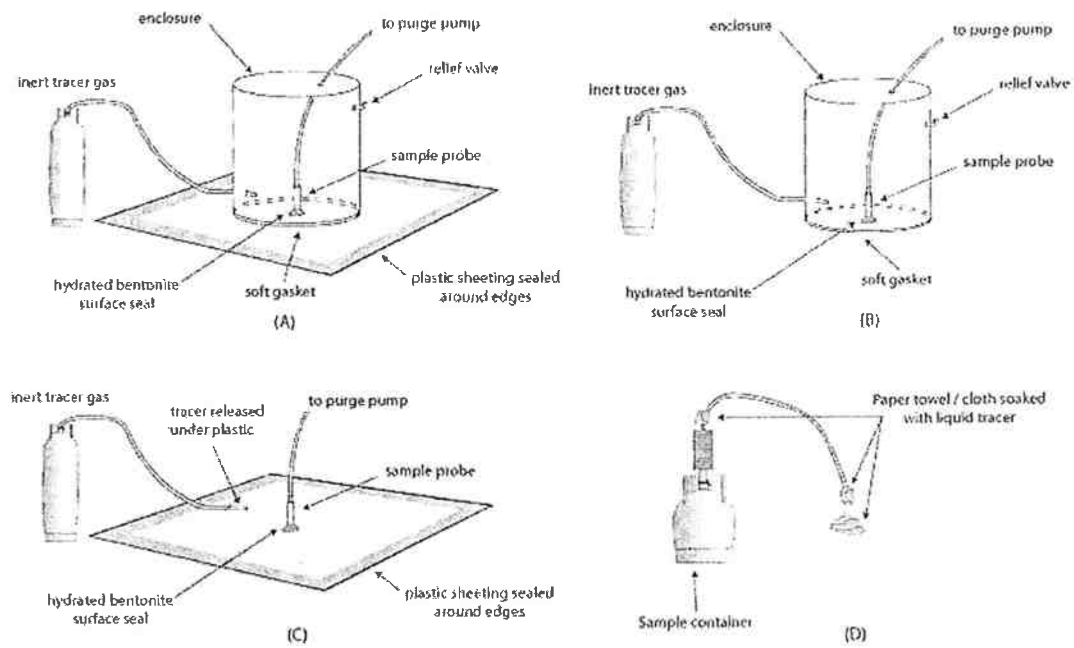
FORMER ELECTRUK BATTERY SITE
4922 IDA DRIVE
LOCKPORT, NEW YORK 14094

PROJECT NO. 2007.0262.00	NOT TO SCALE	DATE: JANUARY 2008	FIGURE NO. 3

H:\2007.0262.00-SOO for Electruck Site Grant Application\Engineering\CADD\BEDROCK MON WELL.dwg, 1/25/2008 2:17:20 PM, dshaffer



SCHEMATICS OF A GENERIC PERMANENT SOIL VAPOR PROBE
AND PERMANENT NESTED SOIL VAPOR PROBES



note: during the introduction of tracer gas, measures should be taken to maintain ambient air pressure within the enclosure

SCHEMATICS OF GENERIC TRACER GAS APPLICATIONS WHEN
COLLECTING SOIL VAPOR SAMPLES

TYPICAL SOIL VAPOR PROBE DETAIL AND TRACER GAS SCHEMATICS

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REMEDIAL INVESTIGATION/ALTERNATIVES ANALYSIS PROGRAM
FORMER ELECTRUK BATTERY SITE
4922 IDA DRIVE
LOCKPORT, NEW YORK 14094

PROJECT NO. 2007.0262.00	NOT TO SCALE	DATE: JANUARY 2008	FIGURE NO. 4

ATTACHMENT A

FIELD FORMS

TVGA CONSULTANTS

TEST BORING LOG

BORING NO.

Project: Former Electruk Battery Site RI/AA
Client: Town of Lockport
Contractor:

Project No. 2007.0262.00
GS Elev
WS Ref Elev
N-S Coord
E-W Coord
Start Date
Finish Date
Driller
Geologist

Groundwater Data (feet)			
Date	Time	Depth	Elev

Equipment Data	Casing	Sampler	Core
Type	HSA	SS	
Diameter	4.25"	2.0"	
Weight		140 #	
Fall		30"	

Well Construction	Depth (feet)	Sample No.	Blows per 6"	Recovery (in.)	Log	Unified	Field Description	Remarks PID Reading (ppm) Direct	Remarks PID Reading (ppm) Head
	5								
	10								
	15								
	20								
	25								
	30								

PIT NO:____________	# TEST PIT LOG	TVGA CONSULTANTS

Project Name: Former Electruk Battery Site RI/AA Project Location: Town of Lockport, NY	Project No: 2007.0262.00 Date: ____________

Description

Depth	
0	Surface:
1	
2	
3	
4	
5	
6	

Comments:

Location Sketch	Cross Section:
Geologist:	Operator:

TVGA
CONSULTANTS

INSPECTOR'S DAILY REPORT

JOB TITLE: Former Electruk Battery Site RI/AA

TVGA JOB NO.: 2007.0262.00

CLIENT: Town of Lockport

CONTRACTOR: ______

VISITORS: ______

PHOTOS TAKEN: ______

DATE: ______

Day of Week: S M T W T F S

I.R. No.: ______

Sheet No. ______ **of** ______

Contractor Hours Worked:
______ **AM** ______ **PM**

Inspector Hours Worked:
______ **AM** ______ **PM**

Weather:
______ **AM** ______ **PM**

Temperature:
______ **AM** ______ **PM**

DESCRIPTION OF WORK PERFORMED AND INSPECTED

Specify for each operation: Item No., Sub-Contractor (if any), Location and Nature of Work

ITEM NO.	INTERIM QUANT.	FINAL QUANT.	EST. NO.	DESCRIPTION OF WORK

The above described work was incorporated into this project and was inspected by:

______ Reviewed by: ______

Inspector's Signature

☐ **REVERSE SIDE USED FOR ADDITIONAL REMARKS AND SKETCHES.**

MANPOWER						EQUIPMENT				
TYPE	**PRIME**					**TYPE**	**PRIME**			
Foreman										
Operators										
Laborers										

WELL INSTALLATION REPORT

TVGA CONSULTANTS

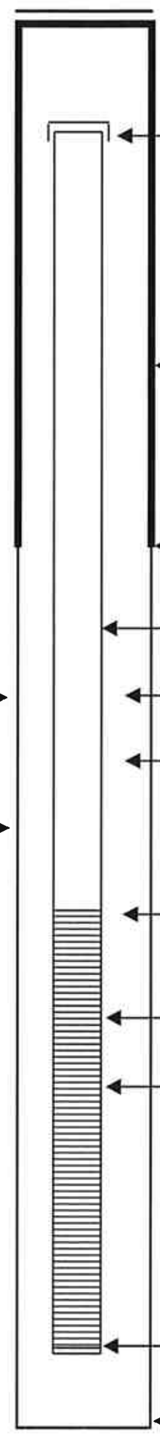
Project Name Former Electruk Battery Site RI/AA
Project Number 2007.0262.00
Contractor
Date of Installation
Project Location

Geologist
Driller
Well No.
Boring No.
Sheet __ of

Lock No.

Survey Datum

Ground Elevation



____ Top of Seal

____ Top of Sand

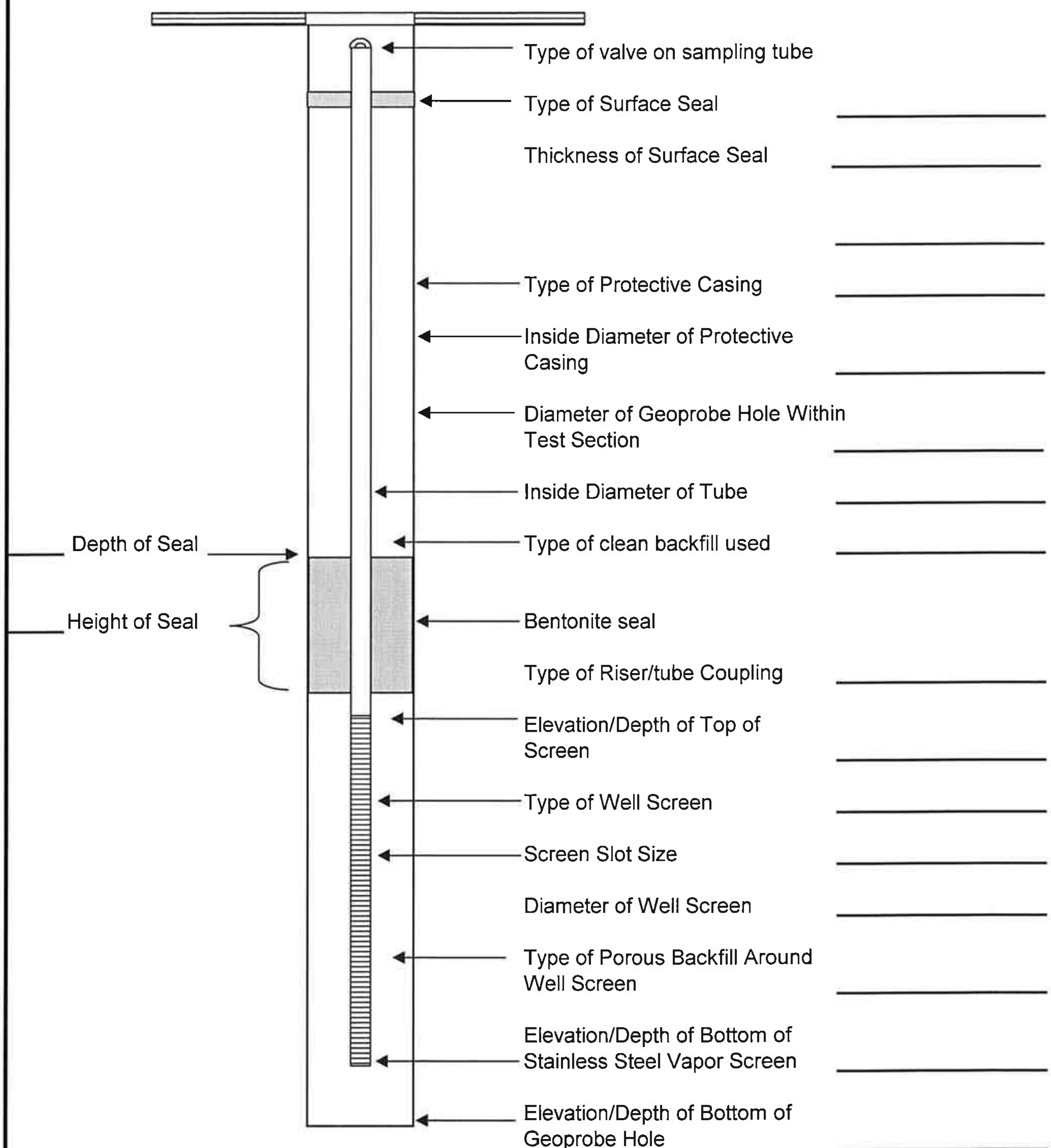
Elevation/Stick up Above/Below Ground Surfae of Casing	
Elevation/Stick up Above/Below Ground Surfae of Riser Pipe	
Thickness of Surface Seal	
Type of Surface Seal	
Type of Protective Casing	
Inside Diamater of Protective Casing	
Elevation/Depth of Bottom of Protective Casing	
Inside Diamter of Riser Pipe	
Type of Backfill Around Riser	
Diamter of Bore Hole Within Test Section	
Type of Coupling	
Elevation/Depth of Top of Screen	
Type of Well Screen	
Screen Slot Size	
Diameter of Well Screen	
Type of Backfill Around Well Screen	
Elevation/Depth of Bottom of Well Screen	
Elevation/Depth of Bottom of Bore Hole	

TVGA CONSULTANTS

VAPOR PROBE INSTALLATION REPORT

Project Name Former Electruk Battery Site RI/AA
Project Number 2007.0262.00
Contractor ____________
Date of Installation ____________
Project Location ____________

Geologist ____________
Driller ____________
Vapor Probe No. ____________
Probe No. ____________
Sheet __ of ____________



TVGA CONSULTANTS

WELL DEVELOPMENT LOG

HOLE NO:

Project Name: Former Electruk Battery Site RI/AA
Project Location: Town of Lockport, New York

Project No: 2007.0262.00
Date: ______
Screen Length: ______

Purge Information:

(1) Depth to Bottom of Well: ______ (from TOC)

(2) Depth to Water: ______ ft (from TOC)

(3) Column of Water: ______ (#1 - #2)

(4) Casing Diameter: ______ in

(5) Volume Conversion: ______gal/ft

(6) 1 Vol. of Well: ______ gal

Method of Purging: WaTerra/Bailer/Submersible/Other: ______

Volume Conversion:

1" = 0.041   2" = 0.163   4" = 0.653   6" = 1.469   8" = 2.611   10" = 4.08

Field Analysis:

Vol Purged (gal)								
Time								
ORP/EH (MV)								
pH								
Cond. (MS/CM)								
Turb. (NTU)								
D.O. (mg/l)								
Salinity (%)								
Temp. (°C)								

Total Volume Purged: ______ gal   Total Purge Time: ______

Development Info:

Development Method: ______

Comments: ______

Logged By:

TVGA CONSULTANTS

WELL SAMPLING LOG

HOLE NO:

Project Name: Former Electruk Battery Site RI/AA
Project Location: Town of Lockport, New York

Project No: 2007.0262.00
Date: ____
Screen Length: ____

Purge Information:

(1) Depth to Bottom of Well: ____ (from TOC)

(2) Depth to Water: ____ ft (from TOC)

(3) Column of Water: ____ (#1 - #2)

(4) Casing Diameter: ____ in

(5) Volume Conversion: ____ gal/ft

(6) 1 Vol. of Well: ____ gal

Method of Purging: WaTerra/Bailer/Submersible/Other: ____

Volume Conversion:

1" = 0.041 2" = 0.163 4" = 0.653 6" = 1.469 8" = 2.611 10" = 4.08

Field Analysis:

Vol Purged (gal)								
Time								
ORP/EH (MV)								
pH								
Cond. (MS/CM)								
Turb. (NTU)								
Salinity (%)								
D.O. (mg/l)								
Temp. (°C)								

Total Volume Purged: ____ gal Total Purge Time: ____

Sampling Info:

Sample Method: ____

No. of Bottles: ____

Sample Time: ____

Sample Analyses: ____

Comments: ____

Logged By:

ATTACHMENT B

EQUIPMENT USAGE AND CALIBRATION PROCEDURES

Horiba U-10 Water Quality Meter

ACCURACY:

The Horiba U-10 Water Quality Meter measures six water quality parameters. Measurements can be made for pH, temperature, dissolved oxygen, conductivity, turbidity, and salinity. Operation in standard mode will allow resolution to the following units: 0.1 pH, 1 ° C for temperature, 0.1 mg/l for dissolved oxygen, 0.1 mS/cm for conductivity in 10-100 range, 10 NTU for turbidity and 0.1% for salinity. Operation in expanded mode, will allow resolution to the following units: 0.01 pH, 0.1 ° C temperature, 0.01 mg/l for dissolved oxygen, 0.01 mS/cm for conductivity in 10-100 range, 1 NTU for turbidity and 0.01% for salinity.

CALIBRATION:

Calibration is necessary for all parameters except temperature and salinity, which are factory, calibrated. Calibration for the remaining parameters is completed by filling the supplied beaker with the supplied standard solution approximately 2/3 full (to the line on the beaker) and placing the probe tip in the calibration beaker. Then, press the following keystrokes:

- ❑ Turn power **ON**,
- ❑ Press **MODE** key,
- ❑ Move cursor to AUTO,
- ❑ Press **ENTER,**
- ❑ Wait until calibration is complete. Display will briefly show "END" and then "MEAS," indicating unit is reading for measuring
- ❑ If auto-calibration errors are detected the display will show "Er", which requires re-calibrating the unit. Refer to the

Consult the operations manual or seek help from the manufacturer or supplier if calibration is unsuccessful or if two-point calibration is desired.

PROCEDURE:

1. Ensure that the wire and probe have been properly cleaned before use.
2. After calibration, turn unit on. When "MEAS" is visible on the LCD, the unit is ready.
3. Record water level meter and then place probe into monitoring well into water column.
4. Depress the **ENTER** button to measure parameters.
5. Record data on log form and/or well development form.
6. Follow on-screen commands to store data. Up to 20 measurements may be stored.
7. Remove wire and attached probe while cleaning tape by holding a damp paper towel or moist toilette on the tape.
8. Decon wire and probe according to decon procedures prior to taking measurements in other monitoring wells.

MAINTENANCE:

The Horiba U-10 main unit is water-resistant and requires little maintenance other than frequent cleaning with non-abrasive soap.

MiniTroll Datalogger Hydraulic Conductivity Meter

ACCURACY:

The slug test, with the In-Situ MiniTroll Datalogger measures hydraulic conductivity of the aquifer being tested. The slug test derived hydraulic conductivities are considered accurate within one order of magnitude.

CALIBRATION:

Calibration is not necessary, because the unit is factory calibrated. The transducer should be placed in the monitoring well for one-hour prior to use to allow for temperature equilibrium.

PROCEDURE:

1. Develop monitoring well prior to performing slug tests.
2. Record static water level.
3. Ensure that the wire and transducer have been properly cleaned before use.
4. Select a transducer depth that places the transducer no less than five feet deeper than the fully submerged slug and at least two feet above the bottom of the well.
5. Attach transducer cable so that the transducer probe depth remains stable during test.
6. After installing the transducer, the water level in the well should be allowed to return to static conditions. If water level is substantially above the static water level, a bailer may be used to remove water from the well.
7. Determine the optimal slug length. Standard slug length is 10 feet. However, if the water column in the well is to small to fit the transducer and the ten-foot slug, a shorter slug must be assembled. Five-foot and one-foot sections can be used to construct a shorter length.
8. Once the water level has returned to static, the initial part of the slug test, the falling head test, can be conducted. After starting the In-Situ MiniTroll Datalogger, quickly lower the slug into the water column until the slug is completely submerged. Data collection should continue for a minimum of fifteen minutes, or until the water returns to static conditions.
9. If after allowing the water level to return to static conditions, the water level is substantially above the static water level, then a bailer may be used to remove water from the well.
10. Once the water level has returned to static, the second part of the slug test, the rising head test, can be conducted. After starting the In-Situ MiniTroll Datalogger, the slug should be quickly removed from the water column. The slug should be removed from the well to prevent water level impacts from water dripping off the slug. Care should be taken to avoid tangling the slug and the transducer cable. If the slug and cable do become tangled, the transducer probe will be raised and the test will need to proceed from the beginning.
11. Decontaminate wire and probe according to procedures prior to taking measurements in other monitoring wells.

MAINTENANCE:

Routine maintenance shall be performed in accordance with the manufacturer's specifications.

MiniRAE 2000 Photoionization Detector

ACCURACY:

The useful range of the instrument is from 0 to 2000 ppm with an accuracy of +/- 2.0 ppm and > 2000 is +/- 20% if reading. Response time is less than three seconds to 10,000 ppm.

CALIBRATION:

The MiniRAE 2000 will be calibrated using a pressurized cylinder of "span" gas. The calibration gas will be in the same matrix in which the measurements will be taken. Prior to performing the span calibration, a fresh air calibration will be performed in a clean ambient air environment to determine the zero point of the sensor calibration curve.

Fresh Air Calibration

1. Press and hold down both the **[N/-]** and **[MODE]** keys for three seconds scroll down to the "Calibrate/select Gas" option and press **[Y/+]**.

2. The first menu item in this sub menu is the "Fresh air Cal", press **[Y/+]** to begin fresh air calibration. This will take approximately 15 seconds, after which the display will return to the "Fresh air Cal" sub menu. Press the **[MODE]** to return to the previous menu.

Span Calibration

1. Connect the calibration adapter to the inlet port of the MiniRAE 2000 Monitor, and connect the tube to the regulator or Tedlar bag.

2. Press the **[Y/+]** key when the "Span Cal?" option is highlighted.

3. The display will then show "Apply gas now!". Turn on the valve of the span gas supply. The calibration can be started manually by pressing any key while "Apply gas now!" is on the display.

4. The display will count down from 30 seconds, and when it reaches 0, the display shows the calibrated value.

5. The display will read "No Gas" if the gas was improperly attached or not turned on.

6. After a span calibration is completed, the display will show the message "Span Cal Done! Turn Off Gas".

7. Turn of the gas and disconnect the calibration adapter, and press any key to return to the "Span Gas Cal?" menu.

PROCEDURE:

1. Turn the unit on in a clean environment by pressing the **[MODE]** button, located under the display screen.

2. Once the unit has run through the start up menu, which it will do every time it is turned on, cycle through to the *Current battery voltage and shutdown voltage* display by pressing the **[MODE]** key until the menu appears. The battery is fully charged at 4.8 volts or higher, and when the voltage falls below 4.4 volts there will be 20-30 min of run time left and the unit will need to be recharged.

3. The MiniRAE supports two (2) operational modes: Survey mode for the manual start/stop of measurements and display of certain exposure values; Hygiene mode for automatic measurements, running and datalogging continuously and calculation of additional exposure values.

4. To operate in the Survey mode after checking the battery cycle back through the menu until **Ready** appears on the display screen. Press the **[Y/+]** to start the measurement cycle. The pump will start and the reading will be displayed.

5. To operate in the Hygiene mode, after checking the battery cycle through to the Survey, Site ID, and Gas Name menu option and press **[Y/+]**. The "Change Op Mode" will be the first sub-menu to appear, press **[Y/+]** when this display highlighted. The unit will display the current operational mode to switch modes press the **[N/-]** to toggle to other selections. Select the Hygiene mode then press the **[MODE]** key, if there has been a change to the existing setting "save?" will appear on the display screen. To accept the change press the **[Y/+]** key.

6. Once the desired mode has been selected place probe in the atmosphere to be monitored and record the reading.

MAINTENANCE:

1. If any of the following conditions occur, consult the troubleshooting guide provided in the instruction manual:

   - Can not turn on the power after charging the battery.
   - No LED or LCD backlight.
   - Reading abnormally high or low.
   - Inlet flow to low.
   - Full scale measurement in humid environment.
   - "Lamp" message during operation.
   - The "Bat" indicator display is on.

2. In the event the troubleshooting techniques fail to resolve the problem, then the unit may require servicing by the manufacturer or supplier.

- The light source window will require cleaning every four weeks during periods of continued use.
- The meter battery will be checked at the beginning and end of each day. If the voltage is 4.4 volts or less the unit will flash the "Bat" display and will have a run time of 20-30 min.

- Tape will not unwind,.
    - loosen measuring wheel stopper, or
    - inspect tape for tangling or damage.

If these do not solve the problem, consult the operations manual or seek help from the manufacturer or supplier.

Solonist Model 101 Water Level Meter

ACCURACY:

The Solonist Model 101 Water Level Meter has English graduations in feet, 10ths of feet and 100ths of feet, therefore measurements should be made to the 100^{th} of a foot. The range of the measuring tape is 100 feet.

CALIBRATION:

No calibration is necessary as the unit is factory calibrated and all electronics are fully encapsulated to protect against water and mechanical damage.

PROCEDURE:

1. Ensure that the tape and probe have been properly cleaned before use.
2. Turn unit on, and then depress test button to check battery, sensitivity and audio signal.
3. Place tape guide on to the top of the well, loosen wheel tightening knob, place unit on ground. Slowly unwind tape into monitoring well until an audible beep is heard. Note level on tape. Raise tape until beep stops and then lower again until beep is heard.
4. Note water level to the 100^{th} of a foot.
5. Wind tape onto wheel while cleaning tape by holding a damp paper towel or moist toilette on the tape.
6. Decon tape and probe according to decon procedures prior to taking measurements in other monitoring wells.

MAINTENANCE:

The Solonist Model 101 Water Level Meter is constructed of a stainless steel probe and a polyethylene tape that require frequent cleaning with non abrasive soap.

Troubleshooting items are as follows:

- No audible response,
  - Turn unit on,
  - adjust sensitivity,
  - check and replace 9 volt battery, or
  - inspect tape for damage.

- Continuos audible response,
  - Clean probe tip to remove debris or water, or
  - inspect tape for damage.

- Tape will not unwind,.
  - loosen measuring wheel stopper, or
  - inspect tape for tangling or damage.

If these do not solve the problem, consult the operations manual or seek help from the manufacturer or supplier.

ATTACHMENT C

LOW FLOW PURGING AND SAMPLING PROCEDURES

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION I

LOW STRESS (low flow) PURGING AND SAMPLING PROCEDURE FOR THE COLLECTION OF GROUND WATER SAMPLES FROM MONITORING WELLS

July 30, 1996
Revision 2

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION I

LOW STRESS (low flow) PURGING AND SAMPLING PROCEDURE FOR THE COLLECTION OF GROUND WATER SAMPLES FROM MONITORING WELLS

I. SCOPE & APPLICATION

This standard operating procedure (SOP) provides a general framework for collecting ground water samples that are indicative of mobile organic and inorganic loads at ambient flow conditions (both the dissolved fraction and the fraction associated with mobile particulates). The SOP emphasizes the need to minimize stress by low water-level drawdowns, and low pumping rates (usually less than 1 liter/min) in order to collect samples with minimal alterations to water chemistry. This SOP is aimed primarily at sampling monitoring wells that can accept a submersible pump and have a screen, or open interval length of 10 feet or less (this is the most common situation). However, this procedure is flexible and can be used in a variety of well construction and ground-water yield situations. Samples thus obtained are suitable for analyses of ground water contaminants (volatile and semi-volatile organic analytes, pesticides, PCBs, metals and other inorganics), or other naturally occurring analytes.

This procedure does not address the collection of samples from wells containing light or dense non-aqueous phase liquids (LNAPLs and DNAPLs). For this the reader may wish to check: Cohen, R.M. and J.W. Mercer, 1993, DNAPL Site Evaluation; C.K. Smoley (CRC Press), Boca Raton, Florida and U.S. Environmental Protection Agency, 1992, RCRA Ground-Water Monitoring: Draft Technical Guidance; Washington, DC (EPA/530-R-93-001).

The screen, or open interval of the monitoring well should be optimally located (both laterally and vertically) to intercept existing contaminant plume(s) or along flowpaths of potential contaminant releases. It is presumed that the analytes of interest move (or potentially move) primarily through the more permeable zones within the screen, or open interval.

Proper well construction and development cannot be overemphasized, since the use of installation techniques that are appropriate to the hydrogeologic setting often prevents "problem well" situations from occurring. It is also recommended that as part of development or redevelopment the well should be tested to determine the appropriate pumping rate to obtain stabilization of field indicator parameters with minimal drawdown in shortest amount of time. With this information field crews can then conduct purging and sampling in a more expeditious manner.

The mid-point of the saturated screen length (which should not exceed 10 feet) is used by convention as the location of the pump intake. However, significant chemical or permeability contrast(s) within the screen may require additional field work to determine the optimum vertical location(s) for the intake, and appropriate pumping rate(s) for purging and sampling more localized target zone(s). Primary flow zones (high(er) permealability and/or high(er) chemical concentrations) should be identified in wells with screen lengths longer than 10 feet, or in wells with open boreholes in bedrock. Targeting these zones for water sampling will help insure that the low stress procedure will not underestimate contaminant concentrations. The Sampling and Analysis Plan must provide clear instructions on how the pump intake depth(s) will be selected, and reason(s) for the depth(s) selected.

Stabilization of indicator field parameters is used to indicate that conditions are suitable for sampling to begin. Achievement of turbidity levels of less than 5 NTU and stable drawdowns of less than 0.3 feet, while desirable, are not mandatory. Sample collection may still take place provided the remaining criteria in this procedure are met. If after 4 hours of purging indicator field parameters have not stabilized, one of 3 optional courses of action may be taken: a) continue purging until stabilization is achieved, b) discontinue purging, do not collect any samples, and record in log book that stabilization could not be achieved (documentation must describe attempts to achieve stabilization) c) discontinue purging, collect samples and provide full explanation of attempts to achieve stabilization (note: there is a risk that the analytical data obtained, especially metals and strongly hydrophobic organic analytes, may not meet the sampling objectives).

Changes to this SOP should be proposed and discussed when the site Sampling and Analysis Plan is submitted for approval. Subsequent requests for modifications of an approved plan must include adequate technical justification for proposed changes. All changes and modifications must be approved before implementation in field.

II. EQUIPMENT

A. Extraction device

Adjustable rate, submersible pumps are preferred (for example, centrifugal or bladder pump constructed of stainless steel or

Teflon).

Adjustable rate, peristaltic pumps (suction) may be used with caution. Note that EPA guidance states: "Suction pumps are not recommended because they may cause degassing, pH modification, and loss of volatile compounds" (EPA/540/P-87/001, 1987, page 8.5-11).

The use of inertial pumps is discouraged. These devices frequently cause greater disturbance during purging and sampling and are less easily controlled than the pumps listed above. This can lead to sampling results that are adversely affected by purging and sampling operations, and a higher degree of data variability.

B. Tubing

Teflon or Teflon lined polyethylene tubing are preferred when sampling is to include VOCs, SVOCs, pesticides, PCBs and inorganics.

PVC, polypropylene or polyethylene tubing may be used when collecting samples for inorganics analyses. However, these materials should be used with caution when sampling for organics. If these materials are used, the equipment blank (which includes the tubing) data must show that these materials do not add contaminants to the sample.

Stainless steel tubing may be used when sampling for VOCs, SVOCs, pesticides, and PCBs. However, it should be used with caution when sampling for metals.

The use of 1/4 inch or 3/8 inch (inner diameter) tubing is preferred. This will help ensure the tubing remains liquid filled when operating at very low pumping rates.

Pharmaceutical grade (Pharmed) tubing should be used for the section around the rotor head of a peristaltic pump, to minimize gaseous diffusion.

C. Water level measuring device(s), capable of measuring to 0.01 foot accuracy (electronic "tape", pressure transducer). Recording pressure transducers, mounted above the pump, are especially helpful in tracking water levels during pumping operations, but their use must include check measurements with a water level "tape" at the start and end of each record.

D. Flow measurement supplies (e.g., graduated cylinder and stop watch).

E. Interface probe, if needed.

F. Power source (generator, nitrogen tank, etc.). If a gasoline generator is used, it must be located downwind and at least 30 feet from the well so that the exhaust fumes do not contaminate the samples.

G. Indicator field parameter monitoring instruments - pH, Eh, dissolved oxygen (DO), turbidity, specific conductance, and temperature. Use of a flow-through-cell is required when measuring all listed parameters, except turbidity. Standards to perform field calibration of instruments. Analytical methods are listed in 40 CFR 136, 40 CFR 141, and SW-846. For Eh measurements, follow manufacturer's instructions.

H. Decontamination supplies (for example, non-phosphate detergent, distilled/deionized water, isopropyl alcohol, etc.).

I. Logbook(s), and other forms (for example, well purging forms).

J. Sample Bottles.

K. Sample preservation supplies (as required by the analytical methods).

L. Sample tags or labels.

M. Well construction data, location map, field data from last sampling event.

N. Well keys.

O. Site specific Sample and Analysis Plan/Quality Assurance Project Plan.

P. PID or FID instrument (if appropriate) to detect VOCs for health and safety purposes, and provide qualitative field evaluations.

III. PRELIMINARY SITE ACTIVITIES

Check well for security damage or evidence of tampering, record pertinent observations.

Lay out sheet of clean polyethylene for monitoring and sampling equipment.

Remove well cap and immediately measure VOCs at the rim of the well with a PID or FID instrument and record the reading in the field logbook.

If the well casing does not have a reference point (usually a V-cut or indelible mark in the well casing), make one. Describe its location and record the date of the mark in the logbook.

A synoptic water level measurement round should be performed (in the shortest possible time) before any purging and sampling activities begin. It is recommended that water level depth (to 0.01 ft.) and total well depth (to 0.1 ft.) be measured the day before, in order to allow for re-settlement of any particulates in the water column. If measurement of total well depth is not made the day before, it should not be measured until after sampling of the well is complete. All measurements must be taken from the established referenced point. Care should be taken to minimize water column disturbance.

Check newly constructed wells for the presence of LNAPLs or DNAPLs before the initial sampling round. If none are encountered, subsequent check measurements with an interface probe are usually not needed unless analytical data or field head space information signal a worsening situation. Note: procedures for collection of LNAPL and DNAPL samples are not addressed in this SOP.

IV. PURGING AND SAMPLING PROCEDURE

Sampling wells in order of increasing chemical concentrations (known or anticipated) is preferred.

1. Install Pump

Lower pump, safety cable, tubing and electrical lines slowly (to minimize disturbance) into the well to the midpoint of the zone to be sampled. The Sampling and Analysis Plan should specify the sampling depth, or provide criteria for selection of intake depth for each well (see Section I). If possible keep the pump intake at least two feet above the bottom of the well, to minimize mobilization of particulates present in the bottom of the well. Collection of turbid free water samples may be especially difficult if there is two feet or less of standing water in the well.

2. Measure Water Level

Before starting pump, measure water level. If recording pressure transducer is used-initialize starting condition.

3. Purge Well

3a. Initial Low Stress Sampling Event

Start the pump at its lowest speed setting and slowly increase the speed until discharge occurs. Check water level. Adjust pump speed until there is little or no water level drawdown (less than 0.3 feet). If the minimal drawdown that can be achieved exceeds 0.3 feet but remains stable, continue purging until indicator field parameters stabilize.

Monitor and record water level and pumping rate every three to five minutes (or as appropriate) during purging. Record any pumping rate adjustments (both time and flow rate). Pumping rates should, as needed, be reduced to the minimum capabilities of the pump (for example, 0.1 - 0.4 l/min) to ensure stabilization of indicator parameters. Adjustments are best made in the first fifteen minutes of pumping in order to help minimize purging time. During pump start-up, drawdown may exceed the 0.3 feet target and then "recover" as pump flow adjustments are made. Purge volume calculations should utilize stabilized drawdown value, not the initial drawdown. Do not allow the water level to fall to the intake level (if the static water level is above the well screen, avoid lowering the water level into the screen). The final purge volume must be greater than the stabilized drawdown volume plus the extraction tubing volume.

Wells with low recharge rates may require the use of special pumps capable of attaining very low pumping rates (bladder, peristaltic), and/or the use of dedicated equipment. If the recharge rate of the well is lower than extraction rate capabilities of currently manufactured pumps and the well is essentially dewatered during purging, then the well should be sampled as soon as the water level has recovered sufficiently to collect the appropriate volume needed for all anticipated samples (ideally the intake should not be moved during this recovery period). Samples may then be collected even though the indicator field parameters have not stabilized.

3b. Subsequent Low Stress Sampling Events

After synoptic water level measurement round, check intake depth and drawdown information from previous sampling event(s) for each well. Duplicate, to the extent practicable, the intake depth and extraction rate (use final pump dial setting information) from previous event(s). Perform purging operations as above.

4. Monitor Indicator Field Parameters

During well purging, monitor indicator field parameters (turbidity, temperature, specific conductance, pH, Eh, DO) every three to five minutes (or less frequently, if appropriate). Note: during the early phase of purging emphasis should be put on minimizing and stabilizing pumping stress, and recording those adjustments. Purging is considered complete and sampling may begin when all the above indicator field parameters have stabilized. Stabilization is considered to be achieved when three consecutive readings, taken at three (3) to five (5) minute intervals, are within the following limits:

turbidity (10% for values greater than 1 NTU),
DO (10%),
specific conductance (3%),
temperature (3%),
pH (± 0.1 unit),
ORP/Eh (± 10 millivolts).

All measurements, except turbidity, must be obtained using a flow-through-cell. Transparent flow-through-cells are preferred, because they allow field personnel to watch for particulate build-up within the cell. This build-up may affect indicator field parameter values measured within the cell and may also cause an underestimation of turbidity values measured after the cell. If the cell needs to be cleaned during purging operations, continue pumping and disconnect cell for cleaning, then reconnect after cleaning and continue monitoring activities.

The flow-through-cell must be designed in a way that prevents air bubble entrapment in the cell. When the pump is turned off or cycling on/off (when using a bladder pump), water in the cell must not drain out. Monitoring probes must be submerged in water at all times. If two flow-through-cells are used in series, the one containing the dissolved oxygen probe should come first (this parameter is most susceptible to error if air leaks into the system).

5. Collect Water Samples

Water samples for laboratory analyses must be collected before water has passed through the flow-through-cell (use a by-pass assembly or disconnect cell to obtain sample).

VOC samples should be collected first and directly into pre-preserved sample containers. Fill all sample containers by allowing the pump discharge to flow gently down the inside of the container with minimal turbulence.

During purging and sampling, the tubing should remain filled with water so as to minimize possible changes in water chemistry upon contact with the atmosphere. It is recommended that 1/4 inch or 3/8 inch (inside diameter) tubing be used to help insure that the sample tubing remains water filled. If the pump tubing is not completely filled to the sampling point, use one of the following procedures to collect samples: (1) add clamp, connector (Teflon or stainless steel) or valve to constrict sampling end of tubing; (2) insert small diameter Teflon tubing into water filled portion of pump tubing allowing the end to protrude beyond the end of the pump tubing, collect sample from small diameter tubing; (3) collect non-VOC samples first, then increase flow rate slightly until the water completely fills the tubing, collect sample and record new drawdown, flow rate and new indicator field parameter values.

Add preservative, as required by analytical methods, to samples immediately after they are collected if the sample containers are not pre-preserved. Check analytical methods (e.g. EPA SW-846, water supply, etc.) for additional information on preservation. Check pH for all samples requiring pH adjustment to assure proper pH value. For VOC samples, this will require that a test sample be collected during purging to determine the amount of preservative that needs to be added to the sample containers prior to sampling.

If determination of filtered metal concentrations is a sampling objective, collect filtered water samples using the same low flow procedures. The use of an in-line filter is required, and the filter size (0.45 um is commonly used) should be based on the sampling objective. Pre-rinse the filter with approximately 25 - 50 ml of ground water prior to sample collection. Preserve filtered water sample immediately. Note: filtered water samples are not an acceptable substitute for unfiltered samples when the monitoring objective is to obtain chemical concentrations of total mobile contaminants in ground water for human health risk calculations.

Label each sample as collected. Samples requiring cooling (volatile organics, cyanide, etc.) will be placed into a cooler with ice or refrigerant for delivery to the laboratory. Metal samples after acidification to a pH less than 2 do not need to be cooled.

6. Post Sampling Activities

If recording pressure transducer is used, remeasure water level with tape.

After collection of the samples, the pump tubing may either be dedicated to the well for resampling (by hanging the tubing inside the well), decontaminated, or properly discarded.

Before securing the well, measure and record the well depth (to 0.1 ft.), if not measured the day before purging began. Note: measurement of total well depth is optional after the initial low stress sampling event. However, it is recommended if the well has a "silting" problem or if confirmation of well identity is needed.

Secure the well.

V. DECONTAMINATION

Decontaminate sampling equipment prior to use in the first well and following sampling of each subsequent well. Pumps will not be removed between purging and sampling operations. The pump and tubing (including support cable and electrical wires which are in contact with the well) will be decontaminated by one of the procedures listed below.

Procedure 1

The decontaminating solutions can be pumped from either buckets or short PVC casing sections through the pump or the pump can be disassembled and flushed with the decontaminating solutions. It is recommended that detergent and isopropyl alcohol be used sparingly in the decontamination process and water flushing steps be extended to ensure that any sediment trapped in the pump is removed. The pump exterior and electrical wires must be rinsed with the decontaminating solutions, as well. The procedure is as follows:

Flush the equipment/pump with potable water.

Flush with non-phosphate detergent solution. If the solution is recycled, the solution must be changed periodically.

Flush with potable or distilled/deionized water to remove all of the detergent solution. If the water is recycled, the water must be changed periodically.

Flush with isopropyl alcohol (pesticide grade). If equipment blank data from the previous sampling event show that the level of contaminants is insignificant, then this step may be skipped.

Flush with distilled/deionized water. The final water rinse must not be recycled.

Procedure 2

Steam clean the outside of the submersible pump.

Pump hot potable water from the steam cleaner through the inside of the pump. This can be accomplished by placing the pump inside a three or four inch diameter PVC pipe with end cap. Hot water from the steam cleaner jet will be directed inside the PVC pipe and the pump exterior will be cleaned. The hot water from the steam cleaner will then be pumped from the PVC pipe through the pump and collected into another container. Note: additives or solutions should not be added to the steam cleaner.

Pump non-phosphate detergent solution through the inside of the pump. If the solution is recycled, the solution must be changed periodically.

Pump potable water through the inside of the pump to remove all of the detergent solution. If the solution is recycled, the solution must be changed periodically.

Pump distilled/deionized water through the pump. The final water rinse must not be recycled.

VI. FIELD QUALITY CONTROL

Quality control samples are required to verify that the sample collection and handling process has not compromised the quality of the ground water samples. All field quality control samples must be prepared the same as regular investigation samples with regard to sample volume, containers, and preservation. The following quality control samples shall be collected for each batch of samples (a batch may not exceed 20 samples). Trip blanks are required for the VOC samples at a frequency of one set per VOC sample cooler.

Field duplicate.

Matrix spike.

Matrix spike duplicate.

Equipment blank.

Trip blank (VOCs).

Temperature blank (one per sample cooler).

Equipment blank shall include the pump and the pump's tubing. If tubing is dedicated to the well, the equipment blank will only include the pump in subsequent sampling rounds.

Collect samples in order from wells with lowest contaminant concentration to highest concentration. Collect equipment blanks after sampling from contaminated wells and not after background wells.

Field duplicates are collected to determine precision of sampling procedure. For this procedure, collect duplicate for each analyte group in consecutive order (VOC original, VOC duplicate, SVOC original, SVOC duplicate, etc.).

If split samples are to be collected, collect split for each analyte group in consecutive order (VOC original, VOC split, etc.). Split sample should be as identical as possible to original sample.

All monitoring instrumentation shall be operated in accordance with EPA analytical methods and manufacturer's operating instructions. EPA analytical methods are listed in 40 CFR 136, 40 CFR 141, and SW-846 with exception of Eh, for which the manufacturer's instructions are to be followed. Instruments shall be calibrated at the beginning of each day. If a measurement falls outside the calibration range, the instrument should be re-calibrated so that all measurements fall within the calibration range. At the end of each day, check calibration to verify that instruments remained in calibration. Temperature measuring equipment, thermometers and thermistors, need not be calibrated to the above frequency. They should be checked for accuracy prior to field use according to EPA Methods and the manufacturer's instructions.

VII. FIELD LOGBOOK

A field log shall be kept to document all ground water field monitoring activities (see attached example matrix), and record all of the following:

Well identification.

Well depth, and measurement technique.

Static water level depth, date, time and measurement technique.

Presence and thickness of immiscible liquid (NAPL) layers and detection method.

Pumping rate, drawdown, indicator parameters values, and clock time, at the appropriate time intervals; calculated or measured total volume pumped.

Well sampling sequence and time of each sample collection.

Types of sample bottles used and sample identification numbers.

Preservatives used.

Parameters requested for analysis.

Field observations during sampling event.

Name of sample collector(s).

Weather conditions.

QA/QC data for field instruments.

Any problems encountered should be highlighted.

Description of all sampling equipment used, including trade names, model number, diameters, material composition, etc.

VIII. DATA REPORT

Data reports are to include laboratory analytical results, QA/QC information, and whatever field logbook information is needed to allow for a full evaluation of data useability.

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Well PURGING-FIELD WATER QUALITY MEASUREMENTS FORM

Location (Site/Facility Name) ______________________
Well Number ____________ Date ______________________
Field Personnel ______________________
Sampling Organization ______________________
Identify MP ______________________

Depth to (below MP) ______ / ______ (top / bottom) of screen
Pump Intake at (ft. below MP) ______________
Purging Device; (pump type) ______________

Clock Time 24 HR	Water Depth below MP ft	Pump Dial[1]	Purge Rate ml/min	Cum. Volume Purged liters	Temp. °C	Spec. Cond.[2] µS/cm	pH	ORP/ Eh[3] mv	DO mg/L	Turb-idity NTU	Comments

1. Pump dial setting (for example: hertz, cycles/min, etc).
2. µSiemens per cm(same as µmhos/cm)at 25 °C.
3. Oxidation reduction potential (stand in for Eh).

APPENDIX B

QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) PLAN

REMEDIAL INVESTIGATION/ALTERNATIVES ANALYSIS
FORMER ELECTRUK BATTERY SITE
(NYSDEC Site No. E932132)
4922 IDA PARK DRIVE, TOWN OF LOCKPORT
NIAGARA COUNTY, NEW YORK

FINAL QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) PLAN

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2007.0262.00 APRIL 2008

RI/AA OF FORMER ELECTRUK BATTERY SITE
(NYSDEC Site No. E932132)
4922 IDA PARK DRIVE, TOWN OF LOCKPORT
NIAGARA COUNTY, NEW YORK

FINAL QUALITY ASSURANCE/QUALITY CONTROL PLAN

TABLE OF CONTENTS

ATTACHMENTS

1.0 INTRODUCTION

This Quality Assurance/Quality Control (QA/QC) Plan addresses the major QA/QC programs and procedures to be implemented during the RI/AA of the Former Electruk Battery Site to ensure the quality and ultimate validity of the data generated as a result of the site investigation activities identified in the Work Plan and detailed in the Field Sampling Plan (FSP). The Work Plan contains a description of the project site, its history of use and occupancy, and a preliminary evaluation of potential areas of environmental concern, while the FSP provides a detailed description of the methods and equipment to be employed to collect and analyze environmental samples. The purpose of this QA/QC Plan is to establish the policies, organization, objectives, functional activities, and specific QA/QC activities required to ensure the quality of the field and laboratory data generated in association with the investigation of the project site.

2.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

The organization of the project team and general responsibilities of each of its members are outlined in Section 6.0 of the Work Plan and illustrated in the organization chart presented therein. The following paragraphs detail the specific responsibilities relative to quality assurance of key members of the project team.

TVGA Project Manager

Responsible for project implementation and the commitment of the resources necessary to meet project objectives and requirements. The Project Manager's primary function is to ensure that technical, financial and scheduling objectives are achieved. The Project Manager will serve as the primary point of contact and control for matters concerning the project. Specific duties and functions of the Project Manger include, but are not limited to, the following:

- Define project objectives, including Data Quality Objectives (DQOs), and develop and implement a detailed work plan and 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 ensure performance within budget and schedule constraints;
- Inform all staff concerning the project's special considerations;
- 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 ensure its quality, responsiveness and timeliness;
- Review and analyze overall task performance with respect to planned requirements and authorizations;
- Oversee field and laboratory QA/QC programs to ensure compliance with the QA/QC Plan;

- Review results of performance and system audits and initiate, implement and document corrective actions;
- Approve all external reports (deliverables) before their submission to the client and/or regulatory agencies;
- Ultimately responsible for the preparation and quality of interim and final reports; and
- Represent the project team at meetings.

TVGA QA Officer

The QA Officer will remain independent of direct job involvement and routine, daily operations and will have direct access to corporate management as necessary to resolve any QA disputes. The QA Officer will be responsible for implementing the QA program in conformance with the demands of specific investigations, TVGA policies, and client requirements. Specific functions and duties include:

- Review and approval of QA policies and procedures;
- Conducting QA program training sessions for technical staff;
- Verification of compliance with corporate and project specific QA procedures and requirements;
- Conducting or supervising field and office audits and documenting results;
- Notifying the Project Manager of QA problems;
- Assist in corrective action selection and implementation;
- Documentation of corrective actions; and
- Review of external reports (project deliverables).

TVGA Remedial Investigation Team Leader

The RI Team Leader will be responsible for the implementation of the site characterization program, including the coordination and direct supervision of field personnel and subcontractors. Specific responsibilities include:

- Oversight of field operations;
- Provide on-site technical support to field personnel;
- Supervise proper implementation of procedures specified in the Field Sampling Plan;
- Ensure adherence to all field QA/QC protocols (e.g., sample collection, labeling, handling, packaging, and shipment; calibration of field instruments, field documentation, etc.);
- Recognize the need for, and implement necessary corrective actions during field operations;
- Ensure health and safety guidelines are followed to avoid compromising sample integrity;
- Validate field data on an ongoing basis;
- Serve as technical liaison with analytical laboratory; and
- Communicate QA problems to Project Manager and QA Officer and implement corrective actions as directed.

Laboratory Quality Assurance Manager

The selected analytical laboratory will provide a Laboratory QA Officer, whom is responsible for ensuring that all of the specific requirements of the quality assurance program are followed on a daily basis. Additional responsibilities are as follows:

- Develop and implement QA plan;
- Update the QA Plan on a regular basis (annually), or as often as necessary to ensure the generation of data which meets client requirements;
- Oversee the daily functions of the QA program to verify that all elements of the program are followed;
- Perform regular audits, both scheduled and unscheduled;
- Document variations from the QA program and notify the Laboratory Director and laboratory administration of variations and corrective actions taken;
- Develop, implement and oversee in-house QC program for alternate source reference standards;
- Evaluate data from in-house QC program and make recommendations to laboratory management for corrective actions;
- Prepare QC reports for specialty projects;
- Be knowledgeable of developments in industry standards and apply new procedures in QA/QC to the laboratory program;
- Audit subcontract laboratories and prepare reports to document compliance with equivalent QA/QC programs and standards; and
- Prepare and submit reports to the laboratory administration on the ongoing status of the laboratory QA/QC programs.

Data Validator

A qualified data validator will review and assess of the analytical data generated by the laboratory to determine the acceptability or validity of the data relative to stated project goals and requirements for usability. The data validator will be responsible for reviewing the data package with respect to completeness and compliance, and will complete a detailed evaluation of the validity of the data, the results of which are to be reported to the TVGA Project Manager and QA Officer.

3.0 QA OBJECTIVES FOR MEASUREMENT DATA

3.1 Data Quality Objectives

Data Quality Objectives (DQOs) are qualitative or quantitative statements that specify the quality of the data required from a data collection program to support the intended use of the data and associated decisions. Pursuant to the United States Environmental Protection Agency (USEPA) publication, *Data Quality Objectives Process for Hazardous*

Waste Site Investigations (2000), the project DQOs will be achieved utilizing the definitive data category. The analyses of samples will provide definitive data generated using rigorous analytical methods, such as reference methods approved by the NYSDEC and USEPA. A summary of the analytical methods to be utilized is presented in the FSP.

The site-specific DQOs for data collected during the site investigation are as follows:

- To characterize the site and determine the nature and extent of contamination occurring on or in soil, groundwater, and surface water;
- To evaluate the potential risks to human health and the environment associated with current site conditions and potential future use scenarios;
- To identify, evaluate and select a long-term remedial action that is environmentally sound and cost-effective;
- To maintain the highest possible scientific/professional standards for each procedure; and,
- To assure the ultimate defensibility of the data generated.

3.2 Standard Criteria and Guidance Values

Data generated during the site investigation will be compared with the applicable Standard Criteria and Guidance Values (SCGs) that are protective of human health and the environment under current and future use scenarios. A preliminary listing of potentially relevant SCGs is provided below:

- Soil and Sump Shipment: 6NYCRR Part 375-6.8 Soil Cleanup Objectives.
- Surface Water, and Groundwater: NYSDEC *Technical and Operational Guidance Series* (TOGS) 1.1.1
- Air: Guidance for Evaluations Soil Vapor Intrusion in the State of New York, October 2006, New York State Department of Health

3.3 Data Quality Assessment

The USEPA specifies five major characteristics of data quality that must be addressed in environmental sampling and analytical projects. These include precision, accuracy, representativeness, comparability, and completeness. Specific QA objectives established for each of these parameters are identified and discussed below for chemical analytical data to be generated for the project.

Precision

A measurement of agreement among individual measurements of the same property under similar conditions. It is expressed in terms of relative percent difference (RPD) between replicates or in terms of the standard deviation. Precision may be affected by the natural variation of the matrix or contamination within that matrix, as well as by errors made in the field and/or laboratory handling procedures. Precision is evaluated using analyses of laboratory matrix spike/matrix spike duplicates and matrix duplicates, which not only exhibit sampling and analytical precision, but indicate precision through the reproducibility of the analytical results. The QA objective for precision is to comply with the RPD criteria specified for the New York State Department of Environmental Conservation (NYSDEC) Analytical Service Protocol (ASP) or USEPA methods to be employed for this project.

Accuracy

The degree of agreement of a measurement (or measurement average) with an accepted reference or true value. It is a measure of system bias, and is usually expressed as the difference of measured verses true values or as a percentage of the difference. Sources of error include the sampling process, field contamination, preservation, handling, sample matrix, sample preparation, and analytical techniques. Accuracy will be determined on the basis of blank sample analysis (e.g., equipment blanks, trip blanks, etc.) and surrogate recoveries from spiked samples. The QA objective for accuracy is to achieve the acceptable percent recovery criteria specified for the methods identified in the FSP.

Representativeness

Expresses the degree of accuracy and precision of data that represents a characteristic of a data population, process condition, a sampling point, or an environmental condition. It is a qualitative parameter that is most dependant on the proper design of the sampling program. Objectives for representativeness are defined for sampling and analysis tasks and are a function of the investigative objectives. The sampling procedures described in the FSP have been selected with the goal of obtaining representative samples for the media of concern.

Completeness

A measure of the amount of valid data obtained compared to the amount expected to be collected under normal conditions. It is usually expressed as a percentage. The QA objective for completeness is to collect and analyze all environmental samples in a manner such that valid data is obtained from 95 percent of the samples. Achievement of this objective will rely on the use of strict sample identification and custody procedures, use of standard reference materials, proper instrument calibration and maintenance, analysis of quality control samples, performance audits, and corrective action anytime QC acceptance criteria are exceeded.

Comparability

Expresses the confidence with which one data set can be compared to another. The objective for comparability is the generation of site characterization data that can be used to make valid comparisons with other data that may be generated in the future at this or other sites. This objective also involves the analysis of the environmental samples collected during the investigation in a manner that produces results comparable to the results that would be obtained by another laboratory using the same analytical procedure. This goal will be achieved through the application of standard techniques for sample collection and analysis, and the reporting of data in appropriate units. Complete field documentation using standardized data collection forms will support the assessment of comparability.

4.0 SAMPLING PROCEDURES

A detailed discussion of sampling activities for the project site is found in the FSP (Appendix A). The following considerations form the basis for the sampling program developed for the project site:

- Site background and history;
- Sampling objectives;
- Sample location and frequency;
- Sample designation;
- Sampling equipment and procedures; and
- Sample handling and analysis.

The sampling objectives, locations and frequency are based upon an evaluation of the data quality objectives discussed in Section 3.1. Sampling procedures are derived from standard protocols that are consistent with USEPA and NYSDEC methods of sample collection. A summary of the analytical parameters, number of samples, sample preservation, and holding times for the project is shown in the FSP.

5.0 SAMPLE CUSTODY

Sample custody is a vital aspect of the remedial investigation program. The samples must be traceable by chain-of-custody procedures from the time of sample collection until the time the data are utilized for any major decision. Evidence of sample collection, shipment, and laboratory receipt must be documented to accomplish this. Specific procedures regarding sample custody are described in Section 10.0 of the FSP.

6.0 CALIBRATION PROCEDURES

6.1 Field Instruments

Field instruments will be utilized for the real-time measurement of the chemical and/or physical characteristics of ambient air, groundwater, soil and fill. The instruments will also be utilized for health and safety monitoring during the field sampling program. The field instruments to be used will include the following:

- A photoionization detector (PID) – for measuring total organic vapors (TOVs), and to measure samples for tracer gas used before and after soil vapor collection
- A water level meter – for measuring depths in monitoring wells
- An oil/water interface probe – to determine levels of oil product in monitoring wells
- A water quality meter - capable of measuring pH, temperature, conductivity, turbidity and salinity
- A transducer and datalogger – for determining pressure differences in monitoring wells related to changes induced in the water column
- A MIE DR2000 Particulate Air Monitor – for measuring fugitive dust emissions during intrusive site investigation activities

The procedures to be utilized to calibrate and maintain these instruments shall be in accordance with Section 11.0 of the FSP and/or the manufacturer's recommendations.

6.2 Laboratory Instruments

Calibration procedures, frequencies and standards for laboratory measurement variables and systems shall be in accordance with the applicable NYSDEC ASP methodologies. These procedures are part of the system audits outlined in the laboratory Quality Assurance Plan.

7.0 ANALYTICAL PROCEDURES

The FSP summarizes the laboratory methods to be employed for the chemical analysis of soil, fill, sediment, soil vapor, surface water and groundwater samples generated during the site investigation. These analyses will be performed by a NYSDEC ELAP CLP accredited laboratory utilizing the applicable protocols and QA procedures required for the respective NYSDEC ASP and USEPA methods.

8.0 DATA REDUCTION, VALIDATION AND REPORTING

The following procedures summarize the practices to be utilized for the reduction, validation, and reporting of both field and laboratory data.

8.1 Field and Technical Data

Both objective (measurement) and subjective (description) data are subject to data validation. All data collection in the field shall be documented following the procedures detailed in Section 3.0 of the FSP. Objective data shall be validated at the time of collection (for example, triplicate measurements) as well as by the RI Team Leader to ensure that the correct codes and units have been included.

After data reduction into tabular or figure form, the objective data shall be reviewed for anomalous or inconsistent values by the RI Team Leader. Any anomalous or inconsistent data shall be resolved or clarified by evaluating the raw field data, equipment calibration logs, etc., and consultation with field personnel.

Subjective field and technical data shall be evaluated by the RI Team Leader for reasonableness and completeness. Whenever possible, peer review shall also be utilized in the data validation process in order to maximize consistency in data evaluation. Periodic field reviews of subjective data collection shall be conducted.

Data reduction, validation and reporting of engineering analysis and calculation data shall follow the procedures documented in TVGA's Standard Operating Procedure (SOP) for Engineering Analysis and Calculation Validation Procedures (Attachment A).

All validated field and technical data shall be reported in draft and final RI reports for review and comment.

8.2 Laboratory Data

The soil and aqueous samples collected during the RI/AA program will be analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides and polychlorinated biphenyls (PCBs) appearing on the Target Compound List (TCL) using NYSDEC ASP methods. The samples will also be analyzed for pH and the metals appearing on the RCRA-8 list using ASP methods. NYSDEC ASP Category B deliverable requirements will be employed for the documentation and reporting of the analytical results. The standard NYSDEC report forms will be completed by the analytical laboratory and included in the deliverable data packages. Data will also be reported in computer disk deliverable formats as specified in NYSDEC ASP. The soil vapor samples collected during the RI/AA program will be analyzed VOCs in accordance with the NYSDOH guidance for evaluating soil vapor intrusion in the state of New York, October 2006 gasoline list, and EPA TO-15 deliverable requirements. Specific laboratory data reduction, review and reporting procedures are detailed in the laboratory Quality Assurance Plan, which can be made available upon request.

The validation of the laboratory data will be performed by a qualified data validator. Validation of 100 percent of the data will be performed in accordance with the NYSDEC Guidance for the Development of Data Usability Summary Reports. The data package will be reviewed for completeness and compliance relative to the criteria specified in the aforementioned NYSDEC document. The validation report will include a narrative summary discussing all quality issues and their impact on the reported results, and copies of laboratory case narratives.

9.0 INTERNAL QUALITY CONTROL

Internal QC checks are used to determine if analytical operations at the laboratory are in control, as well as the effect the sample matrix may have on the data being generated. Two types of internal checks are performed and are described as batch QC and matrix-specific QC procedures. The type and frequency of specific QC samples performed by the laboratory will be according to the specified analytical method and project specific requirements. Acceptable criteria and/or target ranges for these QC samples are presented within the procedures for the specific analytical methods used for the project samples.

QC results that vary from acceptable ranges shall result in the implementation of appropriate corrective measures, potential application of qualifiers, and/or an assessment of the impact these corrective measures have on the established data quality objectives. QC samples including any project-specific QC to be analyzed are discussed below.

9.1 Batch QC

Method Blanks

A method blank is defined as laboratory-distilled or deionized water that is carried through the entire analytical procedure. The method blank is used to determine the level of background contamination. Method blanks are analyzed at a frequency of one per analytical batch.

Matrix Spike Blank Samples

A matrix spike blank (MSB) sample is an aliquot of water that is spiked with all elements being analyzed for calculation of precision and accuracy to verify that the analysis that is being performed is in control. A MSB will be performed for each matrix parameter.

9.2 Matrix-Specific QC

Matrix Spike Samples

An aliquot of a matrix is spiked with known concentrations of specific compounds as stipulated by the methodology. The matrix spike (MS) and matrix spike duplicate (MSD) are subjected to the entire analytical procedure in order to assess both accuracy and precision of the method for the matrix by measuring the percent recovery and relative percent difference of the two spiked samples. The samples are used to assess matrix interference effects on the method, as well as to evaluate instrument performance. MS/MSDs are analyzed at a frequency of one each per 20 samples per matrix. MS/MSDs (and MS/MD for metals only) will be performed.

Matrix Duplicates

The matrix duplicate (MD) is two representative aliquots of the same sample which are prepared and analyzed identically. Collection of duplicate samples provides for the evaluation of precision both in the field and at the laboratory by comparing the analytical results of two samples taken from the same location. Obtaining duplicate samples from a soil matrix requires homogenization (except for volatile organic compounds) of the sample aliquot prior to filling sample containers in order to best achieve representative samples; however, due to interferences, lack of homogeneity, and the nature of the soil samples, the analytical results are not always reproducible. Duplicate samples are to be included at a frequency of one per 20 samples per matrix for metals only.

9.3 Additional QC

Rinseate (Equipment) Blanks

A rinseate or equipment blank is a sample of laboratory-demonstrated analyte-free water passed through and over the cleaned sampling equipment. An equipment blank is used to indicate potential contamination from ambient air and from sample instruments used to collect and transfer samples. This water must originate from one common source within the laboratory and must be the same water used by the laboratory performing the analysis. The equipment blank should be collected, transported, and analyzed in the same manner as the samples acquired that day. Equipment blanks for non-aqueous matrices should be performed at a rate of one per set of sampling equipment.

Trip Blanks

Trip blanks are not required for non-aqueous matrices, but are necessary for aqueous sampling events. They consist of a set of sample bottles filled at the laboratory with laboratory demonstrated analyte-free water. These samples then accompany the bottles that are prepared at the lab into the field and back to the laboratory, along with collected samples for analysis. These bottles are never opened in the field, and must be returned to the lab with the same set of bottles they accompanies into the field. Trip blanks will be analyzed for volatile organic compounds (VOCs) only at a frequency of one per VOC sample shipment.

Blind Field Duplicates

A blind field duplicate (BFD) is a duplicate sample collected from a given sampling location, the identity of which is documented by the sampling team but is not revealed to the laboratory. The BFD is subjected to the same analytical methods as the field sample of the same matrix collected from the same location. The data resulting from the analysis of the BFD are compared with those associated with the field sample from the same location to assess the data precision and to verify the reproducibility of the laboratory results. BFD samples are to be collected at a frequency of one per 20 samples per matrix.

10.0 PERFORMANCE AND SYSTEM AUDITS

Audits shall be performed to ascertain whether the QA/QC Plan is being correctly implemented, and to review and evaluate the adequacy of field and laboratory performance, where applicable. Performance audits are a quantitative evaluation of the laboratory's measurement systems, and are conducted by introducing control samples into the data production process. System audits are on-site qualitative inspections and reviews of the components and implementation of the quality assurance program, including field, laboratory and office aspects of the program, to verify compliance with the QA/QC Plan.

10.1 Field Audits

At least one unannounced field audit will be conducted during the field investigation program. Follow-up audits shall be conducted should inconsistencies or problems be identified. The audit, to be performed by the QA Officer or designated TVGA personnel, will assess the effectiveness of the QA program, identify non-conformances, and verify that identified deficiencies are corrected. At a minimum, the field audit shall evaluate:

- Project responsibilities and staffing;
- Health and safety provisions (e.g., personal protective equipment, air monitoring, etc.);
- Sample collection, handling and custody procedures;
- Sample identification;
- QC samples;
- Sample packaging and shipping procedures;
- Equipment calibration and decontamination procedures; and
- Field documentation; and
- Corrective action procedures.

The results of the field audit will be the basis for any corrective actions deemed appropriate.

10.2 Laboratory Audits

Internal and external laboratory performance and system audits will be conducted by the laboratory. The laboratory QA Plan (available upon request) describes the laboratory's program for internal performance audits. In addition to conducting internal reviews and audits, as part of its established quality assurance program, the laboratory is required to participate in regularly scheduled evaluations and audits administered by state and federal agencies. These external audits are performed as part of the certification process and to monitor the laboratory performance. The audits also provide an external quality assurance check of the laboratory and provide reviews and information on the management systems, personnel, standard operating procedures, and analytical measurement systems. Acceptable performance on evaluation samples and audits is required for certification and accreditation. The laboratory shall use the information provided from these audits to monitor and assess the quality of its performance.

10.3 Office Audits

Office audits may also be performed on files containing relevant project documentation. Project files are evaluated against internal document control procedures. Office audits are performed by the QA Officer on a random percentage of projects. For this project, random field logbooks and project files will be audited by the project QA Officer and the results will be presented in the monthly progress report.

11.0 PREVENTATIVE MAINTENANCE

Preventative maintenance of equipment is essential if project resources are to be used cost-effectively. Preventative maintenance will consist of two forms: (1) a schedule of routine preventative maintenance activities to minimize down-time and ensure accuracy of the measurement systems; and (2) availability of critical spare parts and backup systems and equipment. The preventative maintenance approach for specific pieces of equipment used in sampling, monitoring, and documentation will follow manufacturer specifications and good field and laboratory practices. Performance of these maintenance procedures will be documented in the field notebooks.

Field instruments, in general, will be maintained in accordance with manufacturer's recommendations. Support equipment, including safety devices, vehicles, etc., are also periodically inspected to maintain performance standards necessary for all site activities. Responsibilities for instrument maintenance activities of laboratory equipment, and appropriate schedules, are discussed in the laboratory QA Plan (available upon request).

12.0 DATA ASSESSMENT PROCEDURES

12.1 Precision

Precision is evaluated using analyses of a field duplicate and/or laboratory MS/MSD which not only exhibits sampling and analytical precision, but also indicates analytical precision through the reproducibility of the analytical results. Relative Percent Difference (RPD) is used to evaluate precision, and is calculated as follows:

$$RPD = \frac{|x_1 - x_2|}{\left[(x_1 + x_2)/2\right]} \times 100$$

Where:

X_1 = Measured value of sample or matrix spike
X_2 = Measured value of duplicate or matrix spike duplicate

Precision will be determined through the use of MS/MSD (for organics) and ms/mp (for inorganics) analyses. RPD criteria for this project must meet the method requirements.

12.2 Accuracy

Accuracy is defined as the degree of difference between the measured or calculated value and the true value. The closer the numerical value of the measurement comes to the true value or actual concentration, the more accurate the measurement is. Analytical accuracy is expressed as the percent recovery of a compound or element that has been added to the environmental sample at known concentrations before analysis. Analytical accuracy may be assessed through the use of known and unknown QC samples and spiked samples. It is presented as percent recovery. Accuracy will be determined from matrix spike, matrix spike duplicate, and matrix spike blank samples, as well as from surrogate compounds added to the organic fractions (e.g., volatiles, semi-volatiles, PCBs), and is calculated as follows:

$$Accuracy(\%R) = \frac{(x_s - x_u)}{K} \times 100$$

Where: x_s = Measured value of the spiked sample;
x_u = Measured value of the unspiked sample; and
K = Known amount of spike in the sample.

Accuracies between 70 to 130 percent will be required for analytical results generated during this project.

12.3 Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system compared to the total amount expected to be obtained, and is calculated as follows:

$$Completeness(\%) = \frac{(x_v - x_n)}{N} \times 100$$

Where: x_v = Number of valid measurements;

x_n = Number of invalid measurements; and

N = Number of valid measurements expected to be obtained

The completeness goal for analytical results generated during the project is 95 percent.

13.0 CORRECTIVE ACTIONS

The Project Manager has the primary responsibility for initiating and implementing corrective action relative to field activities, while the analytical Laboratory Director is responsible for taking corrective action in the laboratory. It is their combined responsibility to see that all sampling and analytical procedures are followed as specified in applicable documents and that the data generated meet the prescribed acceptance criteria. Other project team members shall also be responsible for problem recognition and corrective actions within the context of their assigned tasks. Some potential incidents that would elicit corrective action, and the corresponding responses are outlined in the following subsections.

13.1 Field Incidents

During the field program, corrective action may be initiated by the Project Manager, RI Team Leader, Field Auditor, or the NYSDEC on-site representative. The need for corrective action may arise due to field audits or in the normal course of field operations. Typical corrective actions may include:

- Replacement of equipment, either in part or totally, due to malfunction;
- Recalibration of field instruments;
- Additional instruction of personnel in the proper procedures, whenever necessary;
- Discussion of any unique on-site problems in order to arrive at an appropriate solution;
- Correction of custody forms and field logs and notebooks when errors occur.

13.2 Laboratory Incidents

Laboratory corrective actions shall be implemented to resolve problems and restore proper function to the analytical system when errors, deficiencies, or out-of-control situations exist at the laboratory. Full documentation of the corrective action procedure needed to resolve the problem shall be filed in the project records, and the information summarized in the case narrative. The following subsections discuss potential laboratory corrective actions.

13.2.1 Incoming Samples

Problems noted during sample receipt shall be documented by the laboratory. The TVGA Project Manager shall be contacted immediately for problem resolution.

13.2.2 Sample Holding Times

If any sample extraction and/or analyses exceed method holding time requirements, the TVGA Project Manager shall be notified immediately for problem resolution.

13.2.3 Instrument Calibration

Sample analysis shall not be allowed until all initial calibrations meet the appropriate requirements. All laboratory instrumentation must be calibrated in accordance with the method requirements. If any initial/continuing calibration standards exceed QC limits, recalibration must be performed and, if necessary, reanalysis of all affected samples back to the previous acceptable calibration check.

13.2.4 Reporting Limits

The laboratory must meet the required detection limits for each analytical method. If difficulties arise in achieving these limits due to a particular sample matrix, the laboratory must notify the TVGA Project Manager for problem resolution. In order to achieve those detection limits, the laboratory must utilize all appropriate cleanup procedures in an attempt to retain the required detection limits. When any sample requires a secondary dilution due to high levels of target analytes, the laboratory must document all initial analyses and secondary dilution results. Secondary dilution will be permitted only to bring target analytes within the linear range of calibration. If samples are analyzed at a secondary dilution with no target analytes detected, the TVGA Project Manager will be immediately notified so that appropriate corrective actions can be initiated.

13.2.5 Method QC

All QC, including blanks, matrix duplicates, matrix spikes, matrix spike duplicates, surrogate recoveries, matrix spike blank samples, and other method-specified QC samples, shall meet the method requirements. Failure of method-required QC will result in the review and possible qualification of all affected data. If the laboratory cannot find any errors, the affected samples shall be reanalyzed and/or re-extracted/re-digested, then reanalyzed within method-required holding times to verify the presence or absence of matrix effects. If matrix effect is confirmed, the corresponding data shall be flagged accordingly using the flagging symbols and criteria. If matrix effect is not confirmed, then the entire batch of samples may have to be reanalyzed and/or re-extracted/re-digested, then reanalyzed. TVGA shall be notified as soon as possible to discuss possible corrective actions should unusually difficult sample matrices be encountered.

13.2.6 Calculation of Errors

All analytical results must be reviewed systematically for accuracy prior to submittal. If upon data review, calculation and/or reporting errors exist, the laboratory will be required to reissue the analytical data report with the corrective actions appropriately documented in the case narrative.

13.3 Documentation

Immediate corrective actions taken in the field will be documented in the field logbook and approved by the RI Team Leader or Project Manager. Corrective actions that result in deviations from the work plan or QA/QC Plan should be documented in a memo to the Project Manager or QA Officer, who will ensure that the appropriate changes are incorporated in the final report. Corrective actions initiated as a result of the field audit must be thoroughly documented by the RI Team Leader and submitted to the QA Officer and Project Manager. All documentation shall be maintained in the project file.

The laboratory maintains a rigorous corrective action documentation system that includes corrective action memos and database change forms that are permanently filed in the sample delivery group file for future reference. The Laboratory Director and Lab QA Officer are notified in writing of all corrective actions taken. Furthermore, the laboratory will notify the TVGA Project Manager of all corrective actions that may have an impact on the quality of the data. A more detailed discussion of laboratory corrective action documentation procedures is presented in the laboratory QA Plan.

14.0 QUALITY ASSURANCE REPORTS

Periodically during the performance of this investigation, field and laboratory personnel will be required to report the performance of all measurement systems to management. Field personnel will report to the TVGA Project Manager or QA Officer. Laboratory personnel reporting requirements are discussed in the laboratory QA Plan.

The frequency of reporting will be daily or weekly as appropriate during the period of time that measurements are being made in the field and/or laboratory. Reporting of measurement system performance will generally be verbal. However, if a problem requiring corrective action is encountered, a formal written report will be prepared.

The results of the field audit as well as any office audits conducted during the course of the project will be formally recorded by, or on behalf of, the TVGA QA Officer and will be reported to the TVGA, NYSDEC Project Managers. The audit reports will summarize the results of the audit and will specifically identify any problems identified as well as the corresponding corrective actions.

The results of performance and system audits conducted by the laboratory are compiled by the Lab QA Officer and formally reported to the Lab Director. If a QC problem arises in the laboratory, the Laboratory Director will immediately contact the TVGA Project Manager to discuss an appropriate corrective action. Whenever a laboratory QA/QC problem requiring corrective action arises, the Laboratory Director will prepare a formal written report to document the nature of the QA/QC problem and the corrective action(s) taken to resolve the problem. This report will be submitted as soon as possible to the TVGA Project Manager.

Serious analytical or sampling problems will be reported to the NYSDEC Project Managers. The time and type of corrective action, if warranted, will depend on the severity of the problem and relative overall importance of the project. Corrective actions may include altering procedures in the field or modifying laboratory protocol. The NYSDEC will be consulted by the TVGA Project Manager prior to the selection and implementation of corrective actions that represent significant modifications to the RI/AA Work Plan or supporting technical plans.

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ATTACHMENT A

SOP FOR ENGINEERING CALCULATIONS

STANDARD OPERATING PROCEDURE
ENGINEERING ANALYSIS AND CALCULATION VALIDATION PROCEDURE

All analysis and calculations activities shall be completely documented and the resulting documentation formally checked in accordance with the procedures detailed below:

General:

Calculations/drawings/logs/tables/etc. shall be performed on standard calculation paper whenever possible or applicable. All calculations/drawing pages shall be individually identified, with the exception of large computer output. Calculations/drawing paper will provide spaces for the originator's name and date of work, the checker's name and date, calculation subject, project number, and page number. All of this information shall be completed for each page. For extra pages, such as large graphs, this information shall also be included.

Calculations/drawing shall, as appropriate, include a statement of calculation intent, description of methodology used, assumptions and their justification, input data and equation references, numerical calculations including units, and results. Input data may include:

- Regulatory requirements
- Performance and operational requirements under various conditions
- Material, geological, environmental, and geotechnical requirements
- Results of field and laboratory testing or calculations
- Information obtained from external personnel or literature and site data surveys

Computer printout that becomes an integral part of the calculations shall be referenced in the calculations by run number or other unique means of identification.

Calculations:

Prior to any calculations, the following procedures will be followed:

A. Have experienced lead-person check design criteria for completeness and accuracy before design begins.

    1. Prepare checklists for various type projects to avoid omissions.

B. Require approval of basic design system before starting detailed calculations.

C. Set up standard design procedures and format for use as guide.

D. Establish format requirements for calculations.

    1. Must be neat and legible.

    2. List all design assumptions.

    3. List all formulae and define symbols.

    4. Group calculations for various portions of project.

Once all calculations have been completed, assignments for checking calculations will be made by the Project Manger. An individual with technical expertise in the calculation subject chosen will be chosen for checking purposes.

Drawings

The following procedures will be followed:

A. Require experienced lead-person to check basic system sketches and typical details for completeness and accuracy before placing on final drawings.

B. Require detailed check of all dimension and notes on drawings.

C. Require lead designer to check all schedules, design criteria, and typical details.

D. Require lead designer to review all drawings to verify that sections and details are labeled correctly.

E. Require lead designer to coordinate drawings with other disciplines' drawings for workability and conformity.

F. Require supervisor (principal, department head) to "review" all drawings for general check.

G. Prepare a form of standard "General Notes" as a guide to avoid omitting necessary criteria.

H. Once all drawings have been completed, the drawings will be checked by procedures similar to the calculations check.

Specifications

The following specification procedures will be followed:

A. Do not specify untried or untested materials without reasonable research.

B. Develop standard master guide specifications.

    1. Edit master copies for each particular project.

    2. Do not use specifications from similar or past projects.

C. Require lead designer to prepare technical sections for his/her portion of project.

Once specifications have been prepared, a complete technical review of the specifications will be completed prior to printing, using similar checking procedures.

APPENDIX C

HEALTH AND SAFETY PLAN (HASP)

REMEDIAL INVESTIGATION/ALTERNATIVES ANALYSIS
FORMER ELECTRUK BATTERY SITE
(NYSDEC Site No. E932132)
4922 IDA PARK DRIVE, TOWN OF LOCKPORT
NIAGARA COUNTY, NEW YORK

FINAL HEALTH AND SAFETY PLAN

Prepared for:

Town of Lockport
6560 Dysinger Road
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Prepared by:

TVGA CONSULTANTS

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2007.00262.00 APRIL 2008

DISCLAIMER

This Health and Safety Plan has been written for the exclusive use of TVGA and its employees. Properly trained and experienced TVGA subcontractors may also use it as a guideline document. However, TVGA does not guarantee the health and safety of any person entering the site.

Due to the potentially hazardous nature of the site and the activity occurring thereon, it is not possible to discover, evaluate, and provide protection for all possible hazards that may be encountered. Strict adherence to the health and safety guidelines set forth herein will reduce, but not eliminate, the potential for injury at the site. The health and safety guidelines in this plan were prepared specifically for this site and should not be used on any other site without prior research by trained health and safety specialists.

TVGA claims no responsibility for the use of this Plan by others. The Plan is written for the specific site conditions, purpose, dates, and personnel specified and must be amended if these conditions change.

RI/AA OF FORMER ELECTRUK BATTERY SITE
(NYSDEC Site No. E932132)
4922 IDA PARK DRIVE, TOWN OF LOCKPORT
NIAGARA COUNTY, NEW YORK

FINAL HEALTH AND SAFETY PLAN

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1.0 INTRODUCTION

TVGA Consultants, on behalf of the Town of Lockport and Niagara County, will provide engineering and environmental services associated with the Remedial Investigation/Alternatives Analysis (RI/AA) program to be implemented at the Former Electruk Battery Site located in the Town of Lockport, Niagara County, New York. The project site has a history of industrial/manufacturing use, having been utilized to manufacture lead acid batteries from 1990 to 1996. The sources of environmental concern at this site include the presence of surface soil, subsurface soil, surface water and/or groundwater contaminated lead and/or solvents and the potential for residual with lead contamination on building surfaces. These concerns arise from the site's historical use as well as a 1996 fire that caused significant damage to the on-site building.

This Health and Safety Plan (HASP) has been developed to govern all field investigation work at the Former Electruk Battery Site. This plan is intended to ensure that the procedures used during planned field investigation activities meet reasonable professional standards to protect human health and safety of workers and the surrounding community. This Plan incorporates, by reference, the applicable requirements of the Occupational Safety and Health Administration in 29 CFR Parts 1910 and 1926.

The requirements and guidelines in the HASP are based on a review of available site specific information and an evaluation of potential hazards. These requirements can and will be modified by Senior Level Management (SLM), the Project Team Leader (PTL), the Site Safety Officer (SSO) or the Work Party Personnel (WPP), if necessary.

All field personnel working on this project must familiarize themselves with this HASP and abide by its requirements. Since every potential health and safety hazard encountered at a site cannot be anticipated, it is imperative that personnel are equipped and trained to respond promptly to a variety of possible hazards. Adherence to this HASP will minimize the possibility that personnel at the site and the public will be injured or exposed to significant health hazards. Information on potential health, safety and environmental hazards is discussed in conjunction with appropriate protective measures including assignment of responsibility, personal protective equipment (PPE) requirements, work practices, and emergency response procedures.

In general, contractors and subcontractors are responsible for complying with the HASP, as well as all Federal, State and local regulations pertaining to their work. With TVGA's permission, a contractor should modify this HASP to address activities of their employees within the scope-of-work this Plan addresses. These changes to the HASP by the contractor must be approved by TVGA. TVGA personnel can and must stop work by a TVGA contractor who is not following the health and safety procedures required by this HASP. However, the contractor/subcontractor expressly retains all responsibility for the safety of their personnel while working on this site.

This HASP is specifically intended for those personnel who will be conducting activities within the defined scope of work in specified areas of the site. Specific tasks covered by this HASP may include, but are not limited to:

- Performing inspections to characterize environmental hazards;
- Conducting non-intrusive inspections and instrument surveys;
- Excavating earthen materials, fill, debris, etc.;
- Collecting soil samples from soil probes and test borings;
- Surface water/sediment sampling;
- Installation and sampling of groundwater monitoring wells;
- Installation and sampling of soil vapor probes; and
- Decontaminating personnel and equipment.

2.0 KEY PERSONNEL

2.1 Off-Site Personnel

Title: Principal
Description: Responsible for defining project objectives, allocating resources, determining the chain of command, and evaluating program outcome.
Contact: Robert R. Napieralski, TVGA, (716) 655-8842

Title: Project Manager
Description: Reports to upper level management, has authority to direct response operations, assumes total control over site activities.
Contact: Daniel E. Riker, TVGA, (716) 655-8842

2.2 On-Site Personnel

Title: Site Safety Officer
Description: Advises the field team on all aspects of health and safety issues, recommends stopping work if any operation threatens worker or public health and safety.
Contact: James C. Manzella, TVGA (716) 655-8842

Title: Project Team Leader
Description: Responsible for field team operations.
Contact: James C. Manzella, TVGA (716) 655-8842

Title: Work Party Personnel
Description: Performs field operations
Contact: TVGA personnel, Town of Lockport personnel, and subcontractor personnel.

2.3 Personnel Responsibilities

The primary safety personnel include the Project Team Leader (PTL), the Site Safety Officer (SSO) and the Work Party Personnel (WPP). For this project, the PTL and the SSO will be the same individual. Additionally, Senior Level Management (SLM) has the responsibility to ensure all project personnel are aware of the requirements of the HASP. The SLM may also recommend policy changes on safety matters including work practices, training and response actions and will provide the necessary resources to conduct the project safely. The PTL is responsible for the implementation of the HASP. The PTL is also responsible for conducting the initial on-site training.

The SSO is responsible for the day-to-day implementation of the HASP. The SSO will assist the PTL in providing initial training for all project personnel and for providing additional training in the form of safety meeting to discuss changed site conditions or upgrade training on an as needed basis. The SSO is also responsible for daily calibration of real-time air monitoring equipment and will ensure that all personnel assigned to operate the instrumentation are properly trained in its use and maintenance.

The SSO has the following specific responsibilities:

- Assuring that a complete copy of this HASP is at the site prior the start of field activities and that all workers are familiar with the document;
- Conducting training and briefing sessions if appropriate, prior to the start of field activities at the site and repeat sessions as necessary;
- Ensuring the availability, use, and proper maintenance of specified personal protective, decontamination, and other health and safety equipment;
- Maintaining a high level of safety awareness among team members and communicating pertinent matters to them promptly;
- Assuring that all field activities are performed in a manner consistent with Company policy and the HASP;
- Monitoring for dangerous conditions during field activities;
- Assuring proper decontamination of personnel and equipment;
- Preparing all health and safety documentation;
- Coordinating with emergency response personnel and medical support facilities, and representatives of the NYSDEC;
- Initiating immediate corrective actions in the event of an emergency or unsafe condition;
- Notifying the SLM and PTL promptly of an emergency, unsafe condition, problem encountered, or significant exceptions to the requirements in this HASP;
- Recommending improved health and safety measures to the SLM, or the PTL.

The SSO has the authority to:

- Suspend field activities or otherwise limit exposures if the health and safety of any persons appears to be endangered;
- Direct Company or contractor personnel to alter work practices that are deemed not properly protective of human health of the environment; and
- Suspend an individual from field activities for significant infraction of the requirements in this HASP.

The WPP is responsible for providing air monitoring during intrusive activities at the site. The WPP is directly responsible to the SSO and will assist the SSO in the day-to-day implementation of the HASP.

Site personnel are responsible for following the requirements of the HASP. They should become thoroughly familiar with the requirements of exposures that may adversely affect the health and safety of on-site personnel, off-site population, or the environment.

3.0 SITE ENTRY

3.1 Objectives

The objectives of the site entry will initially focus on determining the nature and extent of contamination associated with environmental media. The investigation of subsurface conditions will be completed through the excavation of test pits; hollow-stem auger drilling and spilt-spoon sampling; and groundwater monitoring well installation, development, and sampling. The investigation of surface conditions will be completed by collecting surface soil samples from suspect areas, and field screening of soils and fill with a photoionization detector (PID).

3.2 Safety Meetings

To ensure that the HASP is being followed, the Project Team Leader (PTL) shall conduct a safety meeting prior to initiating any site activity.

3.3 Safety Training

The SSO will confirm that every person assigned to a task has had adequate training for that task and that the training is up-to-date by checking with the TVGA Human Resources Office. TVGA and subcontractor personnel working on the site shall have a minimum of at least 24 hours of classroom-style health and safety training and 3 days of on-site training, as required by OSHA 29 CFR 1910.120. All training will have been conducted and certified in accordance with OSHA regulations outlined in 29 CFR 1910.120.

3.4 Medical Surveillance

All TVGA and subcontractor personnel working on this investigatory project will have had a medical surveillance physical consistent with OSHA regulations in 29 CFR 1910.120, and performed by a qualified occupational health physician. The SSO shall confirm prior to initiation of work on this site that every person assigned to a task has had an annual physical, has passed the medical examination, and has been determined medically fit by the occupational health physician for this type of work.

3.5 Site Mapping

A map of the site showing all areas to be accessed during the environmental investigation is depicted on Figure 4 of the Work Plan. A map showing the route from the site to the nearest hospital has been included as Figure 1.

3.6 Meteorological Data

Fieldwork is expected to be completed March through June 2008. Average temperatures for these months are expected to reach highs of approximately 70°F and lows of 15°F. Precipitation for these months is likely to be in the form of rain and or snow. Prior to each day's activities, the daily forecast should be monitored for indications of adverse work conditions.

4.0 HAZARD EVALUATION

4.1 Physical Hazards

Physical hazards such as the following may be encountered on site:

- Slippery surfaces - trip/fall
- Electrical - shock, fire
- Mechanical/Large Equipment - cuts, amputation, trauma
- Uneven Terrain/Excavations/Soil piles/Sink Holes - trip/fall

The planned test pit and drilling investigations also presents hazards specific to working with heavy equipment. Personnel working on or around the drill rig trucks, or backhoes should be aware of the precautions listed below. The practices are meant to be guidelines, and are not all-inclusive of the safety measures necessary while performing intrusive activities.

Utility Clearance

Personnel involved in intrusive work shall determine the minimum distance from marked utilities which work can be conducted with the assistance of the locator line service.

- Elevated superstructures (e.g., drill rig, backhoe, etc) shall remain a distance of 10 feet away from utility lines and 20 feet away from power lines.

- During all intrusive activities (e.g., drilling, excavating, probing), the locator line service should be contacted to mark underground lines before any work is started.

Drilling Safety

TVGA personnel working in the vicinity of drilling or direct-push soil probing rigs shall adhere to the following practices:

- The drilling site should be inspected before the start of work to identify unsafe conditions or operations that the subcontractor may not be aware of.
- TVGA personnel monitoring the drilling activity and inspecting the environmental samples will attend the contractor's daily safety briefing.
- Before the mast is raised, check for overhead obstructions.
- Remind drill rig personnel of their responsibility to safely fill or cover any open borehole or excavation left unattended for any period of time.
- Personnel shall wear steel-toed shoes, safety glasses, hearing protection and hard hats during drilling operations.
- The area shall be roped off, marked or posted, to keep the area clear of pedestrian traffic or spectators.
- All personnel should be instructed in the use of the emergency kill switch on the drill rig.

Heavy Equipment Operations

Working around heavy equipment can be dangerous because of the size and power of the equipment, the limited field of vision of the operator and the noise levels that can be produced by the equipment. Heavy equipment to be utilized at the site may include drill rigs, trucks and backhoes.

To ensure the safety of TVGA personnel in the work area, the following safety procedures regarding heavy equipment must be reviewed prior to and followed during work activities:

- Personnel should never approach a piece of heavy equipment without the operators' acknowledgment and stoppage of work or yielding to the employee.
- Never walk under the load of a bucket or stand beside an opening truck bed.
- Maintain visual contact with the operator when in close proximity to the heavy equipment.
- Wear hearing protection while on or around heavy equipment, when normal conversation cannot be heard above work operations.

Steel-toed shoes, safety glasses, and a hard hat shall be worn for all work conducted near heavy equipment.

4.2 Chemical Hazards

Known and suspected sources of contamination include potential past spills and releases of chemicals and wastes used, generated and/or stored on-site; and past discharges and spills of untreated process wastewater. Potential chemical hazards, which could be encountered during the site investigation, include, but are not limited to:

- Solvents
- Acids
- Metals
- Residual lead contamination on building surfaces
- Lead contaminated soil, sediment, groundwater and surface water

4.3 Exposure Limits

Recommended Exposure Limits (RELs), and OSHA Permissible Exposure Limits (PELs) for several of the above chemical hazards are listed below. A complete list of the compounds detected on-site will be available upon completion of sampling and laboratory analysis. The RELs and PELs for the compounds listed below can be found in the NIOSH Guide to Chemical Hazards.

CHEMICAL	REL [1]	PEL [2]
Lead	0.05 mg/m^3	0.05 mg/m^3
Sulfuric Acid	1 mg/m^3	1 mg/m^3
Cadmium	CA	0.005 mg/m^3
Nickel (Ca)	0.015 mg/m^3	1.0 mg/m^3
Silver	0.01 mg/m^3	0.01 mg/m^3
Arsenic (Ca)	0.002 mg/m^3 (15 minutes)	0.01 mg/m^3
Chromium	0.5 mg/m^3	1.0 mg/m^3
Selenium	0.2 mg/m^3	0.2 mg/m^3
Mercury	0.05 mg/m^3	0.1 mg/m^3
Trichloroethylene (Ca)	CA	100 ppm
Tetrachloroethylene (Ca)	CA	100 ppm
Stoddard solvent	350 mg/m^3	500 ppm

1 REL = NIOSH recommended exposure limits, up to 10 hour work day exposure limit, 40 hours/week. REL in mg/m^3 = (REL in ppm x molecular weight) / 24.45.

2 PEL = OSHA permissible exposure limit, 8 hour exposure limit, 40 hours/week, OSHA 29 CFR 1910.1000.
REL in mg/m^3 = (REL in ppm x molecular weight) / 24.45.
OSHA = Occupational Safety and Health Agency
NIOSH = National Institute for Occupational Safety and Health
N.A. = no applicable value available
CA = NIOSH recommends the substance be treated as a potential human carcinogen

4.4 Dispersion Pathways

Potential exposure mechanisms that can transport particulate and organic compounds from the areas of investigation to other areas of the site as well as beyond the boundaries of the site are:

- Volatilization and wind transport
- Surface water runoff from contaminated areas
- Groundwater flowing beneath the site

4.5 Potential IDLH and Other Dangerous Conditions

The Immediately Dangerous to Life and Health (IDLH) levels for chemicals potentially on-site and their IDLH level are listed below.

CHEMICAL	IDLH Level
Lead	100 mg/m^3
Sulfuric Acid	15 mg/m^3
Cadmium	9 mg/m^3
Nickel (Ca)	10 mg/m^3
Silver	10 mg/m^3
Arsenic (Ca)	50mg/m^3
Chromium	250 mg/m^3
Selenium	1 mg/m^3
Mercury	10 mg/m^3
Trichloroethylene (Ca)	1000 ppm
Tetrachloroethylene	150 ppm
Stoddard solvent	20,000 mg/m^3

CA = NIOSH recommends the substance be treated as a potential human carcinogen

The IDLH level is defined only for the purpose of respirator selection. The IDLH level represents a maximum concentration from which, in the event of respirator failure, one could escape within 30 minutes without experiencing any escape-impairing or irreversible health effects.

Visible indicators of potential IDLH conditions as well as other dangerous conditions are listed below.

- Confined spaces
- Unstable overhead structures
- Unusually colored solid or liquid wastes
- Containers or accumulation structures (e.g., drums, pits, sumps, etc.), the contents of which are unknown
- Potentially explosive or flammable situations indicated by bulging drums, gas generation, effervescence, or instrument readings
- Extremely hazardous materials such as cyanide, phosgene
- Visible vapor clouds
- Biological indicators such as dead animals, stressed vegetation

5.0 MONITORING AND ACTION LEVELS

5.1 Air Monitoring

The following environmental monitoring instruments and methods shall be used on site during the RI/AA program at the specified intervals. Due to the limited potential for dust generation during the RI/AA activities, dust will not be monitored during the RI/AA.

Photoionization Detector (PID)

A PID shall be used continuously at the downwind perimeter of the work area, during sampling of soils and sediments and the installation of the test borings, and advancement of soil probes to monitor for volatile organic compounds. The PID shall be calibrated daily following manufacturers' recommendations (see Section 6.0 of the Field Sampling Plan). Readings and calibration data shall be recorded in daily logs by the SSO.

Temperature

Ambient temperature should be monitored throughout the work day for potential heat or cold stress conditions.

5.2 Action Levels

Should action levels be encountered, work operations shall cease until further evaluation is performed and safe levels are prevalent. If through engineering controls and monitoring, safe levels (below action levels) cannot be achieved, an upgrade in personal protection equipment shall be mandated by the SSO, or operations shall cease in that portion of the site. The action levels for this project are as follows:

- Volatile organic compounds (PID monitor): consistent readings of greater than 5 ppm above background levels in the breathing zone.
- Temperature: ambient air temperature below 36°F for cold stress, and above 90°F for heat stress.

Vapor Emission Response Plan

If the organic vapor level decreases below 5 ppm above background, work activities can resume. If the organic vapor levels are greater than 5 ppm over background but less than 25 ppm over background at the perimeter of the work area, activities can resume (while using the appropriate PPE) provided the organic vapor level 200 feet downwind of the work area or half the distance to the nearest residential or commercial structure, whichever is less, is below 5 ppm over background.

If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown. When work shutdown occurs, downwind air monitoring as directed by the SSO will be implemented to ensure that vapor emission does not impact the nearest residential or commercial structure at levels exceeding those specified in the Major Vapor Emission section.

Major Vapor Emission

If any organic levels greater than 5 ppm over background are identified 200 feet downwind from the work area or half the distance to the nearest 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, organic levels persist above 5 ppm above background 200 feet downwind or half the distance to the nearest residential or commercial property from the work area, then the air quality must be monitored within 20 feet of the perimeter of the nearest residential or commercial structure (20-Foot Zone).

If efforts to abate the emission source are unsuccessful and if levels greater than 5 ppm above background persist for more than 30 minutes in the 20-Foot Zone, then the Major Vapor Emission Response Plan shall automatically be placed into effect. The Major Vapor Emission Response Plan shall be immediately placed into effect if organic vapor levels in the 20-Foot Zone are greater than 10 ppm above background.

Major Vapor Emission Response Plan

Upon activation, the following activities will be undertaken:

- All Emergency Response Contacts as listed in the HASP be contacted.
- The local police authorities will be immediately contacted by the SSO and advised of the situation.

- Frequent air monitoring will be conducted at 30 minute intervals within the 20-Foot Zone. If two successive readings below action levels are measured, air monitoring may be halted or modified by the Site Safety Officer.

6.0 SITE CONTROL MEASURES

Maintaining specific work zones both on-site and off-site, along with other precautionary measures outlined throughout this HASP will help control site access.

6.1 On-Site Control Measures

Temporary fencing or caution tape around the perimeter of the work areas will provide a suitable measure to control access to the work areas and to prevent unauthorized access to on-site work zones.

The SSO will establish and clearly mark the following areas with consultation of the PTL:

Exclusion Zone (EZ)

This will be the actual work area where potential contamination may exist. An outer boundary will be established and clearly marked. The area of the EZ will be established based on site work conditions, exposure monitoring, etc. In general, the EZ will incorporate the area being probed or drilled and a 50-foot radius around the area.

- Access to the EZ will be limited to employees and visitors who have a minimum 24-Hour Hazardous Site Worker training, protective equipment and responsibilities for work in the EZ. The entry of unauthorized personnel into the EZ will be prohibited.
- The Exclusion Zone will be in areas of intrusive activities such as drilling, installation of monitoring wells, excavating and sampling. The limits of the zone will change, as necessary, depending on the SSO's judgment regarding work conditions, air sampling, etc.
- Drilling or excavation activities inside the EZ will commence at Level D. Air monitoring will be performed while drilling or excavating proceeds using a photoionization detector (PID) and a particulate monitor.

Contamination Reduction Zone (CRZ)

An area between the actual work site (EZ) and Support Zone (SZ) will be established to facilitate employee and equipment decontamination, protective equipment storage and supply, and employee rest areas.

- The location of the CRZ will be established in an area offering minimal contamination and will be subject to change based on the SSO's judgments considering work conditions, air monitoring, etc.

- The CRZ will contain a boot wash with brushes and soap, a source of wash water for washing equipment and hands, and plastic garbage bags to contain disposable protective equipment.

Support Zone (SZ)

An area free from contamination will be identified and clearly marked where administrative or other support functions (not requiring entrance to the EZ or CRZ) can be performed. The actual siting of the SZ will be established by the PTL and SSO by considering distance from the EZ, visibility, accessibility, air monitoring data, etc.

All personnel working in the study area will enter their names in a site log, which will be maintained in the SZ. Personnel will only enter an EZ after proceeding through a designated entry / checkpoint at the CRZ. Before engaging in any site work, all personnel involved in such work will be briefed on the following:

- Identity of PTL/SSO
- Boundaries, exit and entry point locations of the Exclusion Zone
- Decontamination procedures when required
- Chemical, radiological and physical hazards suspected of being in the EZ and their signs and symptoms of exposure
- Location of first aid equipment and qualified personnel
- Procedures to be used in contacting emergency personnel, including potential site evacuation procedures in case of emergencies
- Location of emergency equipment
- Location of emergency meeting point
- Contractor staff person in charge;
- Activities taking place that day
- Location of emergency eyewash station
- Heat or cold stress symptoms. All personnel will be advised to watch for signs of stress in staff working in EZ. Symptoms are defined in Attachment E
- Personnel protective equipment requirements and limitations

6.2 Off-Site Control Measures

Although the majority of the site investigation activities will be conducted within the interior area of the project site, background surface soil samples will be collected from separate off-site locations. Residential properties and public roads may be adjacent to a few of the proposed sample locations. Accordingly, the following control measures will be instituted to protect the public from physical and chemical hazards associated with this off-site sampling:

- A localized contaminant reduction zone (CRZ) shall be established at the periphery of the EZ toward the site interior, if possible, to regulate flow of personnel and equipment into and out of the zone.
- Only properly trained and certified project personnel will be permitted to enter the CRZ and EZ.
- The SSO or other member of the WPP will be present throughout the duration of sampling activities to monitor the work zone and prevent unauthorized parties from entry.

7.0 HAZARD COMMUNICATION

In compliance with 29 CFR 1910.1200, any hazardous materials brought on site by any personnel (TVGA or contractors) shall be accompanied with the material's MSDS. The SSO shall be responsible for maintaining the MSDSs on site, reviewing them for hazards that working personnel may be exposed to, and evaluating their use on site with respect to compatibility with other materials including personal protective equipment, and their hazards. Should the SSO deem the material too hazardous for use on site, the party responsible for bringing the material on site shall remove it from the site. No other hazardous materials are expected to be used during the environmental investigation at the site.

8.0 CONFINED SPACE ENTRY

No confined space entry by TVGA personnel is anticipated during the completion of this project. Should a potential confined space hazard exist, all proper confined space entry procedures, techniques, and equipment shall be consistent with OSHA regulations in 29 CFR 1910.146.

9.0 PERSONAL PROTECTIVE EQUIPMENT (PPE)

Based on evaluation of the potential hazards for the site, the initial levels of PPE have been designated as modified Level D for all site activities which is addressed below. No changes to the specified levels of PPE shall be made without the approval of the SSO and the PTL. If action levels are reached, work shall cease and further evaluations shall be performed by the SSO and advisors.

Modified Level D Protection

- Safety glasses with side shields
- Chemical resistant gloves
- Steel-toe and shank boots

- Hard hat
- Neoprene or butyl rubber outer boots

For the protection of site personnel, organic gas/vapor emissions will be continuously monitored during ground intrusive operations, and the required level of protection upgraded if action levels warrant. If an upgrade in PPE is warranted, Level C Protection including full face air-purifying respirators with appropriate cartridges will be implemented.

Level C Protection

Level C Protection, the maximum level likely to be needed at this site, includes the following;

- Full-face air purifying respirators with NIOSH/MSHA - approved high efficiency (HEPA) canisters for acid mists/organic vapors (half-face respirators may be substituted for certain tasks, by approval of the SSO)
- Chemical-resistant (Poly-Tyvek) clothing, one piece, long sleeved
- Outer and inner gloves. Inner gloves to be tight-fitting latex or vinyl. Outer gloves of neoprene or nitrile
- Steel-toe and shank boots (chemical resistant);
- Disposable Tyvek "booties"
- Neoprene or butyl rubber outer boots
- Gloves and boots taped
- Hard hat

For all personnel that may be required to wear full-face respirators (all persons working near a borehole, for example), only NIOSH/MSHA - approved respirators will be used. These will contain cartridges approved for removal of organic vapors/acid mists and particulate. All team members will be fit-tested for respirators. Due to possible difficulties in achieving a proper seal between face and mask, persons with facial hair will not be fitted for respirators, nor will they be allowed to work in areas requiring respiratory protection. Unless the SSO directs otherwise, when respirators are used, the cartridges should be replaced after eight hours of use, or at the end of each shift, or when any indication of breakthrough or excess resistance to breathing is detected.

Donning PPE

The following procedures should be followed when donning protective equipment.

- Inspect all equipment to ensure it is in good condition
- Don protective suit and gather suit around waist
- Put on outer boots over feet of the suit and tape at boot/suit junction
- Don inner gloves
- Don top half of protective suit and seal (as necessary)
- Don respirator protection (if necessary)

- Don outer gloves and tape at glove/suit junction (as necessary)
- Have assistant check all closures and observe wearer to ensure fit and durability of protective gear

10.0 DECONTAMINATION

Level C or higher PPE utilized during site operations warrants the institution of decontamination procedures.

Contaminated material must be either decontaminated or isolated immediately. All materials brought into the Exclusion Zone are presumed contaminated. Alconox and water shall be used as the decontamination solution. Decontamination equipment consisting of large wash tubs, scrub brushes, plastic sheeting, distilled water, plastic garbage bags, trash barrel, and respirator wipes will be used.

Protective clothing, especially reusable boots and gloves, will be decontaminated before leaving the Exclusion Zone by a thorough soap-and-water wash on the decontamination pad. Washing and rinsing solutions will be disposed on site in areas where test pits were excavated unless elevated levels are detected with a PID. If elevated levels are detected, it may be necessary to dispose of decon solutions in a drum or an approved containment tank. Solid waste materials (disposable gloves and garments, tape, plastic drop cloths, etc.) will be containerized for proper disposal. Personnel will be advised that all clothing worn under protective clothing (underwear, shirts, socks, trousers) on-site should be laundered separately from street clothing before redressing. If protective clothing is breached and personal clothing becomes contaminated, the personal clothing will be disposed.

Use of disposable sampling equipment will limit decontamination requirements. The need for widespread vehicle decontamination will be limited by keeping to a minimum the number of vehicles entering the Exclusion Zone. Vehicles leaving the Exclusion Zone must be decontaminated by high pressure and temperature water.

<u>Personal Decontamination</u>

The following steps must be taken to decontaminate personnel leaving a Level B or C work area.

- Place equipment and sample containers that must be decontaminated on a plastic drop cloth;
- Place disposable supplies and equipment in a labeled drum;
- Scrub non-disposable gloves and outer boots (if used) with a brush in a detergent water, then rinse in clean water;
- Remove outer gloves and boot covers;
- Remove protective garments, safety boots and hard hat;
- Wash inner gloves;

- Remove and wash respiratory protection (if worn);
- Remove inner clothing (as necessary for Draft decontamination at end of shift);
- Thoroughly wash face, hands and body; and
- Redress.

Equipment Decontamination

Personnel must take the following steps to decontaminate equipment and sample containers leaving Level A, B, or C work areas:

- Don protective equipment at Modified Level D;
- Wash reusable equipment in detergent solution and/or an appropriate solvent, or steam clean;
- Dry sample containers, etc., with paper towels (if necessary) and place on a clean drop cloth;
- Remove and discard used respirator cartridges. Wash respirators in fresh detergent water, rinse in clean water, and disinfectant. Store in a closed plastic bag, away from sources of contamination; and
- Launder clothing before reuse (or place in appropriate labeled impervious containers for transport to laundry).

Organic vapor/HEPA cartridges are the appropriate canisters for use with the involved substances. All respirators used shall be NIOSH and/or MSHA approved and their use shall be consistent with OSHA regulations in 29 CFR 1910.134. All on-site personnel wearing a respirator shall have respirator clearance from a qualified occupational health physician. In addition, the respirator wearers on site shall perform qualitative fit tests to ensure proper fit of the face seal of the respirator. Filter cartridges used shall be of the same manufacturer as the respirator and shall be changed on a daily basis at a minimum and/or if breathing becomes difficult.

11.0 EMERGENCY PROCEDURES

Prior to entering the site, all personal will complete the attached emergency data sheet. On-site personnel will abide by the following emergency procedures.

- The SSO shall be notified of any on-site emergencies and be responsible for ensuring that the appropriate measures are followed.
- Non-emergencies will be treated on site, documented and the injured party will be directed to seek further medical attention.
- All occupational injuries and illnesses will be reported, recorded, and investigated.

11.1 Communication

The SSO will have a cellular-type telephone on-site at all times for direct outside communications with emergency response organizations.

11.2 Personnel Injury

Upon notification of personnel injury the SSO will assess the nature of the injury. The appropriate first aid shall be initiated and, if necessary, contact shall be made for an ambulance and with the designated medical facility. If the injury increases the risk to others, activities on site will stop until the added risk is removed or minimized.

11.3 Fire/Explosion

Upon notification of fire or explosion, the designated emergency signal shall be sounded and all site personnel shall assemble at a safe distance upwind of the involved area. The SSO shall alert the appropriate fire department through the 911 emergency reporting system.

11.4 PPE Failure

If any site worker experiences a failure or alteration of PPE that affects the protection factor, that person and his or her buddy shall immediately exit the work area. Reentry and resuming work activities shall not be permitted until the equipment has been repaired or replaced.

11.5 Other Equipment Failure

If any equipment on site fails to operate properly, the Field Team Leader and the SSO shall be notified and will determine the effect of this failure on continuing operations on site. If the failure affects the safety of personnel or prevents completion of the remediation tasks, all personnel shall leave the work zone until the situation is evaluated and appropriate actions taken.

11.6 Spill Containment

Should a release of a chemical material occur on site, the SSO shall contain the spill to the extent immediately possible by the use of absorbent booms, pigs, pads, etc. The SSO shall contact appropriate spill response public departments (local or state) and a hazardous materials response contractor for further containment (refer to Section 12.0).

12.0 EMERGENCY MEDICAL CARE

12.1 Hospital

Name: Lockport Memorial Hospital
Address: 521 East Ave, Lockport, NY
Hospital #: (716)-514-5700
Emergency Room #: (716)-434-9110
Directions from site: Start out going north on IDA Park Drive to Upper Mountain Road. Turn right on Upper Mountain Road (NY 93), turn left on to Saunders Settlement Road (NY 31). Continue on Saunders Settlement Road and turn left on to Washburn Street (also NY 31) until East Avenue. Turn right on to East Avenue (also NY 31) and hospital is on the north side of East Avenue. Estimated drive time is 11 minutes and it is 4.8 miles.

12.2 Emergency Notification Numbers

Fire Department: 911
Police Department: 911
Department of Emergency Services: 911

Niagara County Health Department, Environmental Division:
5467 Upper Mountain Rd., Suite 100, Lockport, NY14094
Environmental Health
439-7453

Niagara County Emergency Services:
5526 Niagara St. Ext., Box 496, Lockport, NY 14095-0496
438-3471
911 (24-Hour Emergency Number)

NYSDEC Spill Response Unit: (716) 851-7220
NYSDEC Spill Hotline: 800-457-7362
NYSDOH Division of Environmental Health Assessment: (716) 847-4385

13.0 STANDARD OPERATING PROCEDURES

- Restricted areas are not to be accessed.
- Avoid unrestricted areas that seem questionable or unsafe.
- Minimize contact with hazardous substances.
- Use remote sampling, handling, and/or container-opening techniques whenever possible.
- Protect monitoring and sampling instruments by bagging, if necessary.
- Wear disposable outer garments and use disposable equipment where appropriate.
- All PPE and skin surfaces should be checked for cuts and/or punctures.

- Do not eat, smoke, or drink within the exclusion or contamination reduction zones.
- Due to the potential for the absorption, inhalation, or ingestion of toxic substances, those personnel required to take prescription drugs should not enter this site until their medication program is reviewed and approved for site access by a qualified physician.
- All personnel must be familiar with Client's operating safety procedures.
- The buddy system must always be used and enforced.
- No workers with beards or heavy sideburns are allowed to wear respirators.
- Use of contact lenses is prohibited on site.
- All heavy equipment involved should be equipped with available back-up signals.
- Eating, drinking, chewing gum or tobacco, smoking, or any similar practice is prohibited
- Hands and face must be thoroughly washed upon leaving the Exclusion Zone
- Whenever decontamination procedures for outer garments are in effect, it is recommended that the entire body should be thoroughly washed, as soon as possible, after the protective garment is removed. Thorough showers are required of all personnel at the completion of the workday.
- No excessive facial hair, which interferes with a satisfactory fit of the mask-to-face seal, is allowed for personnel required to wear respiratory protective equipment.
- Medicine and alcohol can exaggerate the effects from exposure to toxic chemicals.
- Fluids will be provided to staff to replace perspiration and will be sealed in containers. All fluids for ingestion will be kept in the Support Zone.
- Due to the effects of protective outer wear decreasing body ventilation, there exists an increase in the potential for heat casualties.
- All field personnel should check for any personal habit, which may allow contaminated soil or water onto or into the body. Jewelry, including watches, shall not be worn within the Exclusion Zone.
- All first aid treatments will be reported to the SSO, who will record each incident.

14.0 COMMUNITY HEALTH AND SAFETY PLAN

14.1 Potential Impacts

Potential hazards to the general public and surrounding community posed by this site investigation plan relate primarily to fugitive dust (particulate) emissions, organic contaminants and physical hazards associated with the operation of heavy equipment and open excavations. Potential exposure mechanisms that can transport particulates, both contaminated and non-contaminated, and volatile organic compounds beyond the site boundary include:

- Contaminated dust transported by wind erosion; and
- Volatile organic compounds transmitted by wind currents.

The site is located in an area that consists mainly of commercial properties. Commercial properties are primarily located west and north of the site, and are of a sufficient separation distance that it is unlikely that they will be adversely impacted by the site investigation activities.

Limiting potential exposure mechanisms that can transport contaminants beyond the site boundary will be completed by implementation of an air monitoring plan, maintaining site control, the use of engineering controls and following emergency procedures.

14.2 Monitoring Plan

The drilling and test pit excavation activities are not expected to produce measurable fugitive dust. Probing activities generally do not produce fugitive dust. The hollow stem auger drilling will produce limited auger spoils, which will likely be damp, therefore limiting the amount of dust produced. The air monitoring program will measure VOCs at the sampling locations on a continuous basis.

Should action levels be encountered, work operations shall cease until further evaluation is performed and safe levels are prevalent. If through engineering controls and monitoring, safe levels (below action levels) cannot be achieved, an upgrade in personal protection equipment shall be mandated by the SSO, or operations shall cease in that portion of the site. The action levels for this project and the response measures to be implemented to protect the community in the event that these action levels are exceeded are presented in Section 4.2.

14.3 Site Control

During the implementation of the investigation, TVGA will block the access into the site to the extent practicable using posts, cones rope and/or caution tape. Access to the working area will be restricted via the site control measures detailed in Section 6.0.

14.4 Engineering Controls

In the event measurable dust levels are detected during the drilling of test borings or excavation of test pits, then standard dust suppression techniques may be utilized, including the following:

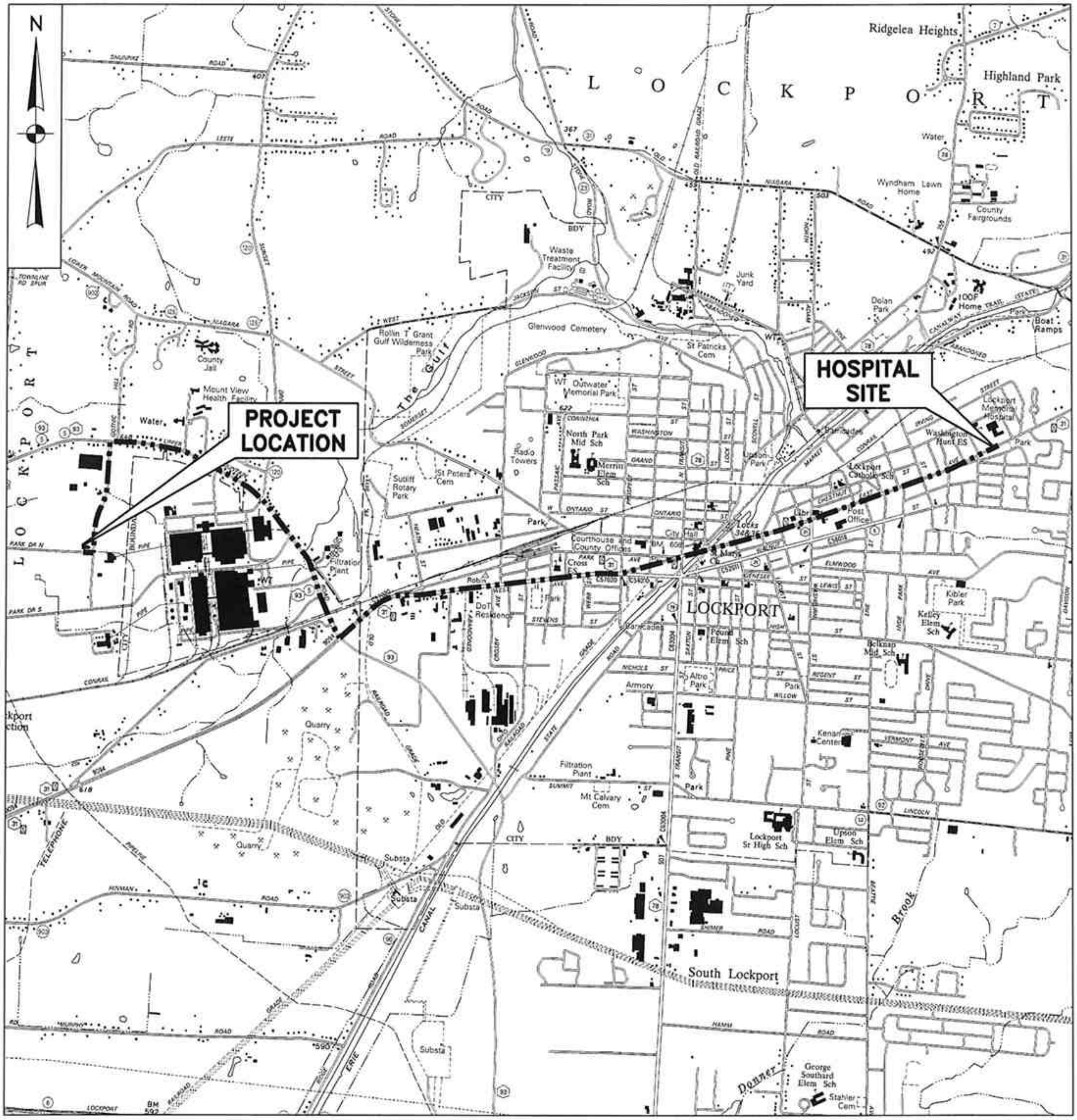
- Wetting excavation faces, and equipment during excavation.
- Restricting vehicle speeds to 10 mph.
- Postponing excavation activities during severe winds.
- Covering excavated areas and material after excavation activity ceases.
- Decreasing the number and size of excavations.

If the dust suppression techniques being utilized do not reduce airborne particulate then investigation activities will be suspended, until a review of the engineering controls can be completed.

14.5 Emergency Notification

This HASP has been developed to include details on emergency coordination and notification procedures to be implemented during an incident. The procedures for specific emergencies are outlined in Section 11.0 and the contact information for local emergency personnel is included in Section 12.0. In the event community health and safety is in question, dialing 911 will summon Fire and Police personnel which can take appropriate actions as necessary.

FIGURES



U.S.G.S LOCKPORT QUADRANGLE
CAMBRIA QUADRANGLE

MAP TO HOSPITAL

TVGA CONSULTANTS
1000 MAPLE ROAD
ELMA, NEW YORK 14059-9530
P. 716.655.8842
F. 716.655.0937
www.tvga.com

REMEDIAL INVESTIGATION/ALTERNATIVES ANALYSIS PROGRAM
FORMER ELECTRUK BATTERY SITE
4922 IDA DRIVE
LOCKPORT, NEW YORK 14094

PROJECT NO. 2007.0262.00	SCALE: 1" = 1,000'	DATE: DECEMBER 2007	FIGURE NO. 1

ATTACHMENT A

CERTIFICATION

TVGA
CONSULTANTS

RI/AA OF FORMER ELECTRUK BATTERY SITE

CERTIFICATION

PROJECT LOCATION: Former Electruk Battery Site, 4922 IDA Park Drive, Town of Lockport, Niagara County, NY
PROJECT NO. 2007.0262.00

Senior Level Management shall sign this form after she/he has conducted a pre-entry briefing.

Each employee conducting field work shall sign this form after the pre-entry briefing is completed and prior to commencing work on site. A copy of this signed form shall be kept at the site, and the original sent to the PTL, for inclusion into the project file.

Site Personnel Sign-off

☐ I have received a copy of the Site-Specific Health and Safety Plan.

☐ I have read the Plan and will comply with the provisions contained therein.

☐ I have attended a pre-entry briefing outlining the specific health and safety provisions on this site.

Name: ______________________________ Date: ____________
______________________________ Date: ____________
______________________________ Date: ____________
______________________________ Date: ____________
______________________________ Date: ____________
______________________________ Date: ____________

TVGA Project Team Leader

☐ A pre-entry briefing has been conducted by myself on ______________________.

☐ I deferred the pre-entry briefing responsibility to the Site Health and Site Safety Officer (SSO).

Name: ______________________________ Date: ______________________.

ATTACHMENT B

MEDICAL DATA SHEET

TVGA CONSULTANTS

MEDICAL DATA SHEET

This brief Medical Data Sheet will be completed by all personnel potentially working on-site and will be kept in the Support Zone during the performance of site operations. This data sheet will accompany any personnel when medical assistance is needed or if transport to the hospital facilities is required:

Site: ____

Name: ______________________________ Home Telephone ______________

Address: ____

____

Age: __________ Height: __________ Weight: __________

Person to Contact in Case of Emergency:

______________________________ Phone No. ______________

Drug or other Allergies: ______________________________

____

Particular Sensitivities: ______________________________

Do You Wear Contacts? YES NO

Provide a Checklist of Previous Illnesses or Exposures to Hazardous Chemicals:

____

____

____

What Medications are you presently using? ______________________

____

Do you have any Medical Restriction? ______________________

____

____

Name, Address, and Phone Number of Personal Physician: ______________

____

____

ATTACHMENT C

DIRECT READING AIR MONITORING FORM

TVGA CONSULTANTS

DIRECT READING AIR MONITORING FORM

DATE: ____________________
PROJECT: Former Electruk Battery Site
PROJECT #: 2007.0262.00
WEATHER CONDITIONS: ____________________
WIND DIRECT/SPEED: ____________________

USER: ____________________
CALIBRATION: ____________________
CALIBRATED BY: ____________________
COMMENTS: ____________________

ACTIVITY	INSTRUMENT	WORKING RANGE	TIME	READING	COMMENTS

ATTACHMENT D

HEAT AND COLD STRESS SYMPTOMS

Hazard Alert

Heat Stress in Construction

Heat is a serious hazard in construction. Your body builds up heat when you work and sweats to get rid of extra heat. But sometimes your body may not cool off fast enough. This can happen, say, if you are up on a roof pouring hot asphalt or you are lifting heavy loads.

Too much heat can make you tired, hurt your job performance, and increase your chance of injury. You can get skin rash. You can also get:

- **Dehydration.** When your body loses water, you can't cool off fast enough. You feel thirsty and weak.
- **Cramps.** You can get muscle cramps from the heat even after you leave work.
- **Heat exhaustion.** You feel tired, nauseous, headachy, and giddy (dizzy and silly). Your skin is damp and looks muddy or flushed. You may faint.
- **Heat stroke.** You may have hot dry skin and a high temperature, Or you may feel confused. You may have convulsions or become unconscious. **Heat stroke can kill you** unless you get emergency medical help.

The Risk of Heat Stress

Your risk of heat stress depends on many things. These include:

- Your physical condition
- The weather (temperature, humidity)
- How much clothing you have on
- How fast you must move or how much weight you must lift
- If you are near a fan or there is a breeze
- If you are in the sun.

If there is an industrial hygienist on your work site, ask the hygienist about the Wet-Bulb Globe Temperature Index. It is a more precise way to estimate the risk of heat stress.

Protect Yourself

Try to do these things:

- **Drink a lot of cool water all day — before you feel thirsty.** Every 15 minutes, you may need a cup of water (5 to 7 ounces).

(Please turn the page.)

• **Keep taking rest breaks**. Rest in a cool, shady spot. Use fans.
• **Wear light-colored clothing,** made of cotton.
• **Do the heaviest work in the coolest time of the day**.
• **Work in the shade.**
• **For heavy work in hot areas,** take turns with other workers, so some can rest.
• **If you travel to a warm area for a new job,** you need time for your body to get used to the heat. Be extra careful the first 2 weeks on the job.
• **If you work in protective clothing,** you need more rest breaks. You may also need to check your temperature and heart rate. On a Superfund site where the temperature is 70 degrees or more, the U.S. Environmental Protection Agency (EPA) says a health professional should monitor your body weight, temperature, and heart rate.
• **If you think someone has heat stroke, call emergency services (or 911).** Immediately move the victim to the shade. Loosen his/her clothes. Wipe or spray his/her skin with cool water and fan him/her. You can use a piece of cardboard or other material as a fan.

OSHA does not have a special rule for heat. But because heat stress is known as a serious hazard, workers are protected under the **General Duty Clause** of the Occupational Safety and Health Act. The clause says employers must provide "employment free from recognized hazards causing or likely to cause physical harm."

For more information, call your local union, the Center to Protect Workers' Rights (CPWR) (301-578-8500 or www.cpwr.com), the National Institute for Occupational Safety and Health (1-800-35-NIOSH or www.cdc.gov/niosh), or OSHA (1-800-321-OSHA or www.osha.gov). Or check the website www.elcosh.org

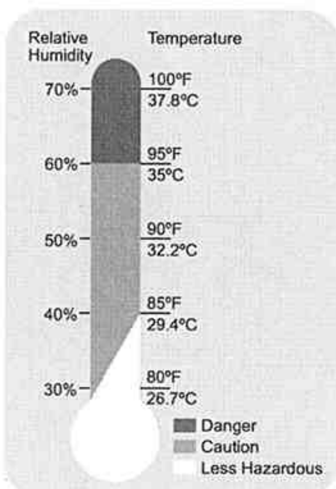
The Center to Protect Workers' Rights is the research and development institute of the Building and Construction Trades Dept., AFL-CIO: CPWR, Suite 1000, 8484 Georgia Ave., Silver Spring, MD 20910. (Edward C. Sullivan is president of the Building and Construction Trades Department and CPWR.) Production of this flyer was supported by grants UO2/310982 and UO2/312014 from the National Institute for Occupational Safety and Health (NIOSH). The contents are solely the responsibility of the authors and do not necessarily represent the official views of NIOSH.

Heat stress - April 9, 2001

The Heat Equation

HIGH TEMPERATURE + HIGH HUMIDITY + PHYSICAL WORK = HEAT ILLNESS

When the body is unable to cool itself through sweating, **serious** heat illnesses may occur. The most severe heat-induced illnesses are heat exhaustion and heat stroke. If left untreated, **heat exhaustion** could progress to **heat stroke** and possible **death.**



U.S. Department of Labor
Occupational Safety and Health Administration
OSHA 3154
2002

Heat Exhaustion

What are the symptoms?

HEADACHES; DIZZINESS OR LIGHTHEADEDNESS; WEAKNESS; MOOD CHANGES SUCH AS IRRITABILITY, CONFUSION, OR THE INABILITY TO THINK STRAIGHT; UPSET STOMACH; VOMITING; DECREASED OR DARK-COLORED URINE; FAINTING OR PASSING OUT; AND PALE, CLAMMY SKIN

What should you do?

- Act immediately. If not treated, heat exhaustion may advance to heat stroke or death.
- Move the victim to a cool, shaded area to rest. Don't leave the person alone. If symptoms include dizziness or lightheadedness, lay the victim on his or her back and raise the legs 6 to 8 inches. If symptoms include nausea or upset stomach, lay the victim on his or her side.
- Loosen and remove any heavy clothing.
- Have the person drink cool water (about a cup every 15 minutes) unless sick to the stomach.
- Cool the person's body by fanning and spraying with a cool mist of water or applying a wet cloth to the person's skin.
- Call 911 for emergency help if the person does not feel better in a few minutes.

Heat Stroke–A Medical Emergency

What are the symptoms?

DRY, PALE SKIN WITH NO SWEATING; HOT, RED SKIN THAT LOOKS SUNBURNED; MOOD CHANGES SUCH AS IRRITABILITY, CONFUSION, OR THE INABILITY TO THINK STRAIGHT; SEIZURES OR FITS; AND UNCONCIOUSNESS WITH NO RESPONSE

What should you do?

- Call 911 for emergency help immediately.
- Move the victim to a cool, shaded area. Don't leave the person alone. Lay the victim on his or her back. Move any nearby objects away from the person if symptoms include seizures or fits. If symptoms include nausea or upset stomach, lay the victim on his or her side.
- Loosen and remove any heavy clothing.
- Have the person drink cool water (about a cup every 15 minutes) if alert enough to drink something, unless sick to the stomach.
- Cool the person's body by fanning and spraying with a cool mist of water or wiping the victim with a wet cloth or covering him or her with a wet sheet.
- Place ice packs under the armpits and groin area.

How can you protect yourself and your coworkers?

- Learn the signs and symptoms of heat-induced illnesses and how to respond.
- Train your workforce about heat-induced illnesses.
- Perform the heaviest work during the coolest part of the day.
- Build up tolerance to the heat and the work activity slowly. This usually takes about 2 weeks.
- Use the buddy system, with people working in pairs.
- Drink plenty of cool water, about a cup every 15 to 20 minutes.
- Wear light, loose-fitting, breathable clothing, such as cotton.
- Take frequent, short breaks in cool, shaded areas to allow the body to cool down.
- Avoid eating large meals before working in hot environments.
- Avoid alcohol or beverages with caffeine. These make the body lose water and increase the risk for heat illnesses.

What factors put you at increased risk?

- Taking certain medications. Check with your health-care provider or pharmacist to see if any medicines you are taking affect you when working in hot environments.
- Having a previous heat-induced illness.
- Wearing personal protective equipment such as a respirator or protective suit.

Surviving the Cold Weather

Prolonged exposure to low temperatures, wind and/or moisture can result in cold-related injury from frostbite and hypothermia. Here are some suggestions on how to keep warm and avoid frostbite and hypothermia.

Dress properly

Wear several layers of loose-fitting clothing to insulate your body by trapping warm, dry air inside. Loosely woven cotton and wool clothes best trap air and resist dampness.

The head and neck lose heat faster than any other part of the body. Your cheeks, ears and nose are the most prone to frostbite. Wear a hat, scarf and turtleneck sweater to protect these areas.

Frostbite: What to look for

The extent of frostbite is difficult to judge until hours after thawing. There are two classifications of frostbite:

- Superficial frostbite is characterized by white, waxy or grayish-yellow patches on the affected areas. The skin feels cold and numb. The skin surface feels stiff and underlying tissue feels soft when depressed.
- Deep frostbite is characterized by waxy and pale skin. The affected parts feel cold, hard, and solid and cannot be depressed. Large blisters may appear after rewarming.

What to do

1. Get the victim out of the cold and to a warm place immediately.
2. Remove any constrictive clothing items that could impair circulation.
3. If you notice signs of frostbite, seek medical attention immediately.
4. Place dry, sterile gauze between toes and fingers to absorb moisture and to keep them from sticking together.
5. Slightly elevate the affected part to reduce pain and swelling.
6. If you are more than one hour from a medical facility and you have warm water, place the frostbitten part in the water (102 to 106 degrees Fahrenheit). If you do not have a thermometer, test the water first to see if it is warm, not hot. Rewarming usually takes 20 to 40 minutes or until tissues soften.

What not to do

1. Do not use water hotter than 106 degrees Fahrenheit.
2. Do not use water colder than 100 degrees Fahrenheit since it will not thaw frostbite quickly enough.
3. Do not rub or massage the frostbite area.
4. Do not rub with ice or snow.

Hypothermia

Hypothermia occurs when the body loses more heat than it produces. Symptoms include change in mental status, uncontrollable shivering, cool abdomen and a low core body temperature.

Severe hypothermia may cause rigid muscles, dark and puffy skin, irregular heartbeat and respiration, and unconsciousness.
Treat hypothermia by protecting the victim from further heat loss and seeking immediate medical attention. Get the victim out of the cold. Add insulation such as blankets, pillows, towels or newspapers beneath and around the victim. Be sure to cover the victim's head. Replace wet clothing with dry clothing. Handle the victim gently because rough handling can cause cardiac arrest. Keep the victim in a horizontal (flat) position.
Finally, the best way to avoid frostbite and hypothermia is to stay out of the cold. Read a book, clean house or watch TV. Be patient and wait out the dangerous cold weather.

How to Prevent Frostbite and Hypothermia

Prolonged exposure to low temperatures, wind or moisture - whether it be on a ski slope or in a stranded car - can result in cold-related illnesses such as frostbite and hypothermia. The National Safety Council offers these tips to help you spot and put a halt to these winter hazards.

How to detect and treat cold-related illnesses

Frostbite is the most common injury resulting from exposure to severe cold. Superficial frostbite is characterized by white, waxy, or grayish-yellow patches on the affected areas. The skin feels cold and numb. The skin surface feels stiff but underlying tissue feels soft and pliable when depressed. Treat superficial frostbite by taking the victim inside immediately. Remove any constrictive clothing items that could impair circulation. If you notice signs of frostbite, immediately seek medical attention. Place dry, sterile gauze between toes and fingers to absorb moisture and to keep them from sticking together. Slightly elevate the affected part to reduce pain and swelling. If you are more than one hour from a medical facility and you have warm water, place the frostbitten part in the water (102 to 106 degrees Fahrenheit). If you do not have a thermometer, test the water first to see if it is warm, not hot. Rewarming usually takes 20 to 40 minutes or until tissues soften.

Deep frostbite usually affects the feet or hands and is characterized by waxy, pale, solid skin. Blisters may appear. Treat deep frostbite by moving the victim indoors and immediately seek medical attention.

Hypothermia occurs when the body's temperature drops below 95 degrees Fahrenheit. Symptoms of this condition include change in mental status, uncontrollable shivering, cool abdomen and a low core body temperature. Severe hypothermia may produce rigid muscles, dark and puffy skin, irregular heart and respiratory rates, and unconsciousness.

Treat hypothermia by protecting the victim from further heat loss and calling for immediate medical attention. Get the victim out of the cold. Add insulation such as blankets, pillows, towels or newspapers beneath and around the victim. Be sure to cover the victim's head. Replace wet clothing with dry clothing. Handle the victim gently because rough handling can cause cardiac arrest. Keep the victim in a horizontal (flat) position. Give artificial respiration or CPR (if you are trained) as necessary.

How to prevent cold-related illnesses

Avoid frostbite and hypothermia when you are exposed to cold temperatures by wearing layered clothing, eating a well-balanced diet, and drinking warm, non-alcoholic, caffeine-free liquids to maintain fluid levels.
Avoid becoming wet, as wet clothing loses 90 percent of its insulating value.

12/22/1998 - Protecting Workers in Cold Environments

Fact Sheets (Program Highlights) - Table of Contents

U.S. Department of Labor
Occupational Safety and Health Administration

Fact Sheet No. OSHA 98-55

Protecting Workers in Cold Environments

December 1998

As the weather becomes "frightful" during winter months, workers who must brave the outdoor conditions face the occupational hazard of exposure to the cold. Prolonged exposure to freezing temperatures can result in health problems as serious as trench foot, frostbite, and hypothermia. Workers in such industries as construction, commercial fishing and agriculture need to be especially mindful of the weather, its effects on the body, proper prevention techniques, and treatment of cold-related disorders.

The Cold Environment

An individual gains body heat from food and muscular activity and loses it through convection, conduction, radiation and sweating to maintain a constant body temperature. When body temperature drops even a few degrees below its normal temperature of 98.6°F (37°C), the blood vessels constrict, decreasing peripheral blood flow to reduce heat loss from the surface of the skin. Shivering generates heat by increasing the body's metabolic rate.

The four environmental conditions that cause cold-related stress are low temperatures, high/cool winds, dampness and cold water. Wind chill, a combination of temperature and velocity, is a crucial factor to evaluate when working outside. For example, when the actual air temperature of the wind is 40°F (4°C) and its velocity is 35 mph, the exposed skin receives conditions equivalent to the still-air temperature being 11°F (-11°C)! A dangerous situation of rapid heat loss may arise for any individual exposed to high winds and cold temperatures.

Major Risk Factors for Cold-Related Stresses

- Wearing inadequate or wet clothing increases the effects of cold on the body.
- Taking certain drugs or medications such as alcohol, nicotine, caffeine, and medication that inhibits the body's response to the cold or impairs judgment.
- Having a cold or certain diseases, such as diabetes, heart, vascular, and thyroid problems, may make a person more susceptible to the winter elements.

- Being a male increases a person's risk to cold-related stresses. Sad, but true, men experience far greater death rates due to cold exposure than women, perhaps due to inherent risk-taking activities, body-fat composition or other physiological differences.
- Becoming exhausted or immobilized, especially due to injury or entrapment, may speed up the effects of cold weather.
- Aging -- the elderly are more vulnerable to the effects of harsh winter weather.

Harmful Effects of Cold

Trench Foot is caused by long, continuous exposure to a wet, cold environment, or actual immersion in water. Commercial fisherman, who experience these types of cold, wet environments daily, need to be especially cautious.

Symptoms:

Symptoms include a tingling and/or itching sensation, burning, pain, and swelling, sometimes forming blisters in more extreme cases.

Treatment:

Move individuals with trench foot to a warm, dry area, where the affected tissue can be treated with careful washing and drying, rewarming and slight elevation. Seek medical assistance as soon as possible.

Frostbite occurs when the skin tissue actually freezes, causing ice crystals to form between cells and draw water from them, which leads to cellular dehydration. Although this typically occurs at temperatures below 30°F (-1°C), wind chill effects can cause frostbite at above-freezing temperatures.

Symptoms:

Initial effects of frostbite include uncomfortable sensations of coldness; tingling, stinging or aching feeling of the exposed area followed by numbness. Ears, fingers, toes, cheeks, and noses are primarily affected. Frostbitten areas appear white and cold to the touch. The appearance of frostbite varies depending on whether rewarming has occurred.

Deeper frostbite involves freezing of deeper tissues (muscles, tendons, etc.) causing exposed areas to become numb, painless, hard to the touch.

Treatment:

If you suspect frostbite, you should seek medical assistance immediately. Any existing hypothermia should be treated first (See **Hypothermia** below). Frostbitten parts should be covered with dry, sterile gauze or soft, clean cloth bandages. Do not massage frostbitten tissue because this sometimes causes greater injury. Severe cases may require hospitalization and even amputation of affected tissue. Take measures to prevent further cold injury. If formal medical treatment will be delayed, consult with a licensed health care professional for training on rewarming techniques.

General Hypothermia occurs when body temperature falls to a level where normal muscular and cerebral functions are impaired. While hypothermia is generally associated with freezing temperatures, it may occur in any climate where a person's body temperature falls below normal. For instance, hypothermia is common among the elderly who live in cold houses.

Symptoms:

The first symptoms of hypothermia, shivering, an inability to do complex motor functions, lethargy, and mild confusion, occur as the core body temperature

decreases to around 95°F (35°C).
As body temperature continue to fall, hypothermia becomes more severe. The individual falls into a state of dazed consciousness, failing to complete even simple motor functions. The victim's speech becomes slurred and his or her behavior may become irrational.
The most severe state of hypothermia occurs when body temperature falls below 90°F (32°C). As a result, the body moves into a state of hibernation, slowing the heart rate, blood flow, and breathing. Unconsciousness and full heart failure can occur in the severely hypothermic state.

Treatment:

Treatment of hypothermia involves conserving the victim's remaining body heat and providing additional heat sources. Specific measures will vary depending upon the severity and setting (field or hospital). Handle hypothermic people very carefully because of the increased irritability of the cold heart. Seek medical assistance for persons suspected of being moderately or severely hypothermic.
If the person is unresponsive and not shivering, assume he or she is suffering from severe hypothermia. Reduction of heat loss can be accomplished by various means: obtaining shelter, removal of wet clothing, adding layers of dry clothing, blankets, or using a pre-warmed sleeping bag.
For mildly hypothermic cases or those more severe cases where medical treatment will be significantly delayed, external rewarming techniques may be applied. This includes body-to-body contact (e.g., placing the person in a prewarmed sleeping bag with a person of normal body temperature), chemical heat packs, or insulated hot water bottles. Good areas to place these packs are the armpits, neck, chest, and groin. It is best to have the person lying down when applying external rewarming. You also may give mildly hypothermic people warm fluids orally, but avoid beverages containing alcohol or caffeine.

<u>Preventing Cold-Related Disorders</u>

Personal Protective Clothing is perhaps the most important step in fighting the elements is providing adequate layers of insulation from them. Wear at least three layers of clothing:
-- An outer layer to break the wind and allow some ventilation (like Gore-Tex® or nylon);
-- A middle layer of wool or synthetic fabric (Qualofil or Pile) to absorb sweat and retain insulation in a damp environment. Down is a useful lightweight insulator; however, it is ineffective once it becomes wet.
-- An inner layer of cotton or synthetic weave to allow ventilation.
Pay special attention to protecting feet, hands, face and head. Up to 40 percent of body heat can be lost when the head is exposed. Footgear should be insulated to protect against cold and dampness. Keep a change of clothing available in case work garments become wet.
Engineering Controls in the workplace through a variety of practices help reduce the risk of cold-related injuries.

- Use an on-site source of heat, such as air jets, radiant heaters, or contact warm plates.
- Shield work areas from drafty or windy conditions.

- Provide a heated shelter for employees who experience prolonged exposure to equivalent wind-chill temperatures of 20°F (-6°C) or less.
- Use thermal insulating material on equipment handles when temperatures drop below 30°F (-1°C).

Safe Work Practices, such as changes in work schedules and practices, are necessary to combat the effects of exceedingly cold weather.

- Allow a period of adjustment to the cold before embarking on a full work schedule.
- Always permit employees to set their own pace and take extra work breaks when needed.
- Reduce, as much as possible, the number of activities performed outdoors. When employees must brave the cold, select the warmest hours of the day and minimize activities that reduce circulation.
- Ensure that employees remain hydrated.
- Establish a buddy system for working outdoors.
- Educate employees to the symptoms of cold-related stresses -- heavy shivering, uncomfortable coldness, severe fatigue, drowsiness, or euphoria.

The quiet symptoms of potentially deadly cold-related ailments often go undetected until the victim's health is endangered. Knowing the facts on cold exposure and following a few simple guidelines can ensure that this season is a safe and healthy one.

APPENDIX D

CITIZEN PARTICIPATION PLAN

REMEDIAL INVESTIGATION/ALTERNATIVES ANALYSIS
FORMER ELECTRUK BATTERY SITE
(NYSDEC Site No. E932132)
4922 IDA PARK DRIVE, TOWN OF LOCKPORT
NIAGARA COUNTY, NEW YORK

FINAL CITIZEN PARTICIPATION PLAN

Prepared for:

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APRIL 2008

RI/AA OF FORMER ELECTRUK BATTERY SITE
(NYSDEC Site No. E932132)
4922 IDA PARK DRIVE, TOWN OF LOCKPORT
NIAGARA COUNTY, NEW YORK

FINAL CITIZEN PARTICIPATION PLAN

TABLE OF CONTENTS

1.0 INTRODUCTION

The site-specific Citizen Participation Plan (CPP) described herein follows guidelines set forth by the New York State Department of Environmental Conservation (NYSDEC) in their Citizen Participation in New York's Hazardous Waste Site Remediation Program, and has been tailored to the particular needs of the Former Electruk Battery Site (project site). The CPP establishes a framework of activities to provide a context in which two-way communication between the Town of Lockport and the community can be attained. The citizen participation activities will be proactive, early and ongoing throughout the duration of the investigation.

2.0 PROJECT MAILING LIST

For the purpose of informing the public of all relevant project activities, a mailing list will be compiled by the Town and regularly maintained. For these purposes, the term "public" shall include area residents, government officials, media, business interests, environmental and civic groups, and other interested parties. The Town will compile a list of adjacent property owners utilizing Section Block Lot (SBL) numbers and their corresponding tax payer information housed at the local municipal building. This portion of the list will be maintained in confidence and will not be included as part of the CPP available at the document repository (as described below). The NYSDEC will review the project mailing list for completeness.

Appropriate media outlets including local newspapers, radio and television stations will be identified and added to the project mailing list. In addition, existing mailing lists comprised of local elected officials, business and other civic and environmental groups will be identified, compiled and supplemented as needed. Enhanced outreach will be conducted to ensure that all parties, including the project staff, with information about the project site are included on the master list.

3.0 IDENTIFICATION OF A LOCAL DOCUMENT REPOSITORY

The local repository will be the Lockport Public Library at 23 East Ave, Lockport, New York because it is situated in a geographic location suitable to the project site and surrounding area, will provide for handicapped accessibility, and will be open to the public outside normal business hours. The repository will help ensure that pertinent documents and other project information are readily available to the public. Through fact sheets and/or meetings described below, the public will be made aware of the repository location.

4.0 FACT SHEETS

A series of fact sheets will be produced and distributed at major milestones within the project. It is anticipated that two fact sheets will be prepared that will be made available through direct mail to all individuals and organizations included on the mailing list. These major milestones within the project include:

- Prior to initiation of the Remedial Investigation/Alternatives Analysis program.

- Upon announcement of the public comment period for the Proposed Remedial Action Plan.

Additional fact sheets may also be issued throughout the project's duration if necessary, especially if there is significant community interest in the project. Fact Sheets will be one-color, double-sided, 8.5 by eleven inch documents with text and graphics.

5.0 MEETINGS

Given the size and nature of the site investigation, one public meeting may be conducted by the Town. The meeting will likely coincide with the issuance of the Proposed Remedial Action Plan (PRAP) and will occur at the beginning of or during the public comment period relative to the PRAP. Meeting dates, times and locations will be announced via press releases to local media outlets, and notices will be sent to all individuals included on the project mailing list.

6.0 RECEIVE AND CONSOLIDATE PUBLIC COMMENTS

All citizen inquiries and comments received shall be maintained as part of the project database. All citizen inquiries be acknowledged and responded to. This feedback loop is a particularly important piece of any public involvement program in that it helps to build and maintain trust, which later becomes critical to public buy-in. This individual attention is seen as a minimal investment in terms of the return the NYSDEC will gain by understanding wide-spread concerns and issues, long before a Record of Decision is reached. In addition to the above-referenced meeting, another public meeting may be scheduled if there is significant public interest in the project.