NPEC Inc. 3800 Dewey Avenue, #317 • Rochester, NY 14616-2579

March 28, 2011 (via email)

Mr. Randy Hough
Division of Environmental Remediation, Remedial Bureau B
New York State Department of Environmental Conservation
625 Broadway, 12th Floor
Albany, NY 12233-7016

Dear Mr. Hough:

Subject: Revised Remedial Design / Remedial Action Work Plan for OU-2
Sterling Site 3 (Site # 442011), East Greenbush, New York

Enclosed please find the revised document entitled "Remedial Design/Remedial Action Work Plan for OU-2, Sterling Site 3, East Greenbush, New York – March 2011".

The enclosed revised Work plan has been created to address a component of the overall remedy, which requires that "A remedial design program will be implemented to provide the details necessary to determine the exact location and number of area properties impacted above the applicable SCGs and to provide additional information for the design of the monitoring program element of the proposed remedy." Revisions to the Work plan were made to address comments made in the Department's email dated March 18, 2011.

If you have any questions regarding this information or would like a hardcopy of this document, feel free to contact me.

Sincerely,

Robert B. Call

Robert B. Call
Quantum Management Group, Inc.

Enclosure

ec: Terry Lee (NPEC, Inc.)
Steven Bates (NYSDOH)

Robert Call • Project Manager • Phone: (585) 477-2012 • Fax: (585) 588-2161

REMEDIAL DESIGN/REMEDIAL ACTION WORK PLAN FOR OPERABLE UNIT 2

STERLING SITE 3
EAST GREENBUSH, NEW YORK

MARCH 2011
REF. NO. 007830 (95)

Prepared by:
CRA Infrastructure & Engineering, Inc.

285 Delaware Avenue, Suite 500
Buffalo, New York 14202

Tel: 716•856•2142
Fax: 716•856•2160

ENGINEER'S CERTIFICATION

I certify that I am currently a New York State registered professional engineer and that this Remedial Design/Remedial Action Work Plan (RAWP) was prepared in substantial accordance with the requirements of the August 2010 Order on Consent and Administrative Settlement (Index #A4-0624-08-09) for the Sterling Drug Site 3 – Operable Units 1 and 2, and in substantial conformance with the DER Technical Guidance for Site Investigations and Remediation (DER-10).

Robert G. Adams, PE
CRA Infrastructure & Engineering, Inc.
Registration No. 064918

2/17/11
Date

TABLE OF CONTENTS

LIST OF FIGURES
(Following Report)

LIST OF TABLES
(Following Report)

LIST OF APPENDICES

1.0 INTRODUCTION

1.1 GENERAL

This report presents the Remedial Design/Remedial Action Work Plan [Remedial Action Work Plan (RAWP)] for the off-Site groundwater plume (Operable Unit 2 [OU-2]) at the Sterling Drug Inc. (Sterling) Site 3 (Site), in East Greenbush, Rensselaer County, New York. A Site location plan is shown on Figure 1.1. The Site consists of an inactive landfill (Operable Unit 1 [OU-1]) that is approximately seven acres in size and was used as a disposal area from 1956 to 1977. Waste disposal activities led to contamination of soil and groundwater at the Site. Remedial activities were implemented beginning in 1989 and continue to date. OU-1 includes the on-Site soils and groundwater managed by the current remedial activities. OU-2 includes the off-property portion of the Site groundwater contaminant plume of ethyl ether and pharmaceutical semi-volatile organic compounds (SVOCs).

This report was prepared by Conestoga-Rovers & Associates (CRA) for NPEC Inc. (NPEC), a wholly owned subsidiary of Eastman Kodak Company that retains the environmental responsibility for the Site.

1.2 REMEDIAL ACTION WORK PLAN OBJECTIVES

NPEC signed an Order on Consent and Administrative Settlement (Order) with the New York State Department of Environmental Conservation (NYSDEC) related to the remedial alternatives presented in the 1992 Record of Decision (1992 ROD) for OU-1 and the 2010 Record of Decision (2010 ROD) for OU-2. The RAWP addresses the requirement in the 2010 ROD for the submittal of a Remedial Design/Remedial Action Work Plan for OU-2. The objective of the RAWP is to address the 2010 ROD requirement "to provide the details necessary to determine the exact location and number of area properties impacted above the applicable SCGs [standards, criteria and guidance] and to provide additional information for the design of the monitoring program element of the proposed remedy."

1.3 REPORT ORGANIZATION

This RAWP is organized as follows:

- Section 1.0 - Introduction
- Section 2.0 - Site Characterization
- Section 3.0 - Additional Investigation Activities
- Section 4.0 - Health and Safety Plan
- Section 5.0 - Schedule
- Section 6.0 - Reporting

2.0 SITE CHARACTERIZATION

2.1 SITE DESCRIPTION

The 7-acre inactive landfill is located on American Oil Road (Riverside Avenue Extension), East Greenbush, in Rensselaer County, New York. The inactive landfill is a wedge-shaped parcel of land located between Papscanee Creek and the CSX Transportation railway tracks. The Site location plan is shown on Figure 1.1. The Site is vegetated and relatively flat and is situated within the 100-year flood plain of the Hudson River. The Hudson River is located 2,200 feet west of the Site. Following closure of operations by Sterling in 1977, remedial efforts were undertaken to address soil and groundwater contamination. As defined in the 1992 ROD, two distinct areas (OU-1 and OU-2) were noted as areas of potential concern. OU-1 includes the closed landfill, and on-Site soils and groundwater, and OU-2 includes the off-property portion of the groundwater contaminant plume. The primary contaminants of concern in the OU-2 groundwater plume are ethyl ether and pharmaceutical SVOCs.

There are no continuously occupied structures that exist on the Site or on the OU-2 off-Site properties. Land use in the surrounding areas is mainly rural in appearance and used for agricultural purposes or open land with some residential areas approximately 3/4 of a mile to the northeast of the Site. There is no current use of groundwater as a source of drinking water, and the groundwater is considered non-potable due to elevated levels of naturally occurring inorganics (iron, etc). There are no known water wells downgradient of the Site and no known water wells within 1.5 miles of the Site based upon a search of the Water Well Information on the NYSDEC website (http://www.dec.ny.gov/cfmx/extapps/WaterWell/index.cfm; NYSDEC, 2010).

2.2 GENERAL SITE USE

Between 1956 and 1977, the OU-1 landfill was used by Sterling for the disposal of waste materials. Company records indicated that disposed wastes in OU-1 included pharmaceutical intermediates, finished pharmaceutical products, Sterling Winthrop Research Institute waste, filter cakes, solvents, still bottoms, motor and lubricating oils, and wood. In 1977, the Site was covered with sandy clay and gravel and closed, and has remained inactive since that time. OU-2 consists of a groundwater contaminant plume from the landfill, consisting of ethyl ether and pharmaceutical SVOCs.

2.3 SITE INVESTIGATIONS AND REMEDIAL ACTIVITIES

The Site was listed by the NYSDEC in 1982 in the Registry of Inactive Hazardous Waste Disposal Sites in New York. The Site was designated in 1983 as a Class 2 inactive hazardous waste disposal site in accordance with NYSDEC's numerical rankings under the Environmental Conservation Law (ECL). A Class 2 site is a site where hazardous waste presents a significant threat to the public health or the environment and action is required.

The Site has been the subject of ongoing investigations and remedial activities since 1982 to delineate the nature and extent of contamination at the Site. Results from previous investigations identified volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) as the primary contaminants in Site soils and groundwater. Several remedial activities have been implemented at the Site, beginning with the removal of 8,452 buried drums from OU-1 between 1989 to 1990. Many of these drums were empty; however, some also contained product. Following the removal of the drums, additional investigations were conducted to determine the extent of the remaining contamination on Site.

In 1992 a ROD (1992 ROD) for OU-1 was signed by NYSDEC. The selected remedy in the 1992 ROD for OU-1 included: vacuum extraction of hot-spots identified in the on-Site soils, groundwater recovery and treatment of the on-Site portion of the contaminant plume, installation of an impermeable landfill cover, Site use restrictions and environmental monitoring.

The Vacuum Extraction (VE) System and groundwater pump and treat system were installed in accordance with the 1992 ROD. The Air Sparging System was installed voluntarily, with the approval and oversight of the NYSDEC, as a further enhancement to source removal prior to capping the landfill. The VE System commenced full-scale operation in December 1994 to address contaminants in the fill/soil within OU-1. The Groundwater Treatment System (GWTS) was commissioned in May 1996 to address groundwater immediately downgradient of OU-1. The Air Sparging System has been operated since July 2000 to address groundwater within the hot spot areas of OU-1. The VE and Air Sparging systems are currently operating and have been effectively reducing the contaminant levels within the landfill. In addition, an impermeable landfill cover, which has been designed, will be placed over the inactive landfill. Various investigations of Site media have been completed.

Prior to construction of the impermeable cover, the operation of the VE and Air Sparging systems will be terminated. The 1992 ROD stated that the VE system and

subsequent Air Sparging system would operate until specific contaminant levels were achieved or until performance data indicated that the system was no longer effective. Further, the 1992 ROD stated that the landfill capping of OU-1 would be implemented once NYSDEC determined that a significant mass of contamination had been removed. In November 2007, NYSDEC determined that significant mass had been removed from OU-1 and that the landfill capping phase could be initiated.

A Focused Feasibility Study Report (FFS) was prepared to evaluate remedial alternatives for OU-2 groundwater. The FFS identified, screened, and evaluated potential remedial alternatives for OU-2 groundwater against threshold criteria including protection of human health and the environment, and compliance with NYS SCG; and against balancing criteria including short-term effectiveness, long-term effectiveness and permanence, reduction of toxicity, mobility or volume, implementability, cost-effectiveness, and community acceptance. The remedial alternative that was selected by NYSDEC for OU-2 groundwater is Alternative G2: Institutional Controls. This alternative is presented in Section 2.7.

The FFS also evaluated exposure pathways for OU-2. An exposure pathway describes the means by which an individual may be exposed to contaminants originating from a site. An exposure pathway has five elements: i) a contaminant source, ii) a contaminant migration route, iii) a point of exposure, and iv) a route of exposure for v) a receptor population. If any of these elements are not present, the exposure pathway is considered incomplete. Currently, there are no known complete exposure pathways for OU-2.

An exposure pathway is considered a potential pathway when one or more of the elements currently does not exist, but could in the future. Potential pathways that could exist in the future include:

1) Inhalation of vapors from contaminants in the groundwater for construction workers involved in future excavation activities
2) Inhalation of vapors accumulating in the indoor air via the vapor intrusion pathway into structures constructed on Site in the future
3) Ingestion, dermal contact and/or inhalation of vapors from contaminated groundwater if drinking water or irrigation wells are installed on Site in the future

The OU-2 off-property groundwater plume is presently monitored on a semi-annual basis for VOCs and Site-specific parameters and on a biennial basis for an expanded list

of locations and parameters including SVOCs and SVOC TICs at select locations. An expanded sampling event for SVOCs, including lidocaine and phenobarbital, and SVOC Tentatively Identified Compounds (TICs) was completed during the Biennial Groundwater Sampling event in June 2010.

2.4 GROUNDWATER HYDROGEOLOGY

Three water-bearing zones have been identified in the vicinity of the Site. The water-bearing zones from shallowest to deepest are:

1) Upper Unconsolidated Aquifer (at a depth of 10 to 90 feet) that consists of gravel and sand and is overlain by silt.
2) Lower Unconsolidated Aquifer (at a depth of 80 to 100 feet) that consists of till and is separated from the upper aquifer by a clay aquitard. The Lower Unconsolidated Aquifer is not present at all locations beneath OU-1 and OU-2
3) the Bedrock Aquifer (at a depth of 45 to 120 feet).

Groundwater flow in the Upper Unconsolidated Aquifer is influenced by a geologic trough and moves in a northwest direction towards the Hudson River. The Hudson River exerts a tidal influence on groundwater in the vicinity of the Site. The tidal effect varies from approximately 0.08 feet at monitoring wells near the inactive landfill to 2 feet at monitoring wells closest to the Hudson River. Groundwater elevations from June 2010 are presented on Figure 2.1.

2.5 NATURE AND EXTENT OF CONTAMINATION

Previous Site investigations indicated that the subsurface within OU-1 consists of approximately 8 feet of a heterogeneous mixture of silt, sand, and clay fill underlain by 6 feet of lower permeability silt, silty clay, and clayey silt. The upper layer was characterized as being mixed with waste products such as glass vials, flasks, wood, and needles. Drums of material have been excavated from the OU-1 area during remedial activities between 1989 and 1990. Following drum removal, sampling conducted at the Site indicated the presence of several "hot spots" in OU-1 composed of VOCs, which have been, and continue to be, addressed by the VE System. The primary contaminants of concern at OU-1 include benzene, toluene, acetone, ethyl ether, 1,2-dichloroethane, trichloroethylene, and chloroform. In addition, a groundwater plume, consisting of ethyl ether and pharmaceutical SVOCs has been detected in OU-2. The Site GWTS

intercepted impacted groundwater downgradient of the source area OU-1, and the treated effluent from the GWTS was discharged back into the groundwater northwest of the landfill and appears to have been a contributor to the OU-2 groundwater plume. The OU-2 plume extends to the northwest of the western boundary of OU-1 and is approximately 2,400 feet long and 750 feet wide along the line of groundwater flow. The plume has migrated to several downgradient, off-Site property parcels. The GWTS ceased operations in March 2007 due to mechanical failures. Monitoring of OU-1 and OU-2 groundwater wells is currently being conducted on a semi-annual basis. The primary constituents (contaminants of concern) detected in the OU-2 plume are ethyl ether, and pharmaceutical SVOCs such as lidocaine, phenobarbital, talbutal, mephobarbital, hexobarbital, and pentazocine.

2.6 GROUNDWATER QUALITY

Groundwater flows towards the Hudson River 2,200 feet away from the Site and surface water runoff from the Site flows to Papscanee Creek. Groundwater in the vicinity of the Site contains naturally elevated iron and manganese concentrations, which discourages its use as a drinking water source and makes it considered non-potable.

Previous investigations have identified benzene, toluene, ethyl ether, methylene chloride, acetone, methylthiophene, 1,2-dichloroethane, trichloroethylene, and chloroform as the primary chemicals of concern in OU-1 groundwater. Concentrations were typically 1 to 2 orders of magnitude higher than the corresponding groundwater remediation goals. However, the GWTS, VE system and Air Sparging system were effective in reducing the levels of the majority of these contaminants in OU-1.

During investigations, a groundwater plume consisting primarily of ethyl ether and SVOCs in the Upper Unconsolidated Aquifer was identified as emanating from the inactive landfill area to off-Site agricultural/open land. This plume of groundwater that has been impacted by Site constituents is defined as OU-2. Groundwater in OU-2 is monitored under the Site semi-annual and biennial groundwater sampling programs.

The lower portion ("B" wells) of the Upper Unconsolidated Aquifer has higher observed concentrations of Site-related constituents than the upper portions ("A" wells) of the Upper Unconsolidated Aquifer. The Bedrock Aquifer does not appear to have been impacted by Site-related constituents.

The majority of VOCs and SVOCs analyzed within OU-2 is either at non-detect levels, or has been reduced to below detection levels. Ethyl ether and some pharmaceutical

SVOCs remain above the NYSDOH Part 5, Drinking Water, Unspecified Organic Contaminant (UOC) standard of 0.050 parts per minute (ppm) milligrams per liter (mg/L) and have impacted a number of off-Site, private property parcels.

Detected VOCs and SVOCs from 2004 to 2010 are presented on Figure 2.2. Detections of VOCs and SVOCs, and SVOC TICs from the June 2010 monitoring event are presented in Table 2.1 and Table 2.2, respectively. The reported results for ethyl ether, lidocaine and phenobarbital from the June 2010 monitoring event are presented on Figure 2.3. Detections of these constituents above the UOC standard are centered near the axis between MW-2S and MW-19B.

The 2010 ROD stated that viable exposure pathways to fish and wildlife receptors from groundwater discharges to the Hudson River were not of concern due to the low volume of potential groundwater contamination emerging to the River and the River's waste assimilation capacity.

2.7 SELECTED REMEDIAL ALTERNATIVE

The remediation goals for the Site are to eliminate or reduce to the extent practicable:

1) The ingestion of groundwater with contaminant levels exceeding drinking water standards
2) The contact with volatiles and/or semi-volatiles, or inhalation of volatiles, from contaminated groundwater

The remediation goals for the Site also include attaining to the extent practicable:

1) Drinking water standards, based upon the potential to use groundwater as a drinking water source, for the Site-specific, regulated, unspecified organic contaminants (UOCs)
2) Restoration of the groundwater aquifer for the Site-related contaminants

In the 2010 ROD, NYSDEC selected institutional controls and monitoring as the remedy for OU-2 groundwater. The components of the selected remedy from the 2010 ROD include:

"1) A remedial design program will be implemented to provide the details necessary to determine the exact location and number of area properties impacted above

the applicable SCGs and to provide additional information for the design of the monitoring program element of the proposed remedy.

2) Imposition of an institutional control (ICs) in the form of an environmental easement that will require (a) development and compliance with an approved site management plan (SMP); (b) if groundwater is to be utilized at the site for drinking water or process water, then an acceptable water supply alternative or the necessary water quality treatment as determined by NYSDOH for the Sterling Drug Site 3 related contaminants of concern will be provided; (c) the on-site property owner (NPEC) to complete and submit to the Department a periodic certification of the institutional and engineering controls; and (d) the on-site property owner (NPEC) will be required to enter into an order on consent with the Department, to ensure the long term implementation, maintenance, monitoring and enforcement of the institutional controls for both the on and off-site areas.

3) Development of a site management plan which will include the following institutional and engineering controls: (a) management of the final cover system; (b) continued evaluation of the potential for vapor intrusion for any buildings developed on the site or in the area of the off-site groundwater contamination, including provision for mitigation of any impacts identified; (c) if groundwater contaminated with site related chemicals is to be utilized at the off-site property(s) for drinking water or process water, then an acceptable water supply alternative or the necessary water quality treatment as determined by NYSDOH will be provided; (d) monitoring of groundwater and soil vapor; (e) identification of any use restrictions on the site; (f) controlling site access where warranted; (g) provisions for the continued proper operation and maintenance of the components of the remedy.

4) The on-site property owner (NPEC) will provide a periodic certification of institutional and engineering controls, prepared and submitted by a professional engineer or such other expert acceptable to the Department, until the Department states in writing that this certification is no longer needed. This submittal will: (a) contain certification that the institutional controls and engineering controls put in place are still in place and are either unchanged from the previous certification or are compliant with Department-approved modifications; (b) allow the Department access to the site; and (c) state that nothing has occurred that will impair the ability of the control to protect public health or the environment, or constitute a violation or failure to comply with the site management plan unless otherwise approved by the Department.

5) The operation of the components of the remedy will continue until the remedial objectives have been achieved, or until the Department determines that continued operation is technically impracticable or not feasible.

6) In the event that an element(s) of the proposed remedy cannot be implemented, then alternative G5 [ex-situ groundwater treatment] will be implemented as the contingency remedy. A long-term monitoring program will be instituted. This program will provide the data and other information required to monitor the localized contaminant concentrations as well as the area wide contaminant migration and thus the need for groundwater point of use treatment and/or soil vapor mitigation. The monitoring program will be a component of the long-term management for the site."

3.0 ADDITIONAL INVESTIGATION ACTIVITIES

Investigative activities for OU-2 groundwater will be performed to address Item 1) of the 2010 ROD to further delineate the location and number of area properties impacted above the applicable SCGs and to provide additional information for the design of the monitoring program element of the proposed remedy. Field activities will be performed in accordance with the HASP in Appendix A. The analytical results generated from this additional investigation will be used with existing sampling data (June 2010) to delineate the properties impacted by the contaminants of concern above applicable SCGs.

3.1 MONITORING WELL INSTALLATION

Seven monitoring wells MW-20B to MW-26B will be installed to further delineate the groundwater plume in OU-2. The proposed monitoring well locations, adjacent property owners and corresponding tax parcel numbers, and the extent of the OU-02 plume are presented on Figure 3.1. It should be noted that easements need to be established to allow for the installation and continued access to the proposed monitoring wells. Locations may need be modified in the event that an easement cannot be negotiated with the landowner in a timely manner. The proposed locations for the monitoring wells are summarized below.

MW-20B: To be installed on the eastern side of the National Grid property west of American Oil Road (Riverside Avenue Extension), labeled tax parcel #165.-1-31.2. This groundwater monitoring location will further define the extent of the groundwater plume in the southern direction.

MW-21B: To be installed on NPEC property, labeled tax parcel #165.-1-31.2, in the northwest corner adjacent to American Oil Road. This groundwater monitoring location will further define the extent of the groundwater plume in the western direction.

MW-22B: To be installed in the north central section of the Webb property, labeled tax parcel #165.-1-32. This groundwater monitoring location will further define the extent of the groundwater plume in the western direction.

MW-23B and MW-24B: Two monitoring wells to be installed along the northern boundary of the Riverside Ave Corporation property, labeled tax parcel #165.-1-30. These groundwater monitoring locations will further define the extent of the groundwater plume in the western direction.

MW-25B and MW-26B: Two monitoring wells to be installed along the north boundary of the Riverside Ave Corporation property, labeled tax parcel #165.-1-33.1. These groundwater monitoring locations will further define the extent of the groundwater plume in the northern direction.

The boring for the monitoring well will be advanced to the bottom of the Upper Unconsolidated Aquifer. The estimated depths of the borings are 48 feet below ground surface. Each boring will be completed as follows:

1) The boring location will be finalized in the field and marked
2) Utility locates will be performed. If necessary, the location of the boring may be moved
3) Plywood and protective plastic sheeting will be placed on the ground at the borehole location
4) Air monitoring in accordance with the HASP and the Community Air Monitoring Plan (CAMP) will be performed
5) Downhole equipment will be steam cleaned prior to use
6) Boring will be advanced using hollow stem augers
7) Continuous split spoon samples will be collected
8) The samples will be screened with a photoionization detector (PID)
9) The samples will be described and classified according to the Unified Soil Classification System (USCS)
10) Notes on sample depth, blow counts, sample recovery, PID readings, soil descriptions, stratigraphy, moisture and water conditions, drilling conditions will be recorded
11) Drilling equipment that may have potentially contacted contaminated media will be decontaminated prior to leaving the Site

The boring will be completed as a monitoring well as follows:

1) The well will be constructed of 2-inch, threaded, Schedule 40 PVC well screen and riser pipe. The well screen will be 20 feet long with No. 10 slots. The riser will be completed with a 3-foot stickup.
2) The sand pack will consist of clean, inert, siliceous material. The sand pack will be completed from 0.5 feet below the screen to 2 feet above the well screen. The

top 0.5 feet of the sand pack will consist of finer sand than the remainder of the sand pack. The sand pack will be placed using a tremie line.

3) A 2-foot thick bentonite seal will be placed above the sand pack. The bentonite seal will be placed using a tremie line.

4) The annulus above the bentonite seal will be filled with cement-bentonite grout to 2 feet below ground surface. The cement-bentonite grout will be placed using a tremie line.

5) A lockable, protective surface casing will be set in a concrete surface seal. A drain will be drilled near the base of the protective casing.

6) Well installation details will be recorded.

7) The top of riser will be marked for subsequent water level measurements.

8) The well ID will be marked on the protective casing.

9) The protective casing will be locked.

10) The location and elevations of the monitoring well will be surveyed. The elevation of the reference point will be measured to the nearest 0.01 foot.

The monitoring well will be developed after the bentonite seal and grout have set. After each well volume is removed, a sample will be collected and field analyzed for turbidity, temperature, pH, and conductivity. Development will continue until two consecutive and consistent readings of temperature, pH, and conductivity are obtained and the turbidity is less than 50 NTUs, if possible. Readings will be considered consistent if consecutive conductivity, temperature, and pH values are within 10 percent of each other. In the event that these field conditions cannot be met, development will continue to a silt-free condition of less than 50 NTUs or until a maximum of ten well volumes have been removed.

The soil cuttings and purged water will be containerized, staged on Site, and sampled for disposal purposes. Soil cuttings that are determined by visual inspection to be not grossly contaminated and non-hazardous may be placed under the cover system for OU-1. All coveralls, gloves, etc. will be collected in plastic bags for disposal off of the Site.

A Snap Sampler assembly will be installed in the monitoring well a minimum of one week after well development for future monitoring.

3.2 GROUNDWATER SAMPLING ACTIVITIES

Groundwater samples will be collected from the locations presented in Table 3.1. The locations are presented on Figure 3.1. The new monitoring well locations (MW-20B to MW-26B) will be sampled approximately three weeks after well development.

At each monitoring well, the well ID will be confirmed and the well integrity will be recorded. The headspace at the well will be monitored after the well cap is opened. The monitoring wells will be sampled using a Snap Sampler. The Snap Sampler will be pre-deployed in the monitoring wells a minimum of 1 week prior to sampling. The VOC samples will be preserved in the field. Quality assurance/quality control (QA/QC) will be collected in accordance with the QAPP.

Water levels will be measured from all of the monitoring wells in the monitoring network during each sampling event. Water levels will be collected using a water level meter to the nearest 0.01 foot. The water level probe will be rinsed between locations using distilled water.

The following parameters will be measured in the field for these locations after the Snap Sampler bottles have been retrieved.

1) Electrical conductivity
2) pH
3) Dissolved oxygen
4) Redox potential
5) Temperature

Samples will be labeled in accordance with the QAPP. Samples will be placed on ice or cooler packs in laboratory supplied coolers immediately after collection and labeling. Samples will remain in coolers under the control of the sampling personnel in the field until relinquished to the delivery firm. Samples will be delivered to the laboratory by courier under chain-of-custody procedures in accordance with the QAPP. Chain-of-custody documents will be completed for each sample cooler. The original and copy of the chain-of-custody will be placed within the cooler. A third copy will be retained by the sampler. In addition, Field Sampling Data Sheets and a sample log of samples collected and shipped off Site will be maintained on Site.

The data obtained from sampling the seven new monitoring points will be evaluated with the June 2010 Biennial sampling data to delineate the extent of properties impacted by contaminants of concern above the applicable SCGs.

3.3 ANALYTICAL REQUIREMENTS

The groundwater samples from the monitored RAWP locations will be analyzed for Target Compound List (TCL) VOCs plus ethyl ether, TCL SVOCs plus lidocaine and phenobarbital, and SVOC TICs. Laboratory analyses will be conducted by a New York state certified laboratory. The analyses will be performed and validated in accordance with the QAPP in Appendix B.

3.4 EQUIPMENT CLEANING

Prior to mobilization of the drill rig it shall be thoroughly cleaned to remove oil, grease, mud, and other foreign matter. Subsequently, before initiating drilling at each borehole, samplers, drill steel, hollow-stem auger sections, and associated equipment will be cleaned to prevent cross-contamination from the previous drilling location. Cleaning will be accomplished by flushing and wiping the components to remove all visible particulates and other solid material followed by a thorough high pressure water wash. Special attention will be given to the threaded sections of the drill rods and the soil sampling equipment.

Equipment not used for collection of samples for chemical analyses will be cleaned as follows:

1) Clean off any gross contamination with a stiff brush
2) Wash and scrub using laboratory grade non-phosphate detergent
3) Rinse with potable water

4.0 HEALTH AND SAFETY PLAN

The project HASP including the CAMP is presented in Appendix A. Although drilling will not occur through source material and volatile emissions are anticipated to be minimal, air monitoring during drilling activities will be performed.

The HASP has been prepared consistent with applicable governmental and non-governmental regulations and guidelines. In particular, the amended rules of OSHA Subpart H of Part 1910 (Title 29 Code of Federal Regulations (CFR) Part 1910.120) and the New York State Department of Health Generic Community Air Monitoring Plan.

Contractors will be required to provide Health and Safety Plans for their employees working at the Site that meet the minimum standards of the HASP in Appendix A.

5.0 SCHEDULE

The tentative project schedule is presented on Figure 5.1.

Actual scheduling and sequencing of project activities will be revised, as necessary, based on approvals, contractor availability, analytical data, etc. The schedule may be adjusted as activities proceed, and NYSDEC will be advised of any changes. NYSDEC will be notified at least 7 days in advance of the commencement of drilling and groundwater sampling activities under the RAWP.

6.0 REPORTING

Reporting associated with the RAWP shall consist of:

i) Monthly Progress Reports

ii) Final Report

These reports will include the content described in the following paragraphs.

Monthly Progress Reports: In accordance with the Order, monthly progress reports will continue to be submitted on the 10th day of each month. The monthly progress reports include descriptions of actions taken during the reporting period, anticipated actions for the next reporting period, approved modifications or changes to the scope, sampling and analytical results, if any, information regarding percentage of completion, unresolved delays, and citizen participation activities.

Final Report: The Final Report shall be submitted to NYSDEC within 90 days following receipt of the final analytical reports from the laboratory.

The Final Report shall include:

i) Descriptions of all work performed.

ii) Descriptions of deviations from the Work Plan with explanations of why the deviations were required.

iii) Presentation of the field and analytical data (including a delineation of the extent of properties impacted by the contaminants of concern above applicable SCGs). In addition to a hard copy report, all analytical results and supporting information will be submitted in the NYSDEC electronic data deliverable (EDD) format.

iv) An evaluation of the satisfaction of the remedial action objectives

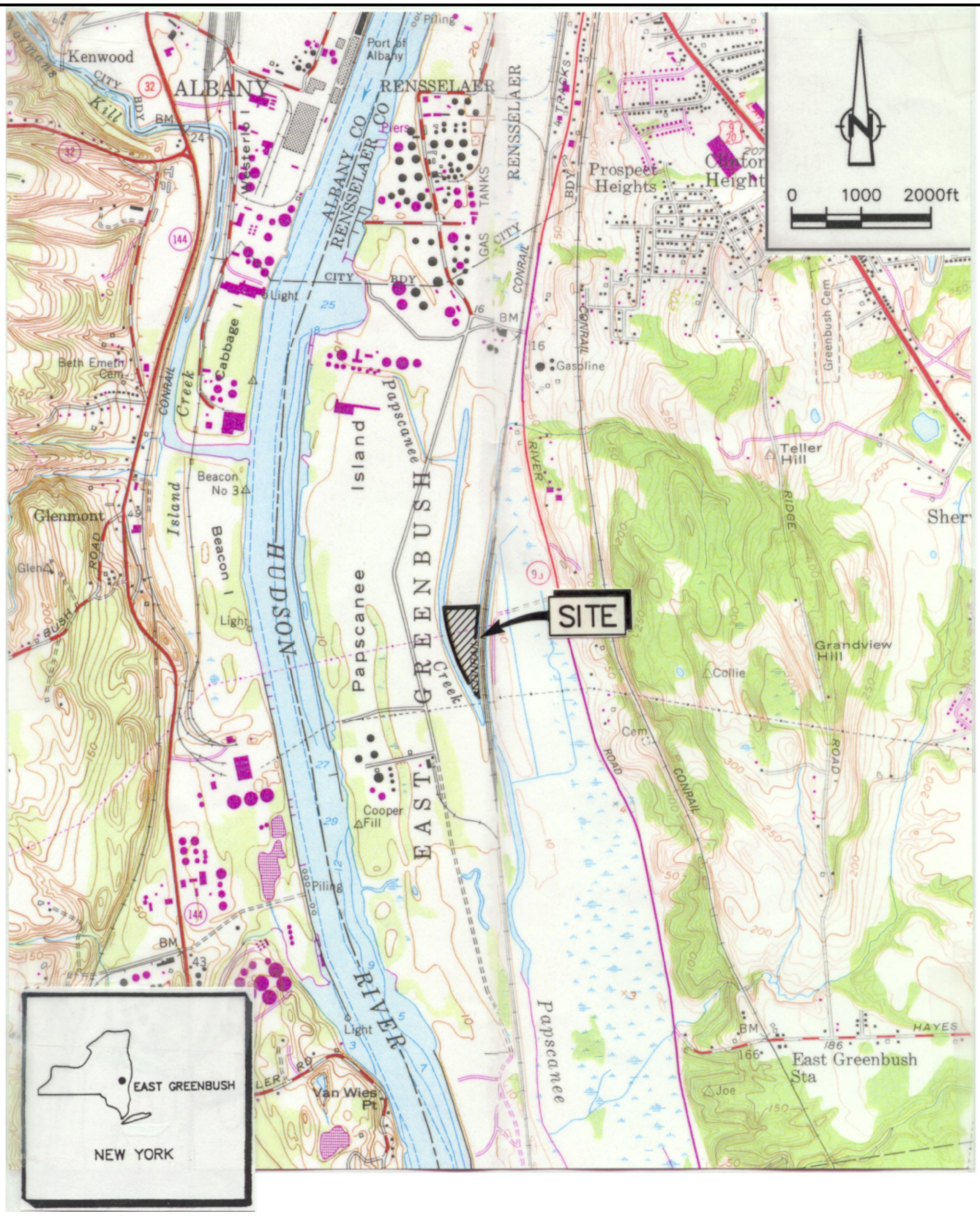
v) Records of disposal

The Final Report shall be prepared in accordance with the Order, with 6 NYCRR 375-1.6(b) and with DER-10 and shall include the following certification signed and sealed by a Professional Engineer:

"I _____ certify that I am currently a NYS registered professional engineer and that this Report was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and

Remediation (DER-10) and that all activities were performed in full accordance with the DER-approved work plan and any DER-approved modifications."

The results of the Final Report will be incorporated into the Site Management Plan (SMP).



SOURCE:
U.S.G.S. TOPOGRAPHIC MAP QUADRANGLE
DELMAR AND EAST GREENBUSH, N.Y.

figure 1.1

SITE LOCATION
STERLING SITE 3
East Greenbush, New York

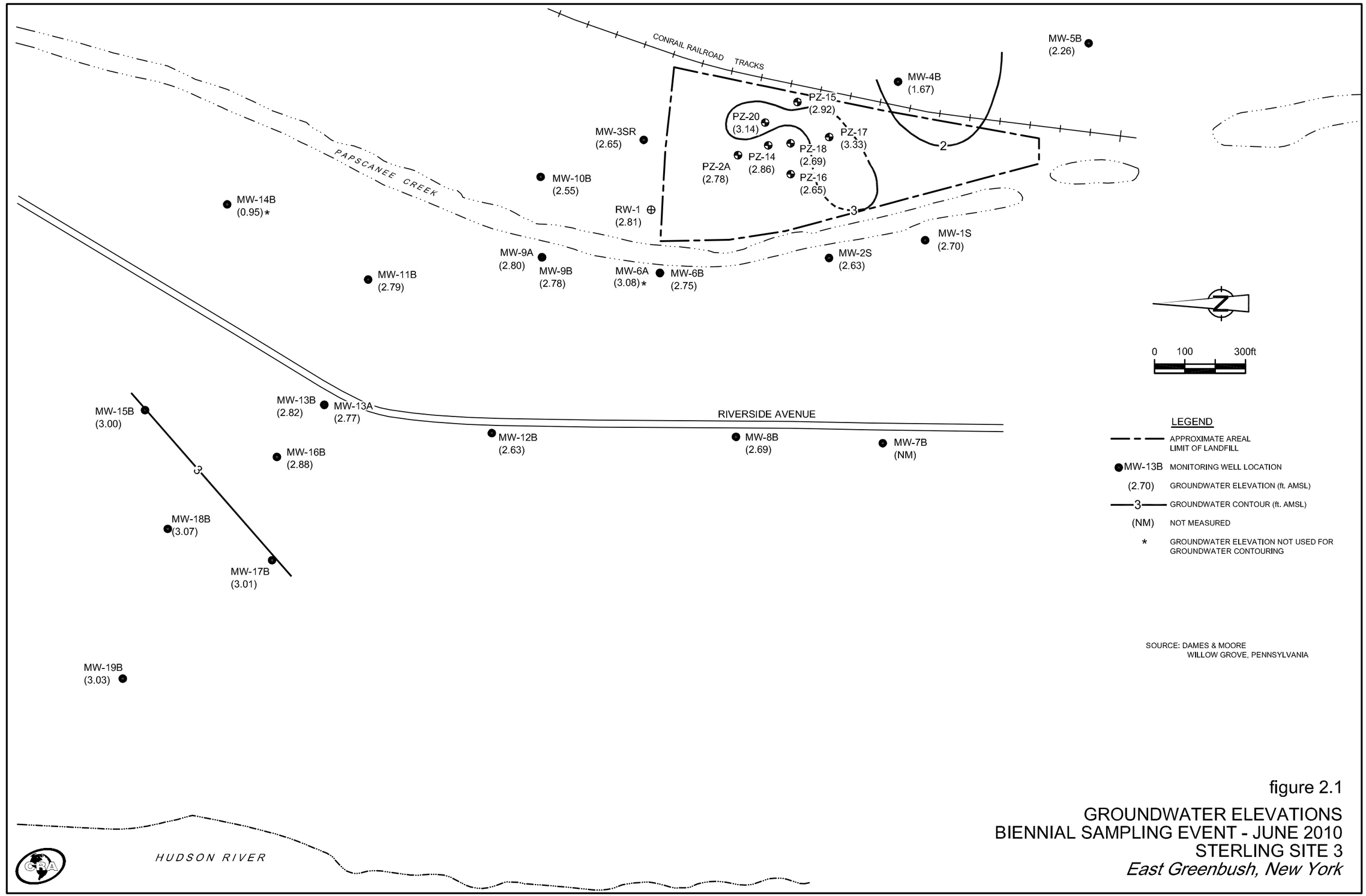
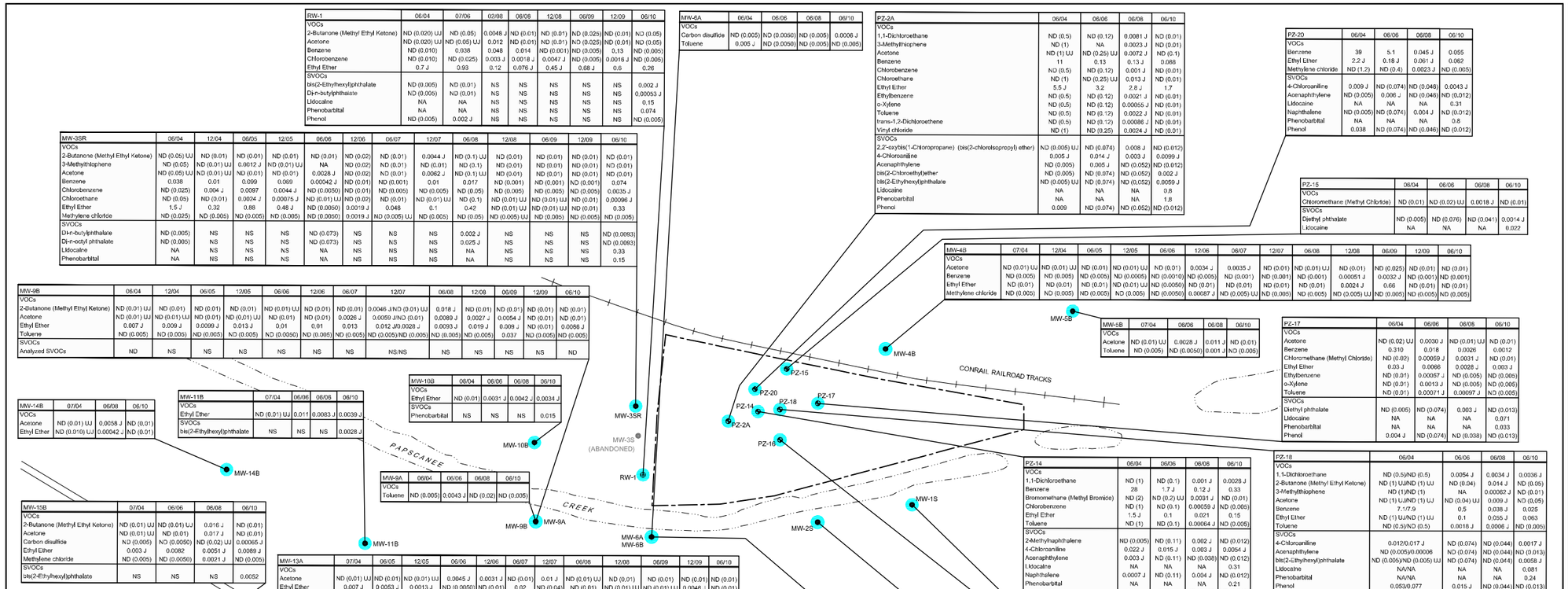


figure 2.1

GROUNDWATER ELEVATIONS
BIENNIAL SAMPLING EVENT - JUNE 2010
STERLING SITE 3
East Greenbush, New York

07830-20(095)GN-WA002 SEP 30/2010



RW-1	06/04	07/06	02/08	06/08	12/08	06/09	12/09	06/10
VOCs								
2-Butanone (Methyl Ethyl Ketone)	ND (0.020) UJ	ND (0.05)	0.0046 J	ND (0.01)	ND (0.01)	ND (0.025)	ND (0.01)	ND (0.05)
Acetone	ND (0.020) UJ	ND (0.05) UJ	0.012	ND (0.01)	ND (0.01)	ND (0.025)	ND (0.01)	ND (0.05)
Benzene	ND (0.010)	0.038	0.048	0.014	ND (0.001)	ND (0.005)	0.13	ND (0.005)
Chlorobenzene	ND (0.010)	ND (0.025)	0.003 J	0.0018 J	0.0047 J	ND (0.005)	0.0016 J	ND (0.005)
Ethyl Ether	0.7 J	0.93	0.12	0.076 J	0.45 J	0.68 J	0.6	0.26
SVOCs								
bis(2-Ethylhexyl)phthalate	ND (0.005)	ND (0.01)	NS	NS	NS	NS	NS	0.002 J
Di-n-butylphthalate	ND (0.005)	ND (0.01)	NS	NS	NS	NS	NS	0.00053 J
Lidocaine	NA	NA	NS	NS	NS	NS	NS	0.15
Phenobarbital	NA	NA	NS	NS	NS	NS	NS	0.074
Phenol	ND (0.005)	0.002 J	NS	NS	NS	NS	NS	ND (0.005)

MW-6A	06/04	06/06	06/08	06/10
VOCs				
Carbon disulfide	ND (0.005)	ND (0.0050)	ND (0.005)	0.0006 J
Toluene	0.005 J	ND (0.0050)	ND (0.005)	ND (0.005)

PZ-2A	06/04	06/06	06/08	06/10
VOCs				
1,1-Dichloroethane	ND (0.5)	ND (0.12)	0.0081 J	ND (0.01)
3-Methylthiophene	ND (1)	NA	0.0023 J	ND (0.01)
Acetone	ND (1) UJ	ND (0.25) UJ	0.0072 J	ND (0.1)
Benzene	11	0.13	0.13 J	0.088
Chlorobenzene	ND (0.5)	ND (0.12)	0.001 J	ND (0.01)
Chloroethane	ND (1)	ND (0.25) UJ	0.013 J	ND (0.01)
Ethyl Ether	5.6 J	2.8 J	1.7	
Ethylbenzene	ND (0.5)	ND (0.12)	0.0021 J	ND (0.01)
o-Xylene	ND (0.5)	ND (0.12)	0.00055 J	ND (0.01)
Toluene	ND (0.5)	ND (0.12)	0.0022 J	ND (0.01)
trans-1,2-Dichloroethene	ND (0.5)	ND (0.12)	0.00086 J	ND (0.01)
Vinyl chloride	ND (1)	ND (0.25)	0.0024 J	ND (0.01)
SVOCs				
2,2'-oxybis(1-Chloropropane) (bis(2-chloroisopropyl) ether)	ND (0.005) UJ	ND (0.074)	0.008 J	ND (0.012)
4-Chloroaniline	0.005 J	0.014 J	0.003 J	0.0099 J
Acenaphthylene	ND (0.005)	0.005 J	ND (0.052)	ND (0.012)
bis(2-Chloroethyl)ether	ND (0.005)	ND (0.074)	ND (0.052)	0.002 J
bis(2-Ethylhexyl)phthalate	ND (0.005) UJ	ND (0.074)	ND (0.052)	0.0059 J
Lidocaine	NA	NA	NA	0.8
Phenobarbital	NA	NA	NA	1.8
Phenol	0.009	ND (0.074)	ND (0.052)	ND (0.012)

PZ-20	06/04	06/06	06/08	06/10
VOCs				
Benzene	39	5.1	0.045 J	0.055
Ethyl Ether	2.2 J	0.18 J	0.061 J	0.062
Methylene chloride	ND (1.2)	ND (0.4)	0.0023 J	ND (0.005)
SVOCs				
4-Chloroaniline	0.009 J	ND (0.074)	ND (0.048)	0.0043 J
Acenaphthylene	ND (0.005)	0.006 J	ND (0.046)	ND (0.012)
Lidocaine	NA	NA	NA	0.31
Naphthalene	ND (0.005)	ND (0.074)	0.004 J	ND (0.012)
Phenobarbital	NA	NA	NA	0.8
Phenol	0.038	ND (0.074)	ND (0.046)	ND (0.012)

PZ-15	06/04	06/06	06/08	06/10
VOCs				
Chloromethane (Methyl Chloride)	ND (0.01)	ND (0.02) UJ	0.0018 J	ND (0.01)
SVOCs				
Diethyl phthalate	ND (0.005)	ND (0.076)	ND (0.041)	0.0014 J
Lidocaine	NA	NA	NA	0.022

MW-3SR	06/04	12/04	06/05	12/05	06/06	12/06	06/07	12/07	06/08	12/08	06/09	12/09	06/10
VOCs													
2-Butanone (Methyl Ethyl Ketone)	ND (0.05) UJ	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.02)	ND (0.01)	0.0044 J	ND (0.1) UJ	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)
3-Methylthiophene	ND (0.05)	ND (0.01) UJ	0.00122 J	ND (0.01) UJ	NA	ND (0.02)	ND (0.01)	ND (0.01)	ND (0.1)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)
Acetone	ND (0.05) UJ	ND (0.01) UJ	ND (0.01)	ND (0.01)	0.0028 J	ND (0.02)	ND (0.01)	0.0062 J	ND (0.1) UJ	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)
Benzene	0.038	0.01	0.099	0.069	0.00042 J	ND (0.01)	ND (0.001)	0.01	0.017	ND (0.001)	ND (0.001)	ND (0.001)	0.074
Chlorobenzene	ND (0.025)	0.004 J	0.0097	0.0044 J	ND (0.0050)	ND (0.01)	ND (0.005)	ND (0.005)	ND (0.05)	ND (0.005)	ND (0.005)	ND (0.005)	0.0035 J
Chloroethane	ND (0.05)	ND (0.01)	0.0024 J	0.00075 J	ND (0.01) UJ	ND (0.02)	ND (0.01)	ND (0.01) UJ	ND (0.01)	ND (0.01) UJ	ND (0.01) UJ	ND (0.01)	0.00096 J
Ethyl Ether	1.5 J	0.32	0.88	0.48 J	ND (0.0050)	0.0019 J	0.048	0.1	0.42	ND (0.01) UJ	ND (0.01) UJ	ND (0.01)	0.33
Methylene chloride	ND (0.025)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.0050)	0.0019 J	ND (0.005) UJ	ND (0.005)	ND (0.05)	ND (0.005) UJ	ND (0.005)	ND (0.005)	ND (0.005)
SVOCs													
Di-n-butylphthalate	ND (0.005)	NS	NS	NS	ND (0.073)	NS	NS	NS	0.002 J	NS	NS	NS	ND (0.0093)
Di-n-octyl phthalate	ND (0.005)	NS	NS	NS	ND (0.073)	NS	NS	NS	0.025 J	NS	NS	NS	ND (0.0093)
Lidocaine	NA	NS	NS	NS	NA	NS	NS	NS	NA	NS	NS	NS	0.33
Phenobarbital	NA	NS	NS	NS	NA	NS	NS	NS	NA	NS	NS	NS	0.15

MW-4B	07/04	12/04	06/05	12/05	06/06	12/06	06/07	12/07	06/08	12/08	06/09	12/09	06/10
VOCs													
Acetone	ND (0.01) UJ	ND (0.01) UJ	ND (0.01)	ND (0.01) UJ	ND (0.01)	ND (0.01)	0.0035 J	ND (0.01)	ND (0.01) UJ	ND (0.01)	ND (0.025)	ND (0.01)	ND (0.01)
Benzene	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.0005)	ND (0.0010)	ND (0.005)	ND (0.001)	ND (0.001)	ND (0.001)	0.00051 J	0.0032 J	ND (0.001)	ND (0.001)
Ethyl Ether	ND (0.01)	ND (0.01) UJ	ND (0.01)	ND (0.01) UJ	ND (0.0050)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	0.0024 J	0.66	ND (0.01)	ND (0.01)
Methylene chloride	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.0050)	0.00087 J	ND (0.005) UJ	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005) UJ	ND (0.005)	ND (0.005)

MW-5B	07/04	06/06	06/08	06/10
VOCs				
Acetone	ND (0.01) UJ	0.0028 J	0.011 J	ND (0.01)
Toluene	ND (0.005)	ND (0.0050)	0.001 J	ND (0.005)

PZ-17	06/04	06/06	06/08	06/10
VOCs				
Acetone	ND (0.02) UJ	0.0030 J	ND (0.01) UJ	ND (0.01)
Benzene	0.310	0.018	0.0026	0.0012
Chloromethane (Methyl Chloride)	ND (0.02)	0.00059 J	0.0031 J	ND (0.01)
Ethyl Ether	0.03 J	0.0066	0.0028 J	0.003 J
Ethylbenzene	ND (0.01)	0.00057 J	ND (0.005)	ND (0.005)
o-Xylene	ND (0.01)	0.0013 J	ND (0.005)	ND (0.005)
Toluene	ND (0.01)	0.00071 J	0.00097 J	ND (0.005)
SVOCs				
Diethyl phthalate	ND (0.005)	ND (0.074)	0.003 J	ND (0.013)
Lidocaine	NA	NA	NA	0.071
Phenobarbital	NA	NA	NA	0.033
Phenol	0.004 J	ND (0.074)	ND (0.038)	ND (0.013)

MW-10B	06/04	06/06	06/08	06/10
VOCs				
Ethyl Ether	ND (0.01)	0.0031 J	0.0042 J	0.0034 J
SVOCs				
Phenobarbital	NS	NS	NS	0.015

MW-14B	07/04	06/08	06/10
VOCs			
Acetone	ND (0.01) UJ	0.0058 J	ND (0.01)
Ethyl Ether	ND (0.010) UJ	0.00042 J	ND (0.01)

MW-11B	07/04	06/06	06/08	06/10
VOCs				
Ethyl Ether	ND (0.01) UJ	0.011	0.0083 J	0.0039 J
SVOCs				
bis(2-Ethylhexyl)phthalate	NS	NS	NS	0.0028 J

MW-9A	06/04	06/06	06/08	06/10
VOCs				
Toluene	ND (0.005)	0.0043 J	ND (0.02)	ND (0.005)

PZ-14	06/04	06/06	06/08	06/10
VOCs				
1,1-Dichloroethane	ND (1)	ND (0.1)	0.001 J	0.0028 J
Benzene	28	1.7 J	0.12 J	0.33
Bromomethane (Methyl Bromide)	ND (2)	ND (0.2) UJ	0.0031 J	ND (0.01)
Chlorobenzene	ND (1)	ND (0.1)	0.00059 J	ND (0.005)
Ethyl Ether	1.5 J	0.1	0.021	0.15
Toluene	ND (1)	ND (0.1)	0.00064 J	ND (0.005)
SVOCs				
2-Methylnaphthalene	ND (0.005)	ND (0.11)	0.002 J	ND (0.012)
4-Chloroaniline	0.022 J	0.015 J	0.003 J	0.0054 J
Acenaphthylene	0.003 J	ND (0.11)	ND (0.038)	ND (0.012)
Lidocaine	NA	NA	NA	0.31
Naphthalene	0.0007 J	ND (0.11)	0.004 J	ND (0.012)
Phenobarbital	NA	NA	NA	0.21
Phenol	0.042	0.092 J	ND (0.038)	ND (0.012)

PZ-18	06/04	06/06	06/08	06/10
VOCs				
1,1-Dichloroethane	ND (0.5)/ND (0.5)	0.0054 J	0.0034 J	0.0036 J
2-Butanone (Methyl Ethyl Ketone)	ND (1) UJ/ND (1) UJ	ND (0.04)	0.014 J	ND (0.05)
3-Methylthiophene	ND (1)/ND (1)	NA	0.00062 J	ND (0.01)
Acetone	ND (1) UJ/ND (1) UJ	ND (0.04) UJ	0.009 J	ND (0.05)
Benzene	7.1/7.9	0.038 J	0.025	
Ethyl Ether	ND (1) UJ/ND (1) UJ	0.1	0.055 J	0.063
Toluene	ND (0.5)/NO (0.5)	0.0018 J	0.0006 J	ND (0.005)
SVOCs				
4-Chloroaniline	0.012/0.017 J	ND (0.074)	ND (0.044)	0.0017 J
Acenaphthylene	ND (0.005)/0.00006	ND (0.074)	ND (0.044)	ND (0.013)
bis(2-Ethylhexyl)phthalate	ND (0.005)/ND (0.005) UJ	ND (0.074)	ND (0.044)	0.0058 J
Lidocaine	NA/NA	NA	NA	0.081
Phenobarbital	NA/NA	NA	NA	0.24
Phenol	0.053/0.077	0.015 J	ND (0.044)	ND (0.013)

MW-8B	07/04	06/06	06/08	06/10
VOCs				
Acetone	ND (0.01) UJ	0.0046 J	0.028 J	ND (0.01)
Ethyl Ether	ND (0.01)	ND (0.0050)	0.0018 J	0.0023 J
Methylene chloride	ND (0.005)	ND (0.0050)	0.0024 J	ND (0.005)
SVOCs				
Di-n-butylphthalate	NS	NS	NS	0.00045 J
Phenobarbital	NS	NS	NS	0.028

MW-13A	07/04	06/05	12/05	06/06	12/06	06/07	12/07	06/08	12/08	06/09	12/09	06/10
VOCs												
Acetone	ND (0.01) UJ	ND (0.01)	ND (0.01) UJ	0.0045 J	0.0031 J	ND (0.01)	0.01 J	ND (0.01) UJ	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)
Ethyl Ether	0.007 J	0.0053 J	0.0013 J	ND (0.0050)	ND (0.01)	0.02	ND (0.04)	ND (0.01)	ND (0.01) UJ	ND (0.01) UJ	0.0046 J	ND (0.01)
SVOCs												
Di-n-butylphthalate	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.00036 J

MW-1S	07/04	06/06	06/08	06/10
VOCs				
Ethyl Ether	0.004 J	ND (0.0050)	ND (0.04) UJ	ND (0.01)

MW-18B	07/04	06/06	06/08	06/10
VOCs				
Carbon disulfide	ND (0.005)	ND (0.0050)	0.00062 J	ND (0.005)
Ethyl Ether	0.014 J	0.36	0.29 J	0.36
SVOCs				
Di-n-butylphthalate	NS	NS	NS	0.00091 J
Lidocaine	NS	NS	NS	0.019
Phenobarbital	NS	NS	NS	0.09

MW-12B	07/04	06/05	12/05	06/06	12/06	06/07	12/07	06/08	12/08	06/09	12/09	06/10
VOCs												
2-Butanone (Methyl Ethyl Ketone)	ND (0.01) UJ	ND (0.01)	ND (0.01)	ND (0.02)	ND (0.02)	ND (0.05)	0.0048 J	ND (0.04) UJ	0.003 J	ND (0.01)	ND (0.01)	ND (0.01)
Acetone	ND (0.01) UJ	0.0029 J	ND (0.01)	ND (0.02)	0.011 J	ND (0.05)	0.0052 J	ND (0.04) UJ	0.016	ND (0.01)	ND (0.01)	ND (0.01)
Carbon disulfide	ND (0.005)	0.00022 J	ND (0.005)	ND (0.01)	ND (0.01)	ND (0.025)	ND (0.005)	ND (0.02)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)
Ethyl Ether	1.1 J	0.69	0.078 J	0.14	0.2	2	0.42	0.7 J	1.3 J	1.3	0.87	1.4
Methylene chloride	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.01) UJ	0.0017 J	ND (0.025) UJ	ND (0.005)	ND (0.02)	ND (0.005) UJ	ND (0.005)	ND (0.005)	ND (0.005)
Toluene	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.01)	0.014	0.0035 J	ND (0.005)	ND (0.02)	0.022	ND (0.005)	ND (0.005)	ND (0.005)
Trichloroethene	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.01)	ND (0.01)	ND (0.025)	ND (0.005)	ND (0.02)	ND (0.005)	ND (0.005)	ND (0.005)	0.0016 J
SVOCs												
Di-n-butylphthalate	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.00043 J
Lidocaine	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.0076
Phenobarbital	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.095

PZ-16	06/04	06/06	06/08	06/10
VOCs				
1,1-Dichloroethane	0.003 J	ND (0.025)	ND (0.25)	ND (0.01)
1,2-Dichloroethane	0.019	0.012 J	ND (0.25)	0.01
Benzene	0.089	0.027	ND (0.05)	0.035
Carbon tetrachloride	ND (0.005)	0.0094 J	ND (0.25)	ND (0.01)
Chloroform (Trichloromethane)	0.002 J	0.0031 J	ND (0.25)	ND (0.01)
Ethyl Ether	0.091 J	ND (0.025)	ND (0.5)	0.063
Toluene	ND (0.005)	0.0030 J	ND (0.25)	ND (0.01)
SVOCs				
2,4-Dichlorophenol	ND (0.005)	ND (0.073)	ND (0.036)	0.002 J
2,4-Dimethylphenol	0.004 J	ND (0.073)	ND (0.036)	0.0019 J
2-Methylphenol	0.001 J	ND (0.073)	ND (0.036)	ND (0.012)
Lidocaine	NA	NA	NA	0.13
Phenobarbital	NA	NA	NA	0.05
Phenol	0.001 J	ND (0.073)	ND (0.036)	ND (0.012)

MW-13B	07/04	12/04	06/05	12/05	06/06	12/06	06/07	02/08	06/08	12/08	07/09	12/09	06/10
VOCs													
2-Butanone (Methyl Ethyl Ketone)	ND (0.01) UJ	ND (0.01)	ND (0.01)/ND (0.01)	ND (0.01)	ND (0.01) UJ	ND (0.04)	ND (0.01)/ND (0.05)	0.0078 J	0.033 J	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.05)
Acetone	ND (0.01) UJ	ND (0.01) UJ	0.0039 J/0.0037 J	0.0029 J	ND (0.01)	ND (0.04)	ND (0.01)/ND (0.05)	0.0085 J	0.02 J	0.0035 J	0.0021 J	ND (0.01)	ND (0.05)
Carbon disulfide	ND (0.005)	ND (0.005) UJ	R/ND (0.005) UJ	ND (0.005)	ND (0.0050)	ND (0.02)	ND (0.005)/ND (0.025)	ND (0.005)	ND (0.02)	ND (0.005)	0.0027 J	ND (0.005)	ND (0.005)
Ethyl Ether	0.54 J	0.31	0.16/0.17	0.13 J	0.6	0.51	0.45/0.41	0.41	0.64 J	0.017 J	0.00064 J	ND (0.01)	0.21
Methylene chloride	ND (0.005)	ND (0.005)	ND (0.005)/ND (0.005)	ND (0.005)	ND (0.0050)	0.0031 J	ND (0.005) UJ/0.0036 J	ND (0.005)	ND (0.02)	ND (0.005) UJ	ND (0.005)	ND (0.005)	ND (0.005)
SVOCs													
bis(2-Ethylhexyl)phthalate	0.00005 J	NS	ND (0.01)/ND (0.01)	NS	ND (0.071)	NS	NS/NS	NS	ND (0.052)	NS	NS	NS	0.003 J
Di-n-butylphthalate	ND (0.005)	NS	ND (0.01)/ND (0.01)	NS	ND (0.071)	NS	NS/NS	NS	0.003 J	NS	NS	NS	0.00055 J
Lidocaine	NA	NS	NA/NA	NS	NA	NS	NS/NS	NS	NA	NS	NS	NS	0.081
Phenobarbital	NA	NS	NA/NA	NS	NA	NS	NS/NS	NS	NA	NS	NS	NS	0.13

MW-7B	07/04	06/06	06/08
VOCs			
2-Butanone (Methyl Ethyl Ketone)	ND (0.01) UJ/ND (0.01) UJ	ND (0.01) UJ	0.021 J
Acetone	ND (0.01) UJ/ND (0.01) UJ	ND (0.01)	0.014 J
Methylene chloride	ND (0.005)/ND (0.005)	ND (0.0050)	0.0025 J

MW-17B	07/04	06/05	12/05	06/06	12/06	06/07	12/07	06/08	12/08	06/09	12/09	06/10
VOCs												
Acetone	ND (0.1) UJ	ND (0.01)	ND (0.01)	ND (0.2)	ND (0.1)	0.011	ND (0.2)	ND (0.01)	0.0043 J	0.0028 J	ND (0.01)	ND (0.01)
Carbon disulfide	ND (0.05)	ND (0.005) UJ	ND (0.005)	ND (0.1)	ND (0.05)	0.0015 J	ND (0.1)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)
Chloromethane (Methyl Chloride)	ND (0.1)	ND (0.01)	ND (0.01)	ND (0.2) UJ	ND (0.1)	ND (0.01)	ND (0.2)	0.00079 J	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)
Ethyl Ether	3.3 J	1.9	1.6 J	1.4	1.2	1.4	2	0.24 J	2.7 J	1.7	1.8	1.7
Methylene chloride	ND (0.05)	ND (0.005)	ND (0.005)	ND (0.1) U	0.011 J	ND (0.005) UJ	0.01 J	ND (0.005)	ND (0.005) UJ	ND (0.005)	ND (0.005)	ND (0.005)
SVOCs												
bis(2-Ethylhexyl)phthalate	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.0031 J
Phenobarbital	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.081

MW-6B	06/04	12/04	06/05	12/05	06/06	12/06	06/07	12/07	06/08	12/08	06/09	12/09	06/10
VOCs													
2-Butanone (Methyl Ethyl Ketone)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01) UJ	ND (0.01)	ND (0.01)	0.0038 J	0.032 J	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)
Acetone	ND (0.01) UJ	ND (0.01) UJ	ND (0.01)	ND (0.01) UJ	ND (0.01)	0.0057 J	0.0046 J	0.0053 J	0.016 J	0.0025 J	0.0022 J	ND (0.01)	ND (0.01)
Ethyl Ether	ND (0.01)	0.002 J	0.0038 J	0.0028 J	ND (0.0050)	0.0023 J	0.0077 J	0.003 J	0.005 J	0.0025 J	0.031 J	0.0024 J	0.0014 J
SVOCs													
Analyzed SVOCs	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	ND

MW-16B	07/04	06/05	12/05	06/06	12/06	06/07	12/07	06/08	12/08	07/09	12/09	06/10
VOCs												
Acetone	ND (0.1) UJ	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.2)	ND (0.01)	ND (0.4)	ND (0.01) UJ	0.0061 J	0.0027 J	ND (0.01)	ND (0.01)
Carbon disulfide	ND (0.05)	ND (0.005) UJ	ND (0.005)	ND (0.0050)	ND (0.1)	ND (0.005)	ND (0.2)	ND (0.005)	ND (0.005)	0.0031 J	ND (0.005)	ND (0.005)
Ethyl Ether	5.1 J	3.1	1.9 J	2.7 J	2.2	0.17	2	3.5 J	5 J	0.037	0.15	3.1
Methylene chloride	ND (0.05)	ND (0.005)	ND (0.005)	ND (0.0050)	0.018 J	ND (0.005) UJ	0.02 J	NO (0.005)	ND (0.005) UJ	ND (0.005)	ND (0.005)	ND (0.005)
SVOCs												
bis(2-Ethylhexyl)phthalate	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.0062/ND (0.011)
Lidocaine	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.0086/NO (0.011)
Phenobarbital	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.1/ND (0.011)

MW-2S	06/04	12/04	06/05	12/05	06/06	12/06	06/07	12/07	06/08	12/08	06/09	12/09	06/10
VOCs													
2-Butanone (Methyl Ethyl Ketone)	ND (0.01) UJ	ND (0.01)/ND (0.01)	ND (0.01)	ND (0.01)/ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.04)	0.028 J	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)
Acetone	ND (0.01) UJ	ND (0.01) UJ/ND (0.01) UJ	ND (0.01)	0.0036 J/0.0030 J	ND (0.01) UJ	ND (0.04)	0.0085 J	ND (0.04)	0.021 J	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)
Benzene	ND (0.005)	ND (0.005)/ND (0.005)	ND (0.005)	0.00073/0.00079	0.0080 J	ND (0.005)	ND (0.001)	ND (0.004)	ND (0.001)	0.0006 J	0.0074	0.001	ND (0.001)
Chlorobenzene	NO (0.005)	ND (0.005)/ND (0.005)	ND (0.005)	ND (0.005)/ND (0.005)	ND (0.0050)	ND (0.005)	ND (0.005)	ND (0.02)	ND (0.005)	NO (0.005)	0.00043 J	ND (0.005)	ND (0.005)
Ethyl Ether	0.063 J	0.051/0.049	0.063	0.09 J/0.08 J	0.38	0.15	0.16	0.24	0.097	0.34 J	1.3	0.19	0.087
Vinyl chloride	ND (0.01)	ND (0.01) UJ/ND (0.01) UJ	ND (0.01)	0.0007 J/0.0008 J	0.00044 J	ND (0.01)	ND (0.01)	ND (0.01)	0.0023 J	ND (0.01)	0.0014 J	0.022	0.0013 J	ND (0.01)
SVOCs													
Phenobarbital	NS	NS/NS	NS	NS/NS	NS	NS	NS	NS	NS	NS	NS	NS	0.014

MW-19B	07/04	06/05	12/05	06/06	12/06	06/07	12/07	06/08	12/08	06/09	12/09	06/10
VOCs												
Acetone	ND (0.01) UJ	ND (0.01)	ND (0.01) UJ	ND (0.02)	0.019/ND (0.01)	0.0028 J	ND (0.02)	ND (0.01) UJ	ND (0.01)	0.003 J	NO (0.01)	ND (0.01)
Ethyl Ether	0.130 J	0.013	0.28 J	0.12	0.12/0.12	0.0019 J	0.15	0.096	0.28 J	0.052 J	0.13	0.058
Methylene chloride	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.01) U	0.00085 J/0.001 J	ND (0.005) UJ	0.0034 J	ND (0.005)	ND (0.005) UJ	ND (0.005)	ND (0.005)	ND (0.005)
SVOCs												
Di-n-butylphthalate	NS	NS	NS	NS	NS/NS	NS	NS	NS	NS	NS	NS	0.00037 J
Lidocaine	NS	NS	NS	NS	NS/NS	NS	NS	NS	NS	NS	NS	0.01
Phenobarbital	NS	NS	NS	NS	NS/NS	NS	NS	NS	NS	NS	NS	0.021

0 100 200 ft

LEGEND

- APPROXIMATE AREAL LIMIT OF LANDFILL
- MW-13B MONITORING WELL LOCATION
- PZ-16 PIEZOMETER LOCATION
- RW-1 RECOVERY WELL LOCATION (RW-1 NOT OPERATIONAL DURING SAMPLING)
- MONITORING WELL SAMPLED IN JUNE 2010

MONITORING WELL AQUIFER DESIGNATION
S - SCREEN OVER ENTIRE UPPER AQUIFER
B - SCREEN AT BASE OF UPPER AQUIFER
A - SCREEN AT TOP OF UPPER AQUIFER

MW-5B	07/04	06/06	06/08	06/10
VOCs				
Acetone	ND (0.01) UJ	0.0028 J	0.011 J	ND (0.01)
Toluene	ND (0.005)	ND (0.0050)	0.001 J	ND (0.005)

SAMPLE LOCATION
SAMPLE DATE (M/YY)
RESULT (mg/L)
PARAMETER

J ESTIMATED CONCENTRATION
UJ ESTIMATED REPORTING LIMIT
ND NO SVOCs DETECTED
NA NOT ANALYZED
NS NOT SAMPLED
ND(0.01) NOT DETECTED AT A DETECTION LIMIT OF 0.01 mg/L
0.018/0.019 CONCENTRATION IN SAMPLE AND DUPLICATE SAMPLE

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

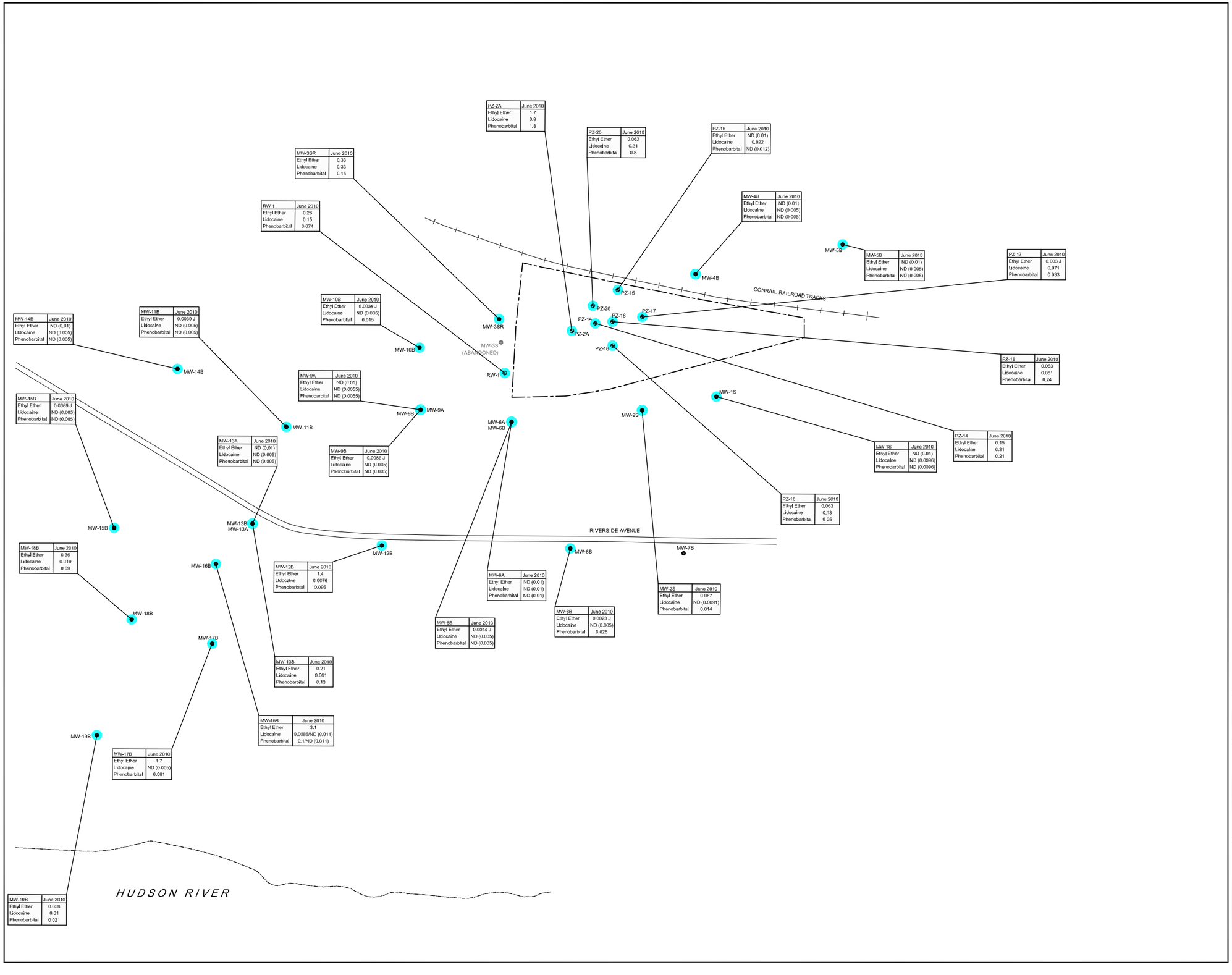
STERLING SITE 3
EAST GREENBUSH, NEW YORK

SUMMARY OF DETECTED GROUNDWATER ANALYTICAL RESULTS

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:
DAMES & MOORE WILLOW GROVE, PENNSYLVANIA

Project Manager:	Reviewed By:	Date:	
M.O.	P.T.	OCTOBER 2010	
Scale: 1"=200'	Project No: 07830-20	Report No: 095	Drawing No: 2.2



0 100 200 ft

LEGEND

- APPROXIMATE AREAL LIMIT OF LANDFILL
- MW-13B — MONITORING WELL LOCATION
- PZ-15 — PIEZOMETER LOCATION
- RW-1 — RECOVERY WELL LOCATION (RW-1 NOT OPERATIONAL DURING SAMPLING)
- MONITORING WELL SAMPLED IN JUNE 2010

MONITORING WELL AQUIFER DESIGNATION
S - SCREEN OVER ENTIRE UPPER AQUIFER
B - SCREEN AT BASE OF UPPER AQUIFER
A - SCREEN AT TOP OF UPPER AQUIFER

PZ-17	June 2010
Ethyl Ether	0.003 J
Lidocaine	0.071
Phenobarbital	0.033

- SAMPLE LOCATION
- SAMPLE DATE (M/M/YY)
- RESULT (mg/L)
- PARAMETER

J — ESTIMATED CONCENTRATION
UJ — ESTIMATED REPORTING LIMIT
ND(0.01) — NOT DETECTED AT A DETECTION LIMIT OF 0.01 mg/L
0.018/0.019 — CONCENTRATION IN SAMPLE AND DUPLICATE SAMPLE

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

STERLING SITE 3
EAST GREENBUSH, NEW YORK

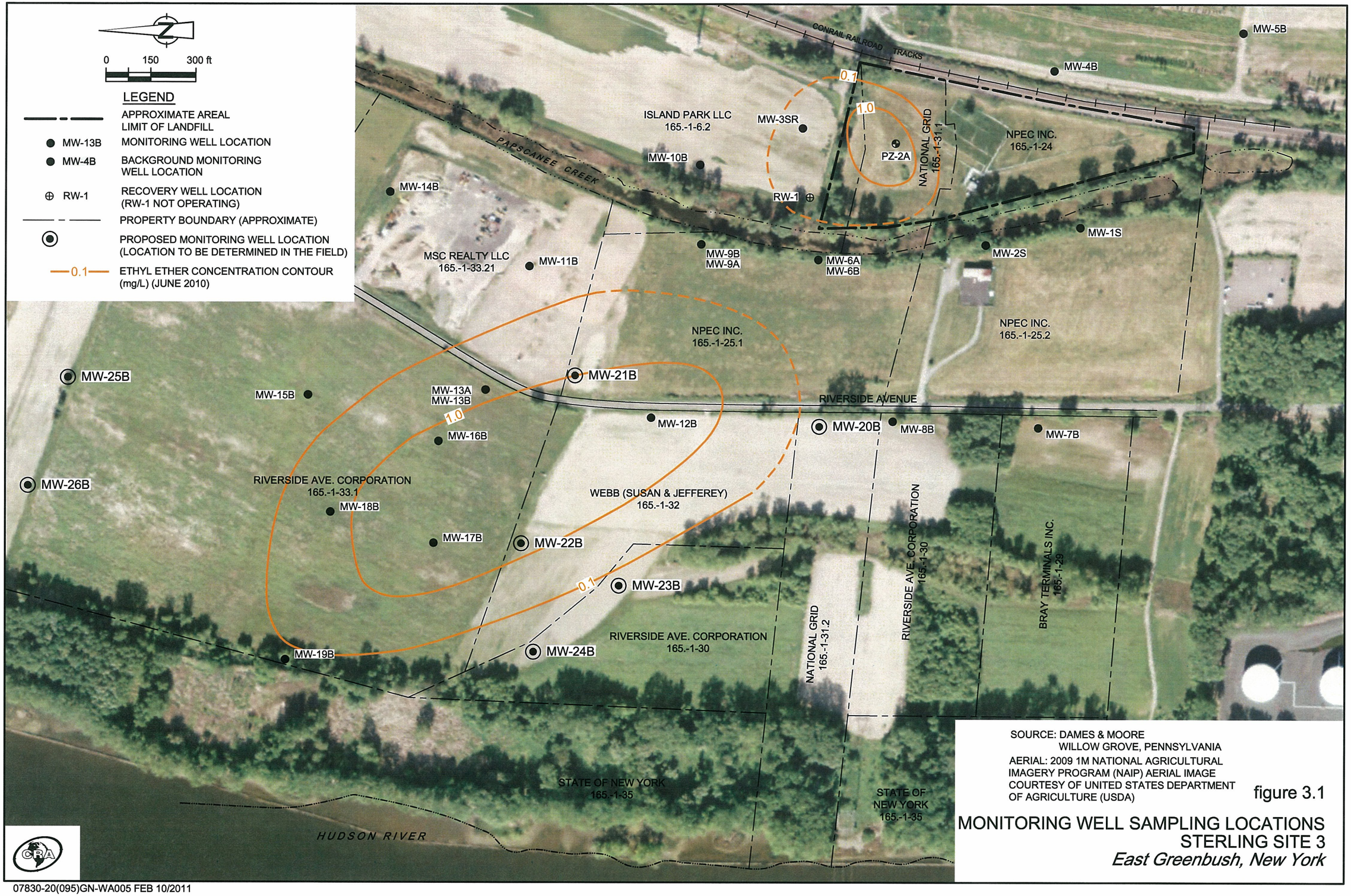
SUMMARY OF SELECT GROUNDWATER ANALYTICAL RESULTS - JUNE 2010

CONESTOGA-ROVERS & ASSOCIATES

Source Reference: DAMES & MOORE WILLOW GROVE, PENNSYLVANIA

Project Manager:	Reviewed By:	Date:	
M.O.	P.T.	OCTOBER 2010	
Scale: 1"=200'	Project N°: 07830-20	Report N°: 095	Drawing N°: 2.3

07830-20(095)GN-WA004 SEP 30/2010



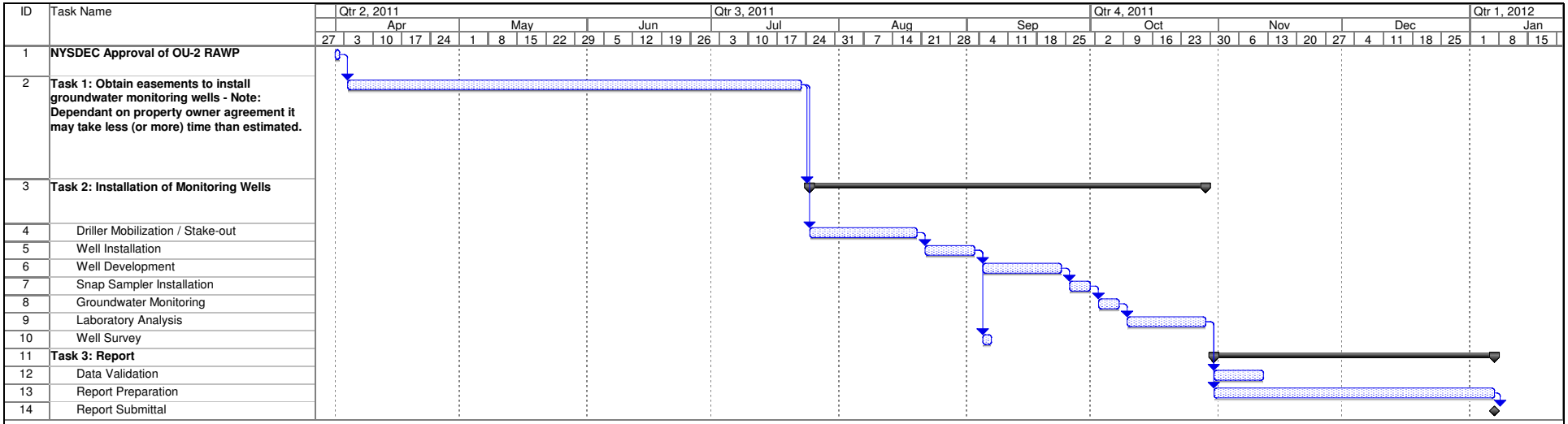
SOURCE: DAMES & MOORE
WILLOW GROVE, PENNSYLVANIA

AERIAL: 2009 1M NATIONAL AGRICULTURAL IMAGERY PROGRAM (NAIP) AERIAL IMAGE COURTESY OF UNITED STATES DEPARTMENT OF AGRICULTURE (USDA)

figure 3.1

MONITORING WELL SAMPLING LOCATIONS
STERLING SITE 3
East Greenbush, New York

07830-20(095)GN-WA005 FEB 10/2011



007830 (95)

figure 5.1
PROPOSED PROJECT SCHEDULE - STERLING SITE 3
East Greenbush, New York

TABLE 2.1

DETECTED ANALYTICAL RESULTS SUMMARY
OPERABLE UNIT 2 GROUNDWATER - JUNE 2010
STERLING SITE 3
EAST GREENBUSH, NEW YORK

Sample Location:		*MW-1S*	*MW-2S*	*MW-3SR*	*MW-4B*	*MW-5B*	*MW-6A*
Sample ID:		*GW-44538-062110-008*	*GW-44538-062110-018*	*GW-44538-062210-022*	*GW-44538-062210-023*	*GW-44538-062210-024*	*GW-44538-062110-003*
Sample Date:		*Jun-2010*	*Jun-2010*	*Jun-2010*	*Jun-2010*	*Jun-2010*	*Jun-2010*
Parameter	***Units***						
Volatile Organic Compounds							
Benzene	mg/L	ND (0.001)	ND (0.001)	0.074	ND (0.001)	ND (0.001)	ND (0.001)
Carbon disulfide	mg/L	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	0.0006 J
Chlorobenzene	mg/L	ND (0.005)	ND (0.005)	0.0035 J	ND (0.005)	ND (0.005)	ND (0.005)
Chloroethane	mg/L	ND (0.01)	ND (0.01)	0.00096 J	ND (0.01)	ND (0.01)	ND (0.01)
Chloroform (Trichloromethane)	mg/L	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)
Ethyl Ether	mg/L	ND (0.01)	0.087	0.33	ND (0.01)	ND (0.01)	ND (0.01)
Trichloroethene	mg/L	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)
Semi-Volatile Organic Compounds							
bis(2-Ethylhexyl)phthalate	mg/L	ND (0.0096)	ND (0.0091)	ND (0.0093)	ND (0.005)	ND (0.005)	ND (0.01)
Di-n-butylphthalate	mg/L	ND (0.0096)	ND (0.0091)	ND (0.0093)	ND (0.005)	ND (0.005)	ND (0.01)
Lidocaine	mg/L	ND (0.0096)	ND (0.0091)	0.33	ND (0.005)	ND (0.005)	ND (0.01)
Phenobarbital	mg/L	ND (0.0096)	0.014	0.15	ND (0.005)	ND (0.005)	ND (0.01)

Notes:

J - Estimated.
ND - Non-detect at associated value.

TABLE 2.1

DETECTED ANALYTICAL RESULTS SUMMARY
OPERABLE UNIT 2 GROUNDWATER - JUNE 2010
STERLING SITE 3
EAST GREENBUSH, NEW YORK

Sample Location:		*MW-6B*	*MW-8B*	*MW-9A*	*MW-9B*	*MW-10B*	*MW-11B*
Sample ID:		*GW-44538-062110-005*	*GW-44538-062110-011*	*GW-44538-062110-004*	*GW-44538-062110-006*	*GW-44538-062210-021*	*GW-44538-062110-013*
Sample Date:		*Jun-2010*	*Jun-2010*	*Jun-2010*	*Jun-2010*	*Jun-2010*	*Jun-2010*
Parameter	***Units***						
Volatile Organic Compounds							
Benzene	mg/L	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Carbon disulfide	mg/L	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)
Chlorobenzene	mg/L	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)
Chloroethane	mg/L	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)
Chloroform (Trichloromethane)	mg/L	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)
Ethyl Ether	mg/L	0.0014 J	0.0023 J	ND (0.01)	0.0086 J	0.0034 J	0.0039 J
Trichloroethene	mg/L	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)
Semi-Volatile Organic Compounds							
bis(2-Ethylhexyl)phthalate	mg/L	ND (0.005)	ND (0.005)	ND (0.0055)	ND (0.005)	ND (0.005)	0.0028 J
Di-n-butylphthalate	mg/L	ND (0.005)	0.00045 J	ND (0.0055)	ND (0.005)	ND (0.005)	ND (0.005)
Lidocaine	mg/L	ND (0.005)	ND (0.005)	ND (0.0055)	ND (0.005)	ND (0.005)	ND (0.005)
Phenobarbital	mg/L	ND (0.005)	0.028	ND (0.0055)	ND (0.005)	0.015	ND (0.005)

Notes:

J - Estimated.
ND - Non-detect at associated value.

TABLE 2.1

DETECTED ANALYTICAL RESULTS SUMMARY
OPERABLE UNIT 2 GROUNDWATER - JUNE 2010
STERLING SITE 3
EAST GREENBUSH, NEW YORK

Sample Location:		*MW-12B*	*MW-13A*	*MW-13B*	*MW-14B*	*MW-15B*	*MW-16B*
Sample ID:		*GW-44538-062110-010*	*GW-44538-062110-009*	*GW-44538-062110-012*	*GW-44538-062210-020*	*GW-44538-062110-014*	*GW-44538-062110-016*
Sample Date:		*Jun-2010*	*Jun-2010*	*Jun-2010*	*Jun-2010*	*Jun-2010*	*Jun-2010*
Parameter	*Units*						
Volatile Organic Compounds							
Benzene	mg/L	ND (0.001)	ND (0.001)	ND (0.005)	ND (0.001)	ND (0.001)	ND (0.001)
Carbon disulfide	mg/L	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	0.00065 J	ND (0.005)
Chlorobenzene	mg/L	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)
Chloroethane	mg/L	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)
Chloroform (Trichloromethane)	mg/L	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)
Ethyl Ether	mg/L	1.4	ND (0.01)	0.21	ND (0.01)	0.0089 J	3.1
Trichloroethene	mg/L	0.0016 J	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)
Semi-Volatile Organic Compounds							
bis(2-Ethylhexyl)phthalate	mg/L	ND (0.005)	ND (0.005)	0.003 J	ND (0.005)	0.0052	0.0062 / ND (0.011)
Di-n-butylphthalate	mg/L	0.00043 J	0.00036 J	0.00055 J	ND (0.005)	ND (0.005)	ND (0.0051) / ND (0.011)
Lidocaine	mg/L	0.0076	ND (0.005)	0.081	ND (0.005)	ND (0.005)	0.0086 / ND (0.011)
Phenobarbital	mg/L	0.095	ND (0.005)	0.13	ND (0.005)	ND (0.005)	0.1 / ND (0.011)

Notes:

J - Estimated.
ND - Non-detect at associated value.

TABLE 2.1

DETECTED ANALYTICAL RESULTS SUMMARY
OPERABLE UNIT 2 GROUNDWATER - JUNE 2010
STERLING SITE 3
EAST GREENBUSH, NEW YORK

Sample Location:		*MW-17B*	*MW-18B*	*MW-19B*	*RW-1*
Sample ID:		*GW-44538-062210-019*	*GW-44538-062110-015*	*GW-44538-062110-017*	*GW-44538-062110-007*
Sample Date:		*Jun-2010*	*Jun-2010*	*Jun-2010*	*Jun-2010*
Parameter	***Units***				
Volatile Organic Compounds					
Benzene	mg/L	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.005)
Carbon disulfide	mg/L	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)
Chlorobenzene	mg/L	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)
Chloroethane	mg/L	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)
Chloroform (Trichloromethane)	mg/L	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)
Ethyl Ether	mg/L	1.7	0.36	0.058	0.26
Trichloroethene	mg/L	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)
Semi-Volatile Organic Compounds					
bis(2-Ethylhexyl)phthalate	mg/L	0.0031 J	ND (0.0053)	ND (0.005)	0.002 J
Di-n-butylphthalate	mg/L	ND (0.005)	0.00091 J	0.00037 J	0.00053 J
Lidocaine	mg/L	ND (0.005)	0.019	0.01	0.15
Phenobarbital	mg/L	0.081	0.09	0.021	0.074

Notes:

J - Estimated.
ND - Non-detect at associated value.

TABLE 2.2

REPORTED SVOC TIC RESULTS SUMMARY
OPERABLE UNIT 2 GROUNDWATER - JUNE 2010
STERLING SITE 3
EAST GREENBUSH, NEW YORK

Sample Location:		*MW-1S*	*MW-2S*	*MW-3SR*	*MW-4B*	*MW-5B*	*MW-6A*
Sample ID:		*GW-44538-062810-008*	*GW-44538-062810-018*	*GW-44538-062910-022*	*GW-44538-062910-023*	*GW-44538-062910-024*	*GW-44538-062810-003*
Sample Date:		*Jun - 2010*	*Jun - 2010*	*Jun - 2010*	*Jun - 2010*	*Jun - 2010*	*Jun - 2010*
Parameter	*Units*						
TIC Semi-Volatile Organic Compounds							
.beta.-Sitosterol A	mg/L	-	-	-	-	-	-
2,4,6(1H,3h,5h)-pyrimidinetrione, 5-ethyl-1,3-dimethyl-5-phenyl- A	mg/L	-	-	0.022 J	-	-	-
2,5-Cyclohexadiene-1,4-dione A	mg/L	-	-	-	-	-	-
9-Octadecenamide, (z)- A	mg/L	-	-	-	-	-	-
Acetamide, n-(2,6-dimethylphenyl)-2-(ethylamino)- A	mg/L	-	-	0.012 J	-	-	-
Benzenemethanamine, N,N-dimethyl A	mg/L	-	-	-	-	-	-
Benzenemethanamine, N-methyl A	mg/L	-	-	0.21 J	-	-	-
Benzyl Alcohol A	mg/L	-	-	-	-	-	-
Cyclobarbitol A	mg/L	-	-	-	-	-	-
Diphenyl ether A	mg/L	-	-	0.054 J	-	-	-
Dipyrone A	mg/L	-	0.023 J	-	-	-	-
Hexobarbital A	mg/L	-	-	-	-	-	-
Mepivacaine hydrochloride A	mg/L	-	-	0.13 J	-	-	-
Mepivacaine hydrochloride B	mg/L	-	-	0.068 J	-	-	-
N,N-Dimethyl-benzenamine A	mg/L	-	-	0.025 J	-	-	-
Noramidopyrine A	mg/L	-	-	-	-	-	-
Octacosane A	mg/L	-	-	-	-	-	-
Pentazocine A	mg/L	-	-	0.033 J	-	-	-
Tetradecanoic acid A	mg/L	-	0.0086 J	0.028 J	-	-	-
Tetradecanoic acid B	mg/L	-	-	-	-	-	-
Tocopherols A	mg/L	-	-	-	-	-	-
Unidentified compounds (base neutrals)	mg/L	-	-	-	-	-	-
Unidentified compounds-volatiles	mg/L	-	-	0.022 J	-	-	-
Unknown 1	mg/L	0.008 J	-	0.018 J	-	-	0.0096 J
Unknown 2	mg/L	0.0079 J	0.027 J	0.012 J	0.0067 J	0.0054 J	0.02 J
Unknown 3	mg/L	0.011 J	0.017 J	0.019 J	0.005 J	0.0045 J	0.013 J
Unknown 4	mg/L	0.01 J	0.0096 J	0.0091 J	0.0047 J	0.0044 J	0.023 J
Unknown 5	mg/L	0.013 J	0.0075 J	0.0098 J	0.0052 J	0.0087 J	0.01 J
Unknown 6	mg/L	0.008 J	-	0.014 J	-	-	-
Unknown 7	mg/L	-	-	0.011 J	-	-	-
Unknown 8	mg/L	-	-	-	-	-	-
Unknown 9	mg/L	-	-	-	-	-	-
Unknown 10	mg/L	-	-	-	-	-	-
Unknown 11	mg/L	-	-	-	-	-	-
Unknown 12	mg/L	-	-	-	-	-	-
Unknown 13	mg/L	-	-	-	-	-	-
Unknown 14	mg/L	-	-	-	-	-	-
Unknown 15	mg/L	-	-	-	-	-	-
Unknown Amine A	mg/L	-	-	0.039 J	-	-	-
Unknown Benzenamine Derivative A	mg/L	-	-	0.015 J	-	-	-

Notes:

J - Estimated.
- - Not applicable.

TABLE 2.2

REPORTED SVOC TIC RESULTS SUMMARY
OPERABLE UNIT 2 GROUNDWATER - JUNE 2010
STERLING SITE 3
EAST GREENBUSH, NEW YORK

Sample Location:		*MW-6B*	*MW-8B*	*MW-9A*	*MW-9B*	*MW-10B*	*MW-11B*
Sample ID:		*GW-44538-062810-005*	*GW-44538-062810-011*	*GW-44538-062810-004*	*GW-44538-062810-006*	*GW-44538-062910-021*	*GW-44538-062810-013*
Sample Date:		*Jun - 2010*	*Jun - 2010*	*Jun - 2010*	*Jun - 2010*	*Jun - 2010*	*Jun - 2010*
Parameter	*Units*						
TIC Semi-Volatile Organic Compounds							
.beta.-Sitosterol A	mg/L	-	-	-	0.017 J	-	-
2,4,6(1H,3h,5h)-pyrimidinetrione, 5-ethyl-1,3-dimethyl-5-phenyl- A	mg/L	-	-	-	-	-	-
2,5-Cyclohexadiene-1,4-dione A	mg/L	-	-	0.0092 J	-	-	-
9-Octadecenamide, (z)- A	mg/L	-	-	-	-	0.0048 J	-
Acetamide, n-(2,6-dimethylphenyl)-2-(ethylamino)- A	mg/L	-	-	-	-	-	-
Benzenemethanamine, N,N-dimethyl A	mg/L	-	-	-	-	-	-
Benzenemethanamine, N-methyl A	mg/L	-	-	-	-	-	-
Benzyl Alcohol A	mg/L	-	-	-	-	-	-
Cyclobarbitol A	mg/L	-	-	-	-	-	-
Diphenyl ether A	mg/L	-	-	-	-	-	-
Dipyrone A	mg/L	-	-	-	-	-	-
Hexobarbital A	mg/L	-	0.0048 J	-	-	-	-
Mepivacaine hydrochloride A	mg/L	-	0.014 J	-	-	0.01 J	-
Mepivacaine hydrochloride B	mg/L	-	-	-	-	-	-
N,N-Dimethyl-benzenamine A	mg/L	-	-	-	-	-	-
Noramidopyrine A	mg/L	-	-	-	-	-	-
Octacosane A	mg/L	-	-	-	-	-	-
Pentazocine A	mg/L	-	-	-	-	-	-
Tetradecanoic acid A	mg/L	-	0.01 J	-	-	-	-
Tetradecanoic acid B	mg/L	-	-	-	-	-	-
Tocopherols A	mg/L	-	-	-	0.0045 J	-	-
Unidentified compounds (base neutrals)	mg/L	-	-	-	0.0052 J	-	-
Unidentified compounds-volatiles	mg/L	-	-	-	-	-	-
Unknown 1	mg/L	0.0045 J	0.0061 J	0.0045 J	0.0075 J	0.0097 J	-
Unknown 2	mg/L	0.0096 J	0.0051 J	0.0067 J	0.0045 J	0.0047 J	0.017 J
Unknown 3	mg/L	0.0046 J	0.007 J	0.01 J	0.0047 J	0.0063 J	0.011 J
Unknown 4	mg/L	0.0085 J	0.0065 J	0.011 J	0.0046 J	0.0094 J	-
Unknown 5	mg/L	0.0042 J	0.004 J	0.01 J	0.0069 J	0.0042 J	0.0072 J
Unknown 6	mg/L	-	0.0064 J	0.0058 J	0.0076 J	0.0055 J	-
Unknown 7	mg/L	-	0.0063 J	-	0.016 J	0.0064 J	-
Unknown 8	mg/L	-	-	-	0.22 J	0.0086 J	-
Unknown 9	mg/L	-	-	-	0.2 J	-	-
Unknown 10	mg/L	-	-	-	0.22 J	-	-
Unknown 11	mg/L	-	-	-	0.029 J	-	-
Unknown 12	mg/L	-	-	-	0.015 J	-	-
Unknown 13	mg/L	-	-	-	0.036 J	-	-
Unknown 14	mg/L	-	-	-	0.0049 J	-	-
Unknown 15	mg/L	-	-	-	0.007 J	-	-
Unknown Amine A	mg/L	-	-	-	-	-	0.0095 J
Unknown Benzenamine Derivative A	mg/L	-	-	-	-	-	-

Notes:

J - Estimated.
- - Not applicable.

TABLE 2.2

REPORTED SVOC TIC RESULTS SUMMARY
OPERABLE UNIT 2 GROUNDWATER - JUNE 2010
STERLING SITE 3
EAST GREENBUSH, NEW YORK

Sample Location:		*MW-12B*	*MW-13A*	*MW-13B*	*MW-14B*	*MW-15B*	*MW-16B*
Sample ID:		*GW-44538-062810-010*	*GW-44538-062810-009*	*GW-44538-062810-012*	*GW-44538-062810-020*	*GW-44538-062810-014*	*GW-44538-062810-016*
Sample Date:		*Jun - 2010*	*Jun - 2010*	*Jun - 2010*	*Jun - 2010*	*Jun - 2010*	*Jun - 2010*
Parameter	*Units*						
TIC Semi-Volatile Organic Compounds							
.beta.-Sitosterol A	mg/L	-	-	-	-	-	- / -
2,4,6(1H,3h,5h)-pyrimidinetrione, 5-ethyl-1,3-dimethyl-5-phenyl- A	mg/L	0.011 J	-	0.025 J	-	-	- / -
2,5-Cyclohexadiene-1,4-dione A	mg/L	-	-	-	-	-	- / -
9-Octadecenamide, (z)- A	mg/L	-	-	-	-	-	- / -
Acetamide, n-(2,6-dimethylphenyl)-2-(ethylamino)- A	mg/L	-	-	-	-	-	- / -
Benzenemethanamine, N,N-dimethyl A	mg/L	-	-	-	-	-	- / -
Benzenemethanamine, N-methyl A	mg/L	-	-	0.011 J	-	-	- / -
Benzyl Alcohol A	mg/L	0.017 J	-	-	-	-	0.004 J / -
Cyclobarbitol A	mg/L	0.038 J	-	-	-	-	- / -
Diphenyl ether A	mg/L	-	-	-	-	-	- / -
Dipyrone A	mg/L	-	-	-	-	-	- / -
Hexobarbital A	mg/L	0.025 J	-	0.026 J	-	-	0.019 J / -
Mepivacaine hydrochloride A	mg/L	0.053 J	-	0.024 J	-	-	0.039 J / -
Mepivacaine hydrochloride B	mg/L	-	-	0.12 J	-	-	- / -
N,N-Dimethyl-benzenamine A	mg/L	-	-	-	-	-	- / -
Noramidopyrine A	mg/L	-	-	-	-	-	- / -
Octacosane A	mg/L	-	-	-	-	-	- / -
Pentazocine A	mg/L	-	-	0.039 J	-	-	- / -
Tetradecanoic acid A	mg/L	0.05 J	-	0.053 J	-	-	0.054 J / -
Tetradecanoic acid B	mg/L	-	-	-	-	-	- / -
Tocopherols A	mg/L	-	-	-	-	-	- / -
Unidentified compounds (base neutrals)	mg/L	-	-	-	-	-	- / -
Unidentified compounds-volatiles	mg/L	-	-	-	-	-	- / -
Unknown 1	mg/L	0.0072 J	-	0.0044 J	0.0047 J	-	0.006 J / 0.0089 J
Unknown 2	mg/L	0.0077 J	0.0046 J	0.0067 J	0.01 J	0.0053 J	0.0048 J / 0.018 J
Unknown 3	mg/L	0.0062 J	0.0043 J	0.006 J	0.0046 J	-	0.0052 J / 0.012 J
Unknown 4	mg/L	0.0053 J	-	0.0091 J	0.01 J	-	0.0056 J / 0.022 J
Unknown 5	mg/L	0.0049 J	0.0043 J	0.03 J	0.0044 J	0.0043 J	0.0051 J / 0.015 J
Unknown 6	mg/L	0.0093 J	-	0.03 J	0.011 J	-	0.0091 J / -
Unknown 7	mg/L	0.079 J	-	0.016 J	0.0049 J	-	0.027 J / -
Unknown 8	mg/L	0.018 J	-	0.0046 J	0.0094 J	-	0.0069 J / -
Unknown 9	mg/L	0.012 J	-	0.014 J	0.012 J	-	0.0058 J / -
Unknown 10	mg/L	0.014 J	-	0.0082 J	0.0069 J	-	0.01 J / -
Unknown 11	mg/L	-	-	0.004 J	0.011 J	-	0.029 J / -
Unknown 12	mg/L	-	-	-	0.0068 J	-	0.017 J / -
Unknown 13	mg/L	-	-	-	-	-	0.0044 J / -
Unknown 14	mg/L	-	-	-	-	-	0.013 J / -
Unknown 15	mg/L	-	-	-	-	-	0.0068 J / -
Unknown Amine A	mg/L	-	-	-	-	-	- / -
Unknown Benzenamine Derivative A	mg/L	-	-	-	-	-	- / -

Notes:

J - Estimated.
- - Not applicable.

TABLE 2.2

REPORTED SVOC TIC RESULTS SUMMARY
OPERABLE UNIT 2 GROUNDWATER - JUNE 2010
STERLING SITE 3
EAST GREENBUSH, NEW YORK

Sample Location:		*MW-17B*	*MW-18B*	*MW-19B*	*RW-1*
Sample ID:		*GW-44538-062810-019*	*GW-44538-062810-015*	*GW-44538-062810-017*	*GW-44538-062810-007*
Sample Date:		*Jun - 2010*	*Jun - 2010*	*Jun - 2010*	*Jun - 2010*
Parameter	*Units*				
TIC Semi-Volatile Organic Compounds					
.beta.-Sitosterol A	mg/L	-	-	-	-
2,4,6(1H,3h,5h)-pyrimidinetrione, 5-ethyl-1,3-dimethyl-5-phenyl- A	mg/L	-	0.011 J	-	0.011 J
2,5-Cyclohexadiene-1,4-dione A	mg/L	-	-	-	-
9-Octadecenamide, (z)- A	mg/L	-	-	-	-
Acetamide, n-(2,6-dimethylphenyl)-2-(ethylamino)- A	mg/L	-	-	-	0.0074 J
Benzenemethanamine, N,N-dimethyl A	mg/L	-	-	-	0.014 J
Benzenemethanamine, N-methyl A	mg/L	-	-	-	0.087 J
Benzyl Alcohol A	mg/L	0.0082 J	-	-	-
Cyclobarbitol A	mg/L	-	0.019 J	-	-
Diphenyl ether A	mg/L	-	-	-	-
Dipyrone A	mg/L	-	-	-	-
Hexobarbital A	mg/L	0.015 J	0.016 J	-	-
Mepivacaine hydrochloride A	mg/L	0.038 J	0.073 J	0.011 J	0.057 J
Mepivacaine hydrochloride B	mg/L	-	-	-	0.078 J
N,N-Dimethyl-benzenamine A	mg/L	-	-	-	-
Noramidopyrine A	mg/L	0.043 J	0.0085 J	-	-
Octacosane A	mg/L	-	0.0095 J	-	-
Pentazocine A	mg/L	-	-	-	0.018 J
Tetradecanoic acid A	mg/L	0.037 J	0.036 J	0.0069 J	0.026 J
Tetradecanoic acid B	mg/L	-	0.016 J	-	-
Tocopherols A	mg/L	-	-	-	-
Unidentified compounds (base neutrals)	mg/L	-	-	-	-
Unidentified compounds-volatiles	mg/L	-	-	-	0.042 J
Unknown 1	mg/L	0.0069 J	0.018 J	0.012 J	0.011 J
Unknown 2	mg/L	0.0052 J	0.0094 J	0.0072 J	0.013 J
Unknown 3	mg/L	0.0044 J	0.011 J	0.0067 J	0.0091 J
Unknown 4	mg/L	0.021 J	0.045 J	0.0082 J	0.026 J
Unknown 5	mg/L	0.0053 J	0.012 J	0.005 J	0.0094 J
Unknown 6	mg/L	0.0083 J	0.013 J	-	0.015 J
Unknown 7	mg/L	0.0059 J	0.012 J	-	0.015 J
Unknown 8	mg/L	0.016 J	0.0088 J	-	0.011 J
Unknown 9	mg/L	0.014 J	0.0092 J	-	-
Unknown 10	mg/L	0.0052 J	0.019 J	-	-
Unknown 11	mg/L	0.0099 J	0.024 J	-	-
Unknown 12	mg/L	0.005 J	-	-	-
Unknown 13	mg/L	-	-	-	-
Unknown 14	mg/L	-	-	-	-
Unknown 15	mg/L	-	-	-	-
Unknown Amine A	mg/L	-	-	-	0.076 J
Unknown Benzenamine Derivative A	mg/L	-	-	-	-

Notes:

J - Estimated.
- - Not applicable.

TABLE 3.1

GROUNDWATER SAMPLING LOCATIONS
STERLING SITE 3
EAST GREENBUSH, NEW YORK

Sampling Location	*Analyses*	*Frequency*
MW-20B	VOCs, SVOCs, SVOC TICs	Once after development
MW-21B	VOCs, SVOCs, SVOC TICs	Once after development
MW-22B	VOCs, SVOCs, SVOC TICs	Once after development
MW-23B	VOCs, SVOCs, SVOC TICs	Once after development
MW-24B	VOCs, SVOCs, SVOC TICs	Once after development
MW-25B	VOCs, SVOCs, SVOC TICs	Once after development
MW-26B	VOCs, SVOCs, SVOC TICs	Once after development

Notes:

VOCs = TCL Volatile Organic Compounds plus ethyl ether
SVOCs - TCL Semi-volatile Organic Compounds plus lidocaine and phenobarbital
SVOC TICs = Semi-volatile Organic Compounds, Tentatively Identified Compounds

APPENDIX A

HEALTH AND SAFETY PLAN

HEALTH AND SAFETY PLAN
REMEDIAL DESIGN/REMEDIAL ACTION
WORK PLAN FOR OU-2

STERLING SITE 3
EAST GREENBUSH, NEW YORK

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TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS

LIST OF FIGURES
(Following Report)

LIST OF TABLES

LIST OF APPENDICES

1.0 INTRODUCTION

The Health and Safety Plan (HASP) presented herein describes the health and safety procedures and emergency response guidelines to be implemented during the Remedial Design/Remedial Action Work Plan [Remedial Action Work Plan (RAWP)] activities for Operable Unit 2 (OU-2) at the Sterling Site No. 3 (Site) located in East Greenbush, New York. Figure 1.1 presents the Project Location and Figure 1.2 presents the Site Layout.

The RAWP scope of work includes the following major activities:

i) Mobilization and demobilization activities

ii) Subcontractor oversight

iii) Drilling activities (monitoring well installation and development)

iv) Decontamination activities

v) Surveying activities

vi) Groundwater sampling and monitoring

During completion of the RAWP activities, personnel may come in contact with soils and groundwater, which potentially contain hazardous substances. This HASP has been developed to ensure the following:

i) That Project personnel are not adversely exposed to the compounds of concern.

ii) Compliance with applicable governmental and non-governmental (American Conference of Governmental Industrial Hygienists [ACGIH]) regulations and guidelines. In particular, the amended rules of the Occupational Safety and Health Administration (OSHA) for Subpart D of Part 1926 (Title 29 Code of Federal Regulations [CFR] Part 1926.65) will be implemented for Project work where there is a potential to come in contact with hazardous substances.

iii) Initiation of proper emergency response procedures to minimize the potential for any adverse impact to Project workers, the general public, or the environment.

iv) The communication of the contents of this HASP to project personnel.

v) Elimination of unsafe conditions. Conditions that can contribute to an accident will be identified, and exposure to these conditions will be eliminated.

vi) Reduction of unsafe acts. Personnel will make a conscious effort to work safely. All contractors will maintain a high degree of safety awareness so that safety factors involved in a task become an integral part of the task.

vii) Frequent inspections are made. Regular safety inspections of the work area, materials and equipment by qualified persons ensure early detection of unsafe conditions. Each contractor working on Site will correct safety and health deficiencies as soon as possible, or suspend project activities until all deficiencies are remedied.

The applicability of this HASP extends to all contractors and their personnel who may potentially be exposed or have the reasonable possibility to be exposed to the safety or health hazards at the Site. As such, contractors and subcontractors selected to work at the Site will be required to prepare a HASP for their project activities. The HASP must minimally meet all the requirements of this HASP. All contractors, including those who are not required to provide a written HASP are required to comply with applicable OSHA standards found in Parts 1910 and 1926.

All RAWP activities at the Site will be conducted in accordance with applicable standards, the provisions of the selected contractor's approved Site-specific HASP (if required) and employer-specific Standard Operating Procedures (SOPs). A copy of any required HASPs will be maintained on Site whenever RAWP activities are in progress.

1.1 PROJECT ORGANIZATION

The selected contractor(s) will be responsible for providing both a Site Superintendent and a Health and Safety Officer (HSO) to direct their activities. The Site Superintendent, if qualified, may fulfill the duties of the HSO. These individuals will be responsible for ensuring that all contract specifications are met, including those related to Site health and safety. The names of these individuals will be presented in the HASPs of each contractor. A Project Engineer will ensure that all work is conducted in accordance with the project specifications including adherence to contractor-specific HASPs.

2.0 SITE CHARACTERIZATION AND POTENTIALLY HAZARDOUS COMPOUNDS

Between 1956 and 1977, the Operable Unit 1 (OU-1) landfill was used by Sterling for the disposal of waste materials. Company records indicated that disposed wastes in OU-1 included pharmaceutical intermediates, finished pharmaceutical products, Sterling Winthrop Research Institute waste, filter cakes, solvents, still bottoms, motor and lubricating oils, and wood. In 1977, the Site was covered with sandy clay and gravel and closed, and has remained inactive since that time. OU-2 consists of a groundwater contaminant plume from the landfill, consisting of ethyl ether and pharmaceutical SVOCs.

3.0 BASIS FOR DESIGN

Regulations set forth by OSHA in Title 29, CFR, Parts 1910 and 1926 (29 CFR 1910 and 1926) form the basis of this HASP. Emphasis is placed on Section 1926.65 (Hazardous Waste Operations and Emergency Response), 1910 Subpart I (Personal Protective Equipment), 1910 Subpart Z (Toxic and Hazardous Substances), 1926 Subpart O (Motor Vehicles, Mechanized Equipment, and Marine Operations), and 1926 Subpart F (Excavations). Some of the specifications within this section are in addition to the OSHA regulations, and reflect the positions of the United States Environmental Protection Agency (USEPA), the National Institute for Occupational Safety and Health (NIOSH), and the United States Coast Guard (USCG) regarding safe operating procedures at hazardous waste sites.

This HASP follows the guidelines established in the following documents:

i) *Standard Operating Safety Guides*, USEPA (Publications 9285.1-03, June 1992)

ii) *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities*, NIOSH, OSHA, USCG, USEPA (86-116), October 1985

iii) Title 29 of the CFR, Part 1926.65

iv) Title 29 of the CFR, Part 1926

v) *Pocket Guide to Chemical Hazards*, DHHS, PHS, CDC, NIOSH (1997)

vi) *Threshold Limit Values*, ACGIH (1998-1999)

vii) *Quick Selection Guide to Chemical Protective Clothing*, Forsberg, K. and S.Z. Mandsorf, 2nd Ed. (1993)

The health and safety of the public and project personnel and the protection of the environment will take precedence over cost and scheduling considerations for all project work.

4.0 ROLES AND RESPONSIBILITIES

4.1 ALL PERSONNEL

All contractor and subcontractor personnel must adhere to the health and safety procedures during the performance of their work. Each person is responsible for completing tasks safely, and reporting any unsafe acts or conditions to his or her immediate supervisor or to the Site Superintendent. No person may work in a manner that conflicts with the safety and environmental precautions expressed in these procedures. After due warning, the Project Engineer will dismiss from the Site any person who violates safety procedures.

Required personnel shall have received training in accordance with 29 CFR 1926.65 and be familiar with the requirements and procedures contained in this document prior to the beginning of project operations.

4.2 INDUSTRIAL HYGIENIST

The Industrial Hygienist is responsible for technical health and safety aspects of the project, including review and approval of contractor HASPs. Inquiries regarding project procedures, and other technical or regulatory issues should be addressed to this individual. Any changes or addenda to this HASP must be approved by the Industrial Hygienist.

4.3 HEALTH AND SAFETY OFFICER (HSO)

The Site HSO is responsible for coordinating Site health and safety issues. The HSO will advise the Project Engineer on health and safety issues, and will establish and oversee the project air monitoring program. The HSO is the primary Site contact on occupational health and safety matters.

It is the responsibility of the HSO to:

i) Verify that all on-Site personnel are made aware of the provisions of this HASP and have been informed of the nature of any physical, chemical, and biological hazards associated with project activities.

ii) Maintain a daily log for all significant health and safety activities and incidents.

iii) Verify that on-Site personnel and visitors have received the required training, including instructions for safety equipment and personal protective equipment (PPE) use.

iv) Suspend work if health and/or safety-related concerns arise.

v) Provide project technical assistance.

vi) Conduct the project air monitoring program. This will also include conducting all required real time air monitoring and equipment maintenance and calibration.

vii) Issue/obtain required work permits.

vii) Verify that project personnel have received the required physical examination and medical clearance certification.

viii) Conduct the project safety orientation training and daily safety meetings.

ix) Maintain the Exclusion Zone (EZ), Contaminant Reduction Zone (CRZ), and restricted work areas.

x) Coordinate emergency procedures.

xi) Conduct training with all standard operating procedures (SOPs) including review of equipment user manuals for power equipment.

xii) Supervise and inspect equipment cleaning.

xiii) Maintain the on-Site Hazard Communication Program including copies of all Material Safety Data Sheets (MSDSs).

xiv) Conduct brief daily safety meetings.

xv) Maintain health and safety documents and records.

4.4 PROJECT ENGINEER

The Project Engineer is ultimately responsible for verifying that all RAWP activities are completed in accordance with the requirements and procedures in this plan.

It is the responsibility of the Project Engineer to:

i) Report all accidents and incidents to the Industrial Hygienist and thoroughly investigate all such occurrences on the project

ii) Approve, in writing, addenda or modifications of this HASP

iii) Suspend work if health and safety-related concerns arise

4.5 SITE SUPERINTENDENT

The Site Superintendent is responsible for implementation of the HASP, including communication of Site requirements to all on-Site project personnel (including subcontractors). The Site Superintendent will be responsible for informing the Industrial Hygienist and the Project Engineer of any changes in the work plan or procedures so that those changes may be addressed in the HASP. Other responsibilities include:

i) Consultation with the HSO on-Site health and safety issues

ii) Stopping work, as required, to ensure personal safety and protection of property, or in cases of life or property-threatening safety non-compliance

iii) Obtaining a Site map and determining and posting routes to medical facilities and emergency telephone numbers, and arranging emergency transportation to medical facilities

iv) Notifying local public emergency officers of the nature of the Site operations, and posting of their telephone numbers in an appropriate location

v) Observing on-Site project personnel for signs of chemical or physical trauma

vi) Verifying that all Site personnel have the proper medical clearance, have met applicable training requirements, and have training documentation available in the office

4.6 CONTRACTORS AND SUBCONTRACTORS

On-Site contractors and subcontractors and their personnel must understand and comply with the Site requirements established in their respective HASP. Subcontractors will prepare their own task-specific HASPs, which must be consistent with the requirements of this HASP. Subcontractor personnel must attend and participate in the Daily Safety Meetings and all other Site safety meetings.

4.7 ON-SITE PERSONNEL AND VISITORS

All personnel must read and acknowledge their understanding of their employer's Site-specific HASP, abide by the requirements of the plan, and cooperate with Site supervision in ensuring a safe work site. Site personnel will immediately report any of the following situations to the Site Superintendent or HSO:

i) Accidents and injuries, no matter how minor

ii) Unexpected or uncontrolled release of chemical substances

iii) Symptoms of chemical exposure

iv) Unsafe or malfunctioning equipment

v) Changes in Site conditions that may affect the health and safety of project personnel

vi) Damage to equipment or property

vii) Situations or activities for which they are not properly trained

5.0 EMPLOYEE TRAINING

5.1 GENERAL

Required project personnel must have completed hazardous waste operations-related training, as required by the OSHA Standard 29 CFR 1926.65. Field employees must also receive a minimum of three days of actual field experience under the direct supervision of a trained, experienced supervisor. Personnel who completed their training more than 12 months prior to the start of the project must have completed an 8-hour refresher course within the past 12 months. The Site Superintendent must have completed an additional 8 hours of training for supervisors.

5.2 BASIC 40-HOUR COURSE

The following is a list of the topics typically covered in a 40-hour training course:

i) General safety procedures

ii) Physical hazards (fall protection, noise, heat stress and cold stress)

iii) Names and job descriptions of key personnel responsible for project health and safety

iv) Safety, health, and other hazards typically present at hazardous waste sites;

v) Use, application, and limitations of PPE

vi) Work practices by which employees can minimize risks from hazards

vii) Safe use of engineering controls and equipment on site

viii) Medical surveillance requirements

ix) Recognition of symptoms and signs which might indicate overexposure to hazards

x) Worker right-to-know (Hazard Communication OSHA 1926.59/1910.1200);

xi) Routes of exposure to contaminants

xii) Engineering controls and safe work practices

xiii) Components of project-specific HASPs

xiv) Decontamination practices for personnel and equipment

xv) Confined space entry procedures

xvi) General emergency response procedures

5.3 SUPERVISOR COURSE

Management and supervisors working at hazardous waste sites are required to receive an additional 8 hours of training, which typically includes:

i) General project safety and health procedures

ii) Personal Protective Equipment (PPE) programs

iii) Air monitoring techniques

5.4 SITE-SPECIFIC TRAINING

Site-specific training will be accomplished by each Site worker reading this HASP, or through a Site briefing by the Project Engineer, Site Superintendent, or HSO on the contents of this HASP before work begins. The review must include a discussion of the chemical, physical, and biological hazards present at the Site, the protective equipment and safety procedures, and emergency procedures. Appendix A provides the Training Acknowledgment Form that all project personnel must sign off on.

5.5 DAILY SAFETY MEETINGS

Daily Safety Meetings will be held to cover the work that will be taking place on each day, the hazards anticipated, the protective clothing and procedures required to minimize hazards and any special emergency procedures that may be needed. The Site Superintendent or HSO will conduct these safety meetings prior to beginning each day's fieldwork. No work will be performed in an EZ before the daily safety meeting has been held. Additional separate safety meetings will also be held prior to beginning new tasks, and repeated if additional unrecognized hazards are encountered. Attachment B provides the form that will be used for documenting the daily safety meetings.

5.6 REQUIREMENTS FOR FIRST AID AND CPR

At least one individual current in First Aid and CPR will be available on Site during operations. Refresher training in first aid (triennially) and CPR (annually) is required to keep the certificate current. This individual must also receive training regarding the precautions and protective equipment necessary to protect against exposure to blood-borne pathogens.

6.0 PERSONAL PROTECTIVE EQUIPMENT (PPE)

PPE is required to safeguard project personnel from various hazards. Varying levels of protection may be required depending on the level of contaminants, the activity being conducted and the degree of exposure to any physical hazard. This section presents the various levels of protection and defines the conditions of use for each level.

6.1 LEVELS OF PROTECTION

Protection levels are determined based upon contaminants present in the work area and the potential for exposure to any hazard. The specific protection levels to be employed at the Site for each work task are presented on each task hazard analysis (THA) form, which are presented in Table 8.1.

6.1.1 LEVEL D PROTECTION

The minimum level of protection that will be required for all project personnel will be Level D. The following equipment will be used:

i) Work clothing as prescribed by the weather

ii) Steel toe work boots, meeting American National Standard Institute (ANSI) Z41

iii) Safety glasses or goggles, meeting ANSI Z87

iv) Hard hat, meeting ANSI Z89

v) Hearing protection (if noise levels exceed 85 dBA, then hearing protection with a Noise Reduction Rating (NRR) of at least 20 dBA must be used)

6.1.2 MODIFIED LEVEL D PROTECTION

Modified Level D will be used when airborne contaminants are not present at levels of concern, but project activities present an increased potential for skin contact with hazardous materials. Modified Level D consists of the following equipment:

i) Tyvek® coveralls

ii) Steel toe work boots

iii) Rubber or neoprene overboots

iv) Safety glasses or goggles

v) Hard hat

vi) Face shield in addition to safety glasses or goggles when projectiles pose a hazard

vii) Nitrile gloves

viii) Hearing protection (when necessary)

6.1.3 LEVEL C PROTECTION

Level C protection will be required when the airborne concentrations of contaminants are present at sustained levels (15 minutes or greater) of 1 part per million (ppm) or greater.

The following equipment will be used for Level C protection:

i) Full-face air purifying respirator (APR) with organic vapor/acid gas cartridges in combination with particulate filters (P-100) which are NIOSH approved

ii) Polyethylene coated Tyvek® suit, ankles, and cuffs taped to boots and gloves

iii) Nitrile gloves over nitrile sample gloves

iv) Safety toe work boots, ANSI approved

v) Chemical resistant rubber or neoprene overboots

vi) Hard hat, ANSI approved

vii) Hearing protection (when necessary)

6.1.4 SELECTION OF PPE

Equipment for personal protection will be selected based on the potential for contact, project conditions, ambient air quality, and the judgment of supervising Site personnel and the Industrial Hygienist. The PPE used will be chosen to be effective against the compound(s) present on the Site.

6.2 RESPIRATORY PROTECTION

Respiratory protection is an integral part of employee health and safety at sites with potential airborne contamination.

6.2.1 SITE RESPIRATORY PROTECTION PROGRAM

The project respiratory protection program will consist of the following:

i) All project personnel who may use respiratory protection will have an assigned respirator.

ii) All project personnel who may use respiratory protection will have been fit tested and trained in the use of a full-facepiece Air Purifying Respirator (APR) within the past 12 months.

iii) All project personnel who may use respiratory protection must, within the past year, have been medically certified as being capable of wearing a respirator. Documentation of the medical certification must be provided to the HSO prior to initiating any project activity.

iv) Only cleaned, maintained, NIOSH approved respirators are to be used on this Site.

v) If respirators are used, the respirator cartridge is to be properly disposed of at the end of each work shift, prior to expected breakthrough or when filter load-up occurs.

vi) Contact lenses are not to be worn when a respirator is worn.

vii) All Site personnel who use respiratory protection must be clean shaven. Mustaches and sideburns are permitted, but they must not touch the sealing surface of the respirator.

viii) Respirators will be inspected and a negative pressure test performed prior to each use.

ix) After each use, the respirator will be thoroughly cleaned at the end of the work shift. The respirator will be stored in a clean plastic bag, away from direct sunlight in a clean, dry location, in a manner that will not distort the facepiece.

Respiratory protection may be required during some of the project activities. This is to ensure worker protection from potentially contaminated particulates and VOCs. It is expected that Modified Level D personal protection will be worn during the monitoring well installation, development and sampling. However, if during these excavations the

real-time air monitoring program indicates the need for an upgrade in protection to Level C, then these excavations will be continued with the increased level of personal protection.

A photoionization detector (PID) with an 11.7 eV lamp will be used to determine if organic vapors are present. A background reading will be established prior to commencing work activities at each active work area.

Action levels to determine the level of respiratory protection necessary for organic vapors are based on the concentration of Site contaminants measured within the breathing zone. The action levels and appropriate respiratory protection are presented in Table 9.1.

6.3 USING PPE

Depending upon the level of protection selected for each work activity, specific donning and doffing procedures may be required. The procedures presented in this section are mandatory if Level C protection is being worn.

All personnel entering the EZ must put on the required PPE in accordance with the requirements of this plan. When leaving the EZ, PPE will be removed in accordance with the procedures listed, to minimize the spread of contamination.

6.3.1 DONNING PROCEDURES

These procedures are mandatory when Level C protection is being worn:

i) Remove bulky outerwear. Remove street clothes and store in clean location
ii) Put on work clothes or coveralls.
iii) Put on the required chemical protective coveralls or rain gear.
iv) Put on the required chemical protective boots or boot covers.
v) Tape the legs of the coveralls to the boots with duct tape.
vi) Put on the required chemical protective gloves.
vi) Tape the wrists of the protective coveralls to the gloves.
vii) Don the required respirator and perform appropriate fit check.
viii) Put hood or head covering over head and respirator straps and tape hood to facepiece.

ix) Don remaining PPE, such as hard hat.

When these procedures are instituted, one person must remain outside the work area to ensure that each person entering has the proper protective equipment.

6.3.2 DOFFING PROCEDURES

The following procedures are mandatory when Level C protection is being worn. Whenever a person leaves a work zone where Level C protection is being worn, the following decontamination sequence will be followed:

i) Upon entering the CRZ, rinse contaminated materials from the boots or remove contaminated boot covers.

ii) Clean reusable protective equipment.

iii) Remove protective garments, equipment, and respirator. All disposable clothing should be placed in a covered container, which is labeled.

iv) Wash hands, face, and neck or shower (if necessary).

v) Proceed to clean area and dress in clean clothing.

vi) Clean and disinfect respirator for next use.

All disposable equipment, garments, and PPE must be placed in covered containers and labeled for disposal. See Section 10.0 for detailed information on decontamination procedures.

6.4 SELECTION MATRIX

The level of personal protection selected will be based upon real-time air monitoring of the work environment and an assessment by the Site Superintendent and HSO of the potential for skin contact with contaminated materials. The PPE selection matrix is given in Table 6.1. This matrix is based upon information available at the time this plan was written. The exposure levels presented in Table 2.2 should be used to verify that any respiratory protection equipment being worn is appropriate.

6.5 DURATION OF WORK TASKS

The duration of activities involving the usage of PPE will be established by the HSO based upon ambient temperature and weather conditions, the capacity of personnel to work in the designated level of PPE (heat stress, see Section 8.3) and limitations of the protective equipment (i.e., ensemble permeation rates, life expectancy of APR cartridges, etc.). As a minimum, rest breaks will be observed at the following intervals:

i) 15 minutes midway between shift startup and lunch

ii) 1/2 to 1 hour for lunch

iii) 15 minutes in the afternoon, between lunch and shift end

All rest breaks will be taken in a clean area (e.g., SZ) after full decontamination and PPE removal. Additional rest breaks will be observed, based upon the heat stress monitoring guidelines presented in Section 8.3.

6.6 LIMITATIONS OF PROTECTIVE CLOTHING

PPE ensembles have been selected to provide protection against contaminants at anticipated concentrations. However, no protective garment, glove, or boot is chemical-proof, nor will it afford protection against all chemical types. Permeation of a given chemical through PPE is a complex process governed by contaminant concentrations, environmental conditions, physical condition of the protection garment, and the resistance of a garment to a specific contaminant; chemical permeation may continue even after the source of contamination has been removed from the garment.

In order to obtain optimum usage from PPE, the following procedures are to be followed by all project personnel using PPE:

i) When using disposable coveralls, don a clean, new garment after each rest break or at the beginning of each shift

ii) Inspect all clothing, gloves, and boots both prior to and during use for:

   a) Imperfect seams

   b) Non-uniform coatings

   c) Tears

   d) Poorly functioning closures

iii) Inspect reusable garments, boots, and gloves both prior to and during use for:

a) Visible signs of chemical permeation

b) Swelling

c) Discoloration

d) Stiffness

e) Brittleness

f) Cracks

g) Any sign of puncture

h) Any sign of abrasion

Reusable gloves, boots, or coveralls exhibiting any of the characteristics listed above will be discarded. PPE used in areas known or suspected to exhibit elevated concentrations of contaminants will not be reused.

7.0 SITE CONTROL

7.1 AUTHORIZATION TO ENTER

All personnel working in EZs must have completed hazardous waste operations initial training as defined in 29 CFR 1926.65; have completed their training or refresher training within the past 12 months, and have been certified by a physician as fit for hazardous waste operations in order to enter a Site area designated as an EZ or CRZ. Personnel without such training or medical certification must stay in the designated SZ. The HSO will maintain a list of persons who are authorized to enter EZs; only personnel on this list will be allowed within the EZ or CRZ.

7.2 SITE ORIENTATION AND HAZARD BRIEFING

No person will be allowed in the general work area during project operations without first being given a safety orientation and hazard briefing. This orientation will be presented by the HSO, and will consist of a review of this HASP. This review will cover the chemical, physical, and biological hazards, protective equipment, safe work procedures, and emergency procedures for the project. Appendix A provides the Training Acknowledgment Form that will be used for documentation purposes. In addition to this meeting, Daily Safety Meetings will be held each day before work begins. All individuals on the Site, including visitors, must document their attendance to the initial and Daily Safety Meetings on the forms included with this HASP. Appendix B presents the Daily Safety Meeting Log.

7.3 CERTIFICATION DOCUMENTS

A training and medical file may be established for the project and kept on Site during all project operations. The 40-hour training, update, and specialty training (first aid/cardiopulmonary resuscitation [CPR]) certificates, as well as current medical clearance for all project field personnel, will be maintained within that file. Contractor and subcontractor personnel must provide their training and medical documentation to the HSO prior to the start of field work.

7.4 ENTRY LOG

A log-in/log-out sheet must be maintained at the Site by the HSO. Personnel may sign in and out on a log sheet as they enter and leave the EZ and CRZ, or the HSO may document entry and exit in the field notebook.

7.5 ENTRY REQUIREMENTS

In addition to the authorization, hazard briefing and certification requirements listed above, no person will be allowed to enter the Site unless he or she is wearing the minimum PPE as described in Section 6.0. Personnel entering the EZ or CRZ must wear the required PPE for the activity that they are conducting.

7.6 EMERGENCY ENTRY AND EXIT

Individuals who must enter the Site on an emergency basis will be briefed of the hazards by the HSO. All hazardous activities will cease in the event of an emergency and any sources of emissions will be controlled, if possible.

Individuals exiting the Site because of an emergency will gather in a safe area for a head count. The HSO is responsible for ensuring that all people who entered the work area have exited in the event of an emergency.

7.7 CONTAMINATION CONTROL ZONES

Contamination control zones are maintained to prevent the spread of contamination and to prevent unauthorized individuals from entering hazardous areas.

7.7.1 EXCLUSION ZONE (EZ)

The EZ consists of the specific work area, or may be the entire area of suspected contamination. All project personnel entering the EZ must use the required PPE, and must have the appropriate training and medical clearance for hazardous waste work. The EZ is the defined area where there is a possible respiratory and/or contact health hazard. Cones, caution tape, or other appropriate means will identify the location of each EZ.

7.7.2 CONTAMINATION REDUCTION ZONE (CRZ)

The CRZ or transition area will be established to perform decontamination of personnel and equipment. All personnel entering or leaving the EZ will pass through this area to prevent any cross-contamination. Tools, equipment, and machinery will be decontaminated in a specific location. The decontamination of all personnel will be performed on Site adjacent to the EZ. Personal protective outer garments and respiratory protection will be removed in the CRZ and prepared for cleaning or disposal. This zone is the only appropriate corridor between the EZ and the SZ.

7.7.3 SUPPORT ZONE (SZ)

The SZ is a clean area outside the CRZ located to prevent personnel exposure to hazardous substances. Eating and drinking will be permitted in the support area only after proper decontamination. Smoking is not allowed on Site.

7.8 RESTRICTED WORK AREAS

Restricted work areas are areas near energized lines or equipment, or areas containing uninsulated, unguarded energized lines or equipment greater than 50 volts. At least two qualified workers will be present when working on or within minimum approach distances from lines or equipment energized at voltages greater than 600 volts. Any mechanical equipment working on or within minimum approach distances from lines or equipment energized at voltages greater than 600 volts will be properly grounded. Restricted work areas will be established in the field, as necessary.

No worker will approach or take any conductive object closer to exposed, energized parts than the distances listed below (for phase to ground clearance):

- Minimum Approach Distance: The closest point of approach to energized lines or equipment by a qualified worker, or by any other conductive object, without the use of insulating gloves, sleeves or portable protection devices, will be in accordance with the table below.
- Reaching Distance: The distance that a worker's hand or any other body part and the end of any uninsulated tool being handled can reach while working, using a

normal range of movement required by the work (for example, not stretching, leaning or reaching in excess of what is required by the work).

Minimum Approach Distances

System Voltage	***Electrically Qualified***
50-1,000 V	Reaching Distance
1,001-15,000 V	Reaching Distance + 2 Ft. 2 In.
23 kV	Reaching Distance + 3 Ft.
34.5 kV	Reaching Distance + 3 Ft.
46 kV	Reaching Distance + 4 Ft.
69 kV	Reaching Distance + 4 Ft.
115 kV	Reaching Distance + 5 Ft.
230 kV	Reaching Distance + 7 Ft.
345 kV	Reaching Distance + 9 Ft.

Unqualified persons will maintain 10 ft. of clearance from overhead lines or exposed energized circuits for voltages to ground of 50 kV. For voltages to ground over 50 kV, 10 ft. plus 4 in. for every 10 kV over 50 kV will be observed.

Minimum Approach Distances for Vehicular and Mechanical Equipment

Voltage	***Electrically Qualified***	***OSHA General***
50-1,000 V	Avoid Contact	Avoid Contact
1,000 V-15kV	2 ft. 2 in.	10 ft.
23-34.5 kV	3 ft.	10 ft.
46-69 kV	4 ft.	10 ft. 8 in.
115 kV	5 ft.	12 ft. 4 in.
230 kV	7 ft.	16 ft.
345 kV	9 ft.	20 ft.

8.0 ACTIVITY HAZARD/RISK ANALYSIS AND GENERAL SAFETY PRACTICES

This section identifies the general hazards associated with specific RAWP activities and presents the documented or potential health and safety hazards that exist at the Site. Every effort will be made to reduce or eliminate these hazards. Those that cannot be eliminated must be guarded against by use of engineering controls and/or PPE. Table 8.1 presents the anticipated hazards/risks and appropriate precautions for all project activities.

In addition to the chemical hazards presented in Section 2.0 of this HASP, physical and biological hazards including snakes, poison ivy, poison oak, mosquitoes, bees, wasps, slips/trips and falls, uneven terrain, slippery surfaces, hazards presented by the use of heavy equipment, noise, electrical, overhead and underground utility hazards, potential drowning hazard, hot work, potential drum removal and handling activities, the use of decontamination equipment, and potential heat and cold stress exist at the Site. It will be the responsibility of each contractor and their personnel to identify the physical hazards posed by the various project activities and implement preventative and corrective action.

8.1 CHEMICAL EXPOSURE

Preventing exposure to toxic chemicals is a primary concern. Chemical substances can enter the unprotected body by inhalation, skin absorption, ingestion, or through a puncture wound (injection). A contaminant can cause damage at the point of contact or can act systematically, causing a toxic effect at a part of the body distant from the point of initial contact.

Chemical exposures are generally divided into two categories: acute and chronic. Symptoms resulting from acute exposures usually occur during or shortly after exposure to a sufficiently high concentration of a contaminant. The concentration required to produce such effects varies widely from chemical to chemical. The term "chronic exposure" generally refers to exposures to "low" concentrations of a contaminant over a long period of time. The "low" concentrations required to produce symptoms of chronic exposure depend upon the chemical, the duration of each exposure, and the number of exposures. For a given contaminant, the symptoms of an acute exposure may be completely different from those resulting from chronic exposure.

For either chronic or acute exposure, the toxic effect may be temporary and reversible, or may be permanent (disability or death). Some chemicals may cause obvious symptoms such as burning, coughing, nausea, tearing eyes, or rashes. Other chemicals may cause health damage without any such warning signs (this is a particular concern for chronic exposures to low concentrations). Health effects such as cancer or respiratory disease may not become evident for several years or decades after exposure. In addition, some toxic chemicals may be colorless and/or odorless, may dull the sense of smell, or may not produce any immediate or obvious physiological sensations. Thus, a worker's senses or feelings cannot be relied upon in all cases to warn of potential toxic exposure.

The effects of exposure not only depend on the chemical, its concentration, route of entry, and duration of exposure, but may also be influenced by personal factors such as the individual's smoking habits, alcohol consumption, medication use, nutrition, age, and sex.

An important exposure route of concern at the Site is inhalation. The lungs are extremely vulnerable to chemical agents. Even substances that do not directly affect the lungs may pass through lung tissue into the bloodstream, where they are transported to other vulnerable areas of the body. Some toxic chemicals present in the atmosphere may not be detected by human senses (i.e., they may be colorless, odorless, and their toxic effects may not produce any immediate symptoms). Respiratory protection is therefore extremely important if there is a possibility that the work site atmosphere may contain such hazardous substances. Chemicals can also enter the respiratory tract through punctured eardrums. Where this is a hazard, individuals with punctured eardrums should be medically evaluated specifically to determine if such a condition would place them at an unacceptable risk and preclude their working at the task in question.

Direct contact of the skin and eyes by hazardous substances is another important route of exposure. Some chemicals directly injure the skin. Some pass through the skin into the bloodstream where they are transported to vulnerable organs. Abrasions, cuts, heat, and moisture enhance skin absorption. The eye is particularly vulnerable because airborne chemicals can dissolve in its moist surface and be carried to the rest of the body through the bloodstream (capillaries are very close to the surface of the eye). Wearing protective equipment, not using contact lenses in contaminated atmospheres (since they may trap chemicals against the eye surface), keeping hands away from the face, and minimizing contact with liquid and solid chemicals can help protect against skin and eye contact.

Although ingestion should be the least significant route of exposure at the Site, it is important to be aware of how this type of exposure can occur. Deliberate ingestion of

chemicals is unlikely; however, personal habits such as chewing gum or tobacco, drinking, eating, smoking cigarettes, and applying cosmetics at the Site may provide a route of entry for chemicals.

The last primary route of chemical exposure is injection, whereby chemicals are introduced into the body through puncture wounds (i.e., by stepping or tripping and falling onto contaminated sharp objects). Wearing safety shoes, avoiding physical hazards, and taking common sense precautions are important protective measures against injection.

8.1.1 CHEMICAL HAZARD CONTROLS

Each contractor will control the exposure or contact with the on-Site contaminants by:

i) Administrative and engineering controls, and where feasible, remote work methods, and personal hygiene procedures.

ii) Development of air monitoring action levels.

iii) Skin contact with chemicals will be controlled by use of the PPE and good housekeeping procedures. The proper PPE (e.g., Tyvek® suit) will be worn for all activities where contact with potentially harmful media or materials is anticipated.

iv) Using respiratory protection, as appropriate, in areas known to have concentrations above the specified action level for each contaminant.

v) Although ingestion should be the least significant route of exposure at the facility, it is important to be aware of how this type of exposure can occur. Deliberate ingestion of chemicals is unlikely; however, personal habits such as chewing gum or tobacco, drinking, eating, smoking cigarettes, and applying cosmetics at the Site may provide a route of entry for chemicals.

8.1.2 HAZARD COMMUNICATION

Personnel required to handle or to use hazardous materials as part of their job duties will be trained and educated by the HSO in accordance with OSHA's Hazard Communication standard. The training will include instruction on the safe usage, and handling procedures of the hazardous materials, how to read and access Material Safety Data Sheets (MSDSs), and the proper labeling requirements.

The MSDSs for chemicals in use at the Site will be available to project personnel and will be maintained on Site by the HSO.

8.2 GENERAL PRACTICES

Additional general safety practices to be implemented are as follows:

i) At least one copy of this HASP must be at the project Site, in a location readily available to all personnel, and reviewed by all project personnel prior to starting work.

ii) All Site personnel must use the buddy system (working in pairs or teams).

iii) Food, beverages, or tobacco products must not be present or consumed in the EZ and CRZ. Cosmetics must not be applied within these zones.

iv) Emergency equipment such as eyewash, fire extinguishers, etc., must be removed from storage areas and staged in readily accessible locations.

v) Contaminated waste, debris, and clothing must be properly contained and legible and understandable precautionary labels must be affixed to the containers.

vi) Removing contaminated soil from protective clothing or equipment with compressed air, shaking, or any other means that disperses contaminants into the air is prohibited.

vii) Containers must be moved only with the proper equipment, and must be secured to prevent dropping or loss of control during transport.

viii) Visitors to the Site must be instructed to stay outside the EZ and CRZ and remain within the SZ during the extent of their stay. Visitors must be cautioned to avoid skin contact with surfaces which are contaminated or suspected to be contaminated.

8.2.1 BUDDY SYSTEM

All on-Site personnel must use the buddy system. Visual contact must be maintained between crew members at all times, and crew members must observe each other for signs of chemical exposure, heat, or cold stress. Indications of adverse effects include, but are not limited to:

i) Changes in complexion and skin coloration

ii) Changes in coordination

iii) Excessive salivation and pupillary response

iv) Changes in speech pattern

Team members must also be aware of potential exposure to possible safety hazards, unsafe acts, or noncompliance with safety procedures. Employees must inform their partners or fellow team members of non-visible effects of exposure to toxic materials. The symptoms of such exposure may include:

i) Headaches

ii) Dizziness

iii) Nausea

iv) Blurred vision

v) Cramps

vi) Irritation of eyes, skin, or respiratory tract

If protective equipment or noise levels impair communications, prearranged hand signals must be used for communication

8.2 HEAT STRESS

Heat stress is caused by a number of interacting factors including environmental conditions, clothing, workload, etc., as well as the physical and conditioning characteristics of the individual. Since heat stress is one of the most common illnesses associated with heavy outdoor work conducted with direct solar load and, in particular, because wearing PPE can increase the risk of developing heat stress, workers must be capable of recognizing the signs and symptoms of heat-related illnesses. Personnel must be aware of the types and causes of heat-related illnesses and be able to recognize the signs and symptoms of these illnesses in both themselves and their co-workers.

Heat Rashes: Are the one of the most common problems in hot work environments. Commonly known as prickly heat, a heat rash is manifested as red papules and usually appears in areas where the clothing is restrictive. As sweating increases, these papules give rise to a prickling sensation. Prickly heat occurs in skin that is persistently wetted by unevaporated sweat, and heat rash papules may become infected if they are not treated. In most cases, heat rashes will disappear when the affected individual returns to a cool environment.

Heat Cramps: Are usually caused by performing hard physical labor in a hot environment. These cramps have been attributed to an electrolyte imbalance caused by sweating. It is important to understand that cramps can be caused both by too much and too little salt.

Cramps appear to be caused by the lack of water replenishment. Because sweat is a hypotonic solution (plus or minus 0.3 percent NaCl), excess salt can build up in the body if the water lost through sweating is not replaced. Thirst cannot be relied on as a guide to the need for water; instead, water must be taken every 15 to 20 minutes in hot environments.

Under extreme conditions, such as working for 6 to 8 hours in heavy protective gear, a loss of sodium may occur. Drinking commercially available carbohydrate-electrolyte replacement liquids is effective in minimizing physiological disturbances during recovery.

Heat Exhaustion: Occurs from increased stress on various body organs due to inadequate blood circulation, cardiovascular insufficiency, or dehydration. Signs and symptoms include pale, cool, moist skin; heavy sweating; dizziness; nausea; headache, vertigo, weakness, thirst, and giddiness. Fortunately, this condition responds readily to prompt treatment.

Heat exhaustion should not be dismissed lightly, however, for several reasons. One is that the fainting associated with heat exhaustion can be dangerous because the victim may be operating machinery or controlling an operation that should not be left unattended; moreover, the victim may be injured when he or she faints. Also, the signs and symptoms seen in heat exhaustion are similar to those of heat stroke, which is a medical emergency.

Workers suffering from heat exhaustion should be removed from the hot environment, be given fluid replacement, and be encouraged to get adequate rest.

Heat Stroke: Is the most serious form of heat stress. Heat stroke occurs when the body's system of temperature regulation fails and the body's temperature rises to critical levels. This condition is caused by a combination of highly variable factors, and its occurrence is difficult to predict.

Heat stroke is a medical emergency. The primary signs and symptoms of heat stroke are confusion; irrational behavior; loss of consciousness; convulsions; a lack of sweating

(usually); hot, dry skin; and an abnormally high body temperature, e.g., a temperature of 41°C (105.8°F). If body temperature is too high, it causes death. The elevated metabolic temperatures caused by a combination of workload and environmental heat load, both of which contribute to heat stroke, are also highly variable and difficult to predict.

If a worker shows signs of possible heat stroke, professional medical treatment should be obtained immediately. The worker should be placed in a shady area and the outer clothing should be removed. The worker's skin should be wetted and air movement around the worker should be increased to improve evaporative cooling until professional methods of cooling are initiated and the seriousness of the condition can be assessed. Fluids should be replaced as soon as possible. The medical outcome of an episode of heat stroke depends on the victim's physical fitness and the timing and effectiveness of first aid treatment.

Regardless of the worker's protestations, no employee suspected of being ill from heat stroke should not be sent home or left unattended unless a physician has specifically approved such an order.

Proper training and preventive measures will help avert serious illness and loss of work productivity. Preventing heat stress is particularly important because once someone suffers from heat stroke or exhaustion, that person may be predisposed to additional heat injuries.

Heat Stress Safety Precautions: Heat stress monitoring and work rest cycle implementation should commence when the ambient adjusted temperature exceeds 72°F. A minimum work rest regimen and procedures for calculating ambient adjusted temperature is described below.

Adjusted Temperature(1)	***Work-Rest Regimen Normal Work Ensemble(2)***	***Work-Rest Regimen Impermeable Ensemble***
90°C (32.°C) or above	After each 45 minutes of work	After each 15 minutes of work
87.5° to 90°F (30.8°C to 32.2°C)	After each 60 minutes of work	After each 30 minutes of work
82.5° to 87.5°F (28.1° to 30.8°C)	After each 90 minutes of work	After each 60 minutes of work

Adjusted Temperature[1]	*Work-Rest Regimen Normal Work Ensemble*[2]	*Work-Rest Regimen Impermeable Ensemble*
77.5° to 82.5°F (25.3° to 28.1°C)	After each 120 minutes of work	After each 90 minutes of work
72.5° to 77.5°F (30.8° to 32.2°C)	After each 150 minutes of work	After each 120 minutes of work

Notes:

(1) Calculate the adjusted air temperature (ta adj) by using this equation: ta adj °F=ta °F + (13 x percent sunshine). Measure air temperature (ta) with a standard mercury-in-glass thermometer, with the bulk shielded from radiant heat. Estimate percent sunshine by judging what percent time the sun is not covered by clouds that are thick enough to produce a shadow (100 percent sunshine = no cloud cover and a sharp, distinct shadow; 0 percent sunshine = no shadows).

(2) A normal work ensemble consists of cotton coveralls or other cotton clothing with long sleeves and pants.

In order to determine if the work rest cycles are adequate for the personnel and specific Site conditions, additional monitoring of the individual's heart rates will be conducted during the rest cycle. To check the heart rate, count the radial pulse for 30 seconds at the beginning of the rest period. If the heart rate exceeds 110 beats per minute, shorten the next work period by one-third and maintain the same rest period.

Additional one or more of the following control measures can be used to help control heat stress and are mandatory if any Site worker has a heart rate (measure immediately prior to rest period) exceeding 115 beats per minute:

i) Project personnel will be encouraged to drink plenty of water and electrolyte replacement fluids throughout the day.

ii) Drinking water will be kept cool (50 to 60°F).

iii) A work regimen that will provide adequate rest periods for cooling down will be established, as required.

iv) All personnel will be advised of the dangers and symptoms of heat stroke, heat exhaustion, and heat cramps.

v) Cooling devices such as vortex tubes or cooling vests should be used when personnel must wear impermeable clothing in conditions of extreme heat.

vi) Project personnel will be instructed to monitor themselves and co-workers for signs of heat stress and to take additional breaks as necessary.

vii) A shaded rest area must be provided. All breaks should take place in the shaded rest area.

viii) Personnel will not be assigned to other tasks during breaks.

ix) Personnel will remove impermeable garments during rest periods. This includes tyvek® garments.

x) All personnel will be informed of the importance of adequate rest, acclimation, and proper diet in the prevention of heat stress disorders.

8.3 COLD STRESS

When decreased ambient air temperatures and/or wind are present during project activities, personnel can experience cold stress conditions. Cold stress can range from minor frostbite to hypothermia.

8.3.1 RECOGNITION AND SYMPTOMS

The signs and symptoms of cold stress are listed below. Project personnel will follow their appropriate guidelines if any personnel exhibit these symptoms:

i) **Frostbite —** Pain in the extremities and loss of manual dexterity. "Frostnip" or reddening of the tissue accompanied by a tingling or loss of sensation in the extremities. Continuous shivering.

ii) **Hypothermia —** Pain in the extremities and loss of manual dexterity. Severe, uncontrollable shivering. Inability to maintain level of activity. Excessive fatigue, drowsiness, irritability, or euphoria.

iii) **Severe Hypothermia —** Clouded consciousness, low blood pressure, pupil dilation, cease of shivering, unconsciousness, and possible death.

Remove the individual to a warm, dry place. If clothing is wet, remove and replace with dry clothing. Keep the individual warm. Re-warming of the individual should be gradual to avoid stroke symptoms. Dehydration and the loss of body fluids may result in cold injury due to a significant change in blood flow to the extremities. If the individual is conscious and alert, provide warm sweet liquids. Avoid coffee and other caffeinated liquids because of diuretic and circulatory effects. Extremities affected by frostbite should be gradually warmed up and returned to normal temperature. Apply moist compresses; begin with lukewarm compresses and slowly increase the

temperature as changes in skin temperature are detected. Keep the individual warm and calm; remove to a medical facility as soon as possible.

8.3.2 WORK PRACTICES

To reduce the adverse health affects from cold exposure project personnel will adopt the following work practices:

i) Providing adequate insulating dry clothing to maintain core temperature above 98.6°F to workers if work is performed in air temperature below 40°F. Wind chill cooling rates and the cooling power of air are critical factors. The higher the wind speed and the lower the temperature in the work area, the greater the insulation value of the protective clothing required.

ii) If the air temperature is of 32°F or less, hands should be protected.

iii) If only light work is involved and if the clothing on the worker may become wet on the job Site, the outer layer of the clothing in use should be impermeable to water. With more severe work under such conditions, the outer layer should be water repellent, and the outerwear should be changed, as it becomes wetted. The outer garments should include provisions for easy ventilation in order to prevent wetting of inner layer by sweat.

iv) If available clothing does not give adequate protection to prevent cold injury, work should be modified or suspended until adequate clothing is made available, or until weather conditions improve.

v) Heated warming shelters should be available nearby (e.g., use of on-Site trailer). Project personnel will be encouraged to use these at regular intervals; the frequency depending on the severity of the environmental exposure. When entering the heated shelter, remove the outer layer of clothing and loosen the remainder of the clothing to permit heat evaporation.

vi) Warm sweet drinks and soups should be provided at the Site to provide caloric intake and fluid volume. The intake of coffee should be limited because of the diuretic and circulatory effect.

vii) The weight and bulk of clothing should be included in estimating the required work performance and weights to be lifted by the worker.

viii) Implementing a buddy system in which workers are responsible for observing fellow workers for early signs and symptoms of cold stress.

ix) Unacclimatized personnel should not be required to work full-time in cold until they become accustomed to the working conditions and required protective clothing.

8.4 BIOLOGICAL HAZARDS

Project personnel will be conducting numerous activities that have the possibility of encountering biological hazards, which include bloodborne pathogens, insects, spiders, rodents, snakes, and large predators. This section identifies precautions to be taken if these hazards are encountered.

8.4.1 VEGETATION OVERGROWTH

Overgrown weeds, bushes, trees, grass and other vegetation are fire and safety hazards. There are a number of hidden hazards not immediately recognized due to the overgrowth of vegetation in areas where field activities may occur, including discarded junk, litter, and debris. Construction materials such as boards, nails, concrete, and other debris may be hidden beneath blades of tall grass, weeds, and bushes. Other hazards may include steep slopes, potholes, trenches, soft spots, dips, etc.; all dangerously concealed from the view of the individual walking or operating motorized equipment in the area. Additionally, there are biological hazards such as snakes, ticks, chiggers, and mosquitoes that breed in overgrowth conditions.

Here are some simple actions project personnel can take:

i) Assess the work area and determine if the area requires vegetation clearance. Consider that overgrowth that extends above the lowest level of motorized equipment (i.e., bumper or fender) or 6 inches above your ankle has hidden hazards that you will not be able to readily identify.

ii) Determine if the area is safe to walk or whether you need motorized equipment. Consider the limitations of the equipment.

iii) Identify slip, trip, and fall hazards and remove from the general work area. Remember to give adequate clearance so that the items being removed do not pose future hazards.

iv) Adequately protect yourself against the hazards by wearing boots that protect the ankles, long pants, and using insecticides.

v) Consider the limitations of manual or mechanical equipment for the clearance of overgrowth, particularly the safety hazards when using sling blades, machetes, weed eaters, bush hogs, or other brush removing equipment.

Before taking any action, determine whether there are any ecological issues that would affect or prevent the removal of overgrowth in protected areas such as wetlands, wildlife habitats, or sanctuaries for endangered and/or protected species.

8.4.2 POISONOUS PLANTS

Common ***Poison Ivy*** grows as a small plant, a vine, and a shrub. Poison Ivy occurs in every state. The leaves always consist of three glossy leaflets. ***Poison Sumac*** grows as a woody shrub or small tree 5 to 25 feet tall. It usually contains nine leaves, with eight paired leaves and one on top, and is common in swampy areas. The plants are potent sensitizers and can cause mild to severe allergic reaction, referred to as "contact dermatitis".

Dermatitis, in Rhus-sensitive persons, may result from contact with the milky sap found in the roots, stems, leaves, and fruit, and may be carried by contacted animals, equipment or apparel.

The best form of prevention is to avoid contact. Wearing long sleeves and gloves, and disposable clothing, such as Tyvek®, is recommended in high-risk areas to avoid exposure from contaminated apparel. Barrier creams and cleaners are also recommended.

8.4.3 INSECTS

Ticks

Ticks are blood feeding external parasites of mammals, birds, and reptiles throughout the world. Some human diseases of current interest in the United States caused by tick-borne pathogens include Lyme disease, ehrlichiosis, babesiosis, Rocky Mountain spotted fever, tularemia, and tick-borne relapsing fever. Lyme disease is caused by a bacterial parasite called spirochete and is spread by infected ticks that live in and near wooded areas, tall grass, and brush. The ticks that cause the disease in the Northeast and Midwest are often no bigger than a poppy seed or a comma in a newsprint. The peak months for human infection are June through October. There are many other tick

borne diseases such as Rocky Mountain Spotted Fever, which can be carried by a variety of ticks. The prevention and treatment of these diseases are similar to those of Lyme disease.

Prevention

Preventative measures include wearing light-colored clothing; keeping clothing buttoned, tucking pant legs in socks, and keeping shirttails tucked in. Periodic checks for ticks should be made during the day, and especially at night. Hair should also be checked by parting it and combing through it to make sure that no ticks have attached to the scalp. Also, check clothing when it is first removed, before ticks have a chance to crawl off.

The most common repellent recommended for ticks are N,N-dimethyl-m-toluamide, or DEET. It is important to follow the manufacturer's instructions found on the container for use with all insecticides especially those containing DEET.

In general, DEET insect repellent should only be applied to clothing, not directly on the skin. Do not apply to sunburns, cuts, or abrasions. Use soap and water to remove DEET once indoors.

Removal

The best way to remove a tick is removal by tweezers. If tweezers are not available, cover your fingers (tissue paper) while grasping the tick. It is important to grasp the tick as close as possible to the site of attachment and use a firm steady pull to remove it. When removing the tick, be certain to remove all the mouth parts from your skin so as not to cause irritation or infection. Wash hands immediately after with soap and water, and apply antiseptic to the area where tick was removed. Get medical attention if necessary.

Symptoms of Lyme Disease

The first symptoms of Lyme Disease usually appear from 2 days to a few weeks after an infected tick bites a person. Symptoms usually consist of a ring-like red rash on the skin where the tick attached, and is often bulls eye like with red on the outside and clear in the center. The rash may be warm, itchy, tender, and/or "doughy" and appears in only 60 to 80 percent of infected persons. An infected person also has flu-like symptoms of fever, fatigue, chills, headaches, a stiff neck, and muscle aches and pains (especially knees). Rashes may be found some distance away from original rash. Symptoms often disappear after a few weeks.

Bees, Wasps, and Yellow Jackets

Insects that sting are members of the order Hymenoptera of the class Insecta. There are two major subgroups: aphids (honeybees, bumblebees) and vespids (wasps, yellow jackets, hornets). Aphids are docile and usually do not sting unless provoked. The stinger of the honeybee has multiple barbs, which usually detaches after a sting. Vespids have few barbs and can inflict multiple stings.

Types of stinging insects that might be encountered on this project site may include:

- Carpenter Bees
- Bumblebees
- Mud Dauber Wasps
- Yellow Jackets
- Cicada Killer Wasps
- Giant Hornets
- Honeybees
- Paper Wasps

Symptoms

If you are stung there are three types of reactions you can have, a normal, a toxic, or an allergic reaction.

- Normal reaction - Only lasts a few hours and consists of pain, redness, swelling, itching, and warmth near the sting area
- Toxic reaction - Will last for several days and results from multiple stings and may cause cramps, headaches, fever, and drowsiness
- Allergic reaction - Might cause hives, itching, swelling, tightness in the chest area and a possibility of breathing difficulties, dizziness, unconsciousness, and cardiac arrest

The stingers of many *Hymenoptera* may remain in the skin and should be removed as quickly as possible without concern for the method of removal. An ice cube placed over the sting will reduce pain; aspirin may also be useful. Persons with known hypersensitivity to such stings should carry a kit containing epinephrine in a prefilled syringe. Antihistamines may help decrease hives and angioedema. Persons who have severe symptoms of anaphylaxis, have positive venom skin test results, and are at risk for subsequent stings should receive immunotherapy regardless of age or time since anaphylaxis.

Precautions

The following precautions can help you avoid stings. Try to wear light colored clothing and shy away from dark or floral prints. Avoid wearing perfumes, hairsprays, colognes, and scented deodorants while working outside. If eating outside, keep all food and

drinks covered; sweet foods and strong scents attract stinging insects as well. Never swat or swing at the insect, it is best to wait for it to leave, softly blow it away, or gently brush it aside. Seek medical attention when the reaction to a sting includes swelling, itching, dizziness or shortness of breath.

If physical control measures are not effective, use a pesticide that will have a minimal impact on both you and the environment.

Mosquitoes

Mosquitoe*s* are common pests that can be found in any state and any work environment where warm, humid conditions exist. Mosquitoes can pass along diseases such as West Nile virus and Malaria. Several different methods can be used to control adult mosquito populations: repellants such as DEET, mosquito traps, foggers, and vegetation and water management.

8.4.4 SNAKES

Snakes may be found in any region of the country. While many snakes encountered are not venomous, a few are; so it is best that you give a wide berth to all snakes. Of the 7,000 venomous snakebites reported each year, only about 15 prove to be fatal; so your chances of survival are extremely high. The usual snake encounter is one in which they see you before you see them, and they slither away from you quickly, startling you. If you see a snake, back away from it slowly and do not touch it. If you or someone you know are bitten try to see and remember the color and shape of the snake, which can help with treatment of the snakebite. Venomous snakes that could be found in the project area include the Rattlesnake.

Preventing Snakebites

Watching where you step, put your hands, or sit down is one of the best ways to prevent snakebites. Poisonous snakes live on or near the ground and often like rocks, woodpiles, and other spots that offer both a place to sun and a place to hide. Most bites occur in and around the ankle. About 99 percent of all bites occur below the knee, except when someone accidentally picks up or falls on the snake.

Watching where you step and wearing boots in tall grass can prevent most snakebites. Another means to protect against snakebites is snake chaps.

Emergency First Aid for Poisonous Snakebite

Although it is important to obtain medical aid immediately, emergency first aid can slow the spread of poison from the bite. Remain calm and avoid unnecessary movement, especially if someone is with you. The rate of venom distribution throughout your body will be slower if you are still and quiet. *Do not* use home remedies, and *do not* drink alcoholic beverages.

In addition, learn the following procedures so you do not waste time before getting medical attention.

i) If less than 60 minutes is required to reach a hospital or other medical aid, follow this procedure:

- Apply a constricting band 2 to 4 inches on each side of the bite. The band should be loose enough to slip your finger under without difficulty, so that you do not cut off circulation completely. Properly applied, the constricting band can be left safely in place for 1 hour without adjustment.
- If ice is available, place some in a towel, shirt, or other piece of cloth and apply it to the bite area. Do not bind it to the bite, but keep it loosely in place. Do not use the ice pack for more than *1 hour*. The objective is to cool the venom and slow its action, but not to freeze the tissue.
- The primary function of the constricting band and ice pack is to slow the spread of venom through your body. Remove them slowly so there will not be a sudden rush of venom through your blood stream.

8.5 NOISE

Exposure to noise over the OSHA action level can cause temporary impairment of hearing; prolonged and repeated exposure can cause permanent damage to hearing. The risk and severity of hearing loss increases with the intensity and duration of exposure to noise. In addition to damaging hearing, noise can impair voice communication, thereby increasing the risk of accidents on Site.

Control: All personnel must wear hearing protection with a Noise Reduction Rating (NRR) of at least 20 when noise levels exceed 85 dBA. When it is difficult to hear a co-worker at normal conversation distance, the noise level is approaching or exceeding 85 dBA, and hearing protection is necessary. All Site personnel who may be exposed to noise must also receive baseline and annual audiograms and training as to the causes and prevention of hearing loss.

Whenever possible, equipment that does not generate excessive noise levels will be selected for this project. If the use of noisy equipment is unavoidable, barriers or increased distance will be used to minimize worker exposure to noise, if feasible.

8.6 SANITATION

Site sanitation will be maintained according to OSHA and Department of Health requirements.

8.6.1 BREAK AREA

Breaks must be taken in the SZ, away from the active work area after project personnel go through decontamination procedures. Eating, drinking, and chewing gum or tobacco will only be allowed in the SZs.

8.6.2 POTABLE WATER

The following rules apply for all project operations:

i) An adequate supply of potable water will be provided in each work area. Potable water must be kept away from hazardous materials, contaminated clothing, and contaminated equipment.

ii) Portable containers used to dispense drinking water must be capable of being tightly closed.

iii) Containers used for drinking water must be clearly marked and not used for any other purpose.

iv) Disposable cups must be supplied, and both a sanitary container for unused cups and a receptacle for disposing of used cups must be provided.

8.6.3 SANITARY FACILITIES

Access to facilities or materials for washing before eating, drinking, or smoking will be provided.

8.6.4 LAVATORY

An adequate number of portable chemical or permanent toilets will be provided.

8.6.5 TRASH COLLECTION

Trash collected from the CRZ will be separated as potentially contaminated waste. Trash collected in the support and break areas will be disposed of as non-hazardous waste. Trash receptacles will be set up in the CRZ and in the SZ.

8.7 ELECTRICAL HAZARDS

Electricity may pose a particular hazard to project personnel due to the use of portable electrical equipment. When an electrical power supply is necessary a qualified electrician shall install it.

General electrical safety requirements include:

i) All electrical wiring and equipment must be a type listed by Underwriters Laboratory (UL), Factory Mutual Engineering Corporation (FM), or other recognized testing or listing agency.

ii) All installations must comply with the National Electrical Safety Code (NESC), the National Electrical Code (NEC), or United States Coast Guard regulations.

iii) Portable and semi-portable tools and equipment must be grounded by a multi-conductor cord having an identified grounding conductor and a multi-contact polarized plug-in receptacle.

iv) Tools protected by an approved system of double insulation, or its equivalent, need not be grounded. Double insulated tools must be distinctly marked and listed by UL or FM.

v) Live parts of wiring or equipment must be guarded to prevent persons or objects from touching them.

vi) Electric wire or flexible cord passing through work areas must be covered or elevated to protect it from damage by foot traffic, vehicles, sharp corners, projections, or pinching.

vii) All circuits must be protected from overload.

viii) Temporary power lines, switch boxes, receptacle boxes, metal cabinets, and enclosures around equipment must be marked to indicate the maximum operating voltage.

ix) Plugs and receptacles must be kept out of water unless of an approved submersible construction.

x) All extension outlets must be equipped with ground fault circuit interrupters (GFCIs).

xi) Attachment plugs or other connectors must be equipped with a cord grip and be constructed to endure rough treatment.

xii) Extension cords or cables must be inspected prior to each use, and replaced if worn or damaged. Cords and cables must not be fastened with staples, hung from nails, or suspended by bare wire.

xiii) Flexible cords must be used only in continuous lengths without splice, with the exception of molded or vulcanized splices made by a qualified electrician.

8.8 MATERIAL HANDLING

Material handling operations to be conducted at the Site include manual lifting of materials to and from trucks and storage areas.

General Storage Practices

The storage of materials and supplies will not create a hazard. General storage area practices will include:

i) Bags, containers, bundles, etc. stored in tiers will be stacked, blocked, interlocked, and limited in height so that they are stable and secure against sliding or collapse.

ii) All stacked materials, cargo, etc. will be examined for sharp edges, protrusions, signs of damage, or other factors likely to cause injury to persons handling these objects. Defects should be corrected as they are detected.

iii) Storage areas will not accumulate materials that constitute hazards from tripping, fire, explosion, or pest harborage.

iv) Storage areas will have provisions to minimize manual lifting and carrying. Aisles and passageways will provide for the movement of mechanical lifting and conveyance devices.

v) Stored materials will not block or obstruct access to emergency exits, fire extinguishers, alarm boxes, first aid equipment, lights, electrical control panels, or other control boxes.

vi) "NO SMOKING" signs will be conspicuously posted, as needed, in areas where combustible or flammable materials are stored and handled.

vii) Cylindrical materials such as pipes and poles will be stored in racks, or stacked on the ground and blocked.

Hoisting and Rigging

Wire ropes, chains, ropes, and other rigging equipment will be inspected prior to each use and as necessary during use to assure their safety. Defective rigging equipment will be immediately removed from service.

Rigging will not be used unless the weight of the load falls within the rigging's safe work operating range. The authorized rigger prior to any "pick" or lifting operation must verify this.

Only personnel trained in safe rigging procedures will be authorized to engage in rigging procedures. Additionally, the rigger must understand and use recognized crane signals.

Job or shop hooks and links and other makeshift fasteners **will not** be used. When U-bolts are used for eye splices, the U-bolt will be applied so the "U" section is in contact with the dead end of the rope.

Wire ropes, chains, ropes, and other rigging equipment will be stored where they will remain clean, dry, and protected from the weather and corrosive fumes.

The proper length of rope or chain slings will be used to avoid wide-angle lifts and dangerous slack. Knotted ropes or lengths of ropes reduced by bolts, knots, or other keepers will not be used.

Heavy Lifting Method

When lifting objects, project personnel will use the following lifting techniques:

i) Feet will be parted, with one foot alongside the object being lifted and one foot behind. When the feet are comfortably spread a more stable lift can occur and the rear foot is in a better position for the upward thrust of the lift.

ii) Use the squat position and keep the back straight - but remember that straight does not mean vertical. A straight back keeps the spine, back muscles, and organs of the body in correct alignment. It minimizes the compression of the guts that can cause a hernia.

iii) Grip is one of the most important elements of correct lifting. The fingers and the hand are extended around the object you are going to lift - using the full palm. Fingers have very little power - use the strength of your entire hand.

iv) The load will be drawn close, and the arms and elbows will be tucked into the side of the body. Holding the arms away from the body increases the strain on the arms and elbows. Keeping the arms tucked in helps keep the body weight centered.

The body will be positioned so that the weight of the body is centered over the feet. This provides a more powerful line of thrust and also ensures better balance. Start the lift with a thrust of the rear foot. Do not twist.

8.9 SLIP/TRIP/HIT/FALL

Slip/trip/hit/fall injuries are the most frequent of all injuries to workers. Project personnel will minimize the risk by utilizing the following:

i) Spot check the work area to identify hazards

ii) Establish and utilize a pathway which is most free of slip and trip hazards

iii) Beware of trip hazards such as wet, slippery, and uneven surfaces or terrain

iv) Carry only loads which you can see over

v) Keep work areas clean and free of clutter, especially in walkways

vi) Communicate hazards to on-Site personnel

8.10 UNDERGROUND UTILITY CLEARANCES

Underground utilities, if present, will be clearly marked and identified prior to commencement of work. Follow local/state regulations with regards to utility locating requirements (i.e., One-Call, etc.)

Personnel involved in intrusive work will:

i) Review and adhere to the established Subsurface Utility Clearance Protocol

ii) Utilize a Property Access/Utility Clearance Data Sheet for documenting approval to excavate

iii) Be able to determine the minimum distance from marked utilities which work can be conducted with the assistance of the locator line service

8.11 FALL HAZARDS

Project personnel may be exposed to fall hazards greater than six feet above another surface and where there are no barriers in place to protect them. These hazards may be found next to each excavation or while working on the bridge. Project personnel exposed to fall hazards greater than 6 feet will follow the selected contractors Fall Protection Program.

The Site Superintendent and HSO will control all fall hazards as they relate to project activities. It is their responsibility to implement the following components of the project's fall protection requirements as they relate to project activities:

i) Ensure appropriate fall protection systems are utilized for project activities.

ii) Verify that all employees are fully protected from fall hazards.

iii) Ensure that necessary materials for proper fall protection (PPE including a harness and lanyard, etc.) are available for project activities.

iv) Provide for proper inspection and replacement of fall protection devices.

v) Provide and ensure that all personnel have received the required training in the use, inspection and the need for fall protection devices (proper fit, proper use, and proper inspection procedures). NOTE: This includes additional training required for the usage of ladders, scaffolds, and manlifts/aerial lifts.

vi) Develop a written emergency rescue plan for retrieval of any worker who falls and is suspended in air while wearing personal fall arrest equipment.

9.0 AIR MONITORING PROGRAM

This section of the HASP presents the requirements for conducting air monitoring during RAWP activities. The air monitoring program is designed to ensure protection for both personnel working on Site and the surrounding community. The contractor who is performing work on Site will conduct the on-Site monitoring program. It will consist of monitoring project personnel exposures to VOCs and particulates. This monitoring will be completed with the use of real-time reading instruments. The drilling activities will in OU-2 where source materials are not expected to be encountered. The closest residential buildings are more than 3/4 of a mile away. A Community Air Monitoring Plan will be conducted by the primary contractor working on Site and will consist of real-time Site air monitoring for VOCs and particulate levels within the work areas and around the Site perimeter, if necessary.

9.1 ON-SITE AIR MONITORING

The HSO or trained assistant will perform air monitoring to evaluate the exposure of project personnel to the potential chemical hazards that have been identified at the Site. The purpose of the air monitoring program is to verify the effectiveness of engineering controls, to help determine the proper level of PPE and to document actual exposure levels to project personnel. During the progress of project activities, the HSO will monitor the levels of VOCs, and particulates on a 15-minute basis or more frequently as necessary. The following monitoring equipment will be used for this purpose:

i) A PID equipped with a 11.7 eV lamp

ii) A real-time digital particulate monitor such as a MIE DataRAM

All instruments will be calibrated on a daily basis in accordance with the manufacturer's guidelines. Records of all calibrations and real-time measurements will be kept in a bound field logbook.

9.1.1 REAL-TIME VOC MONITORING

The HSO will continuously monitor for the presence of VOCs during activities where VOCs may potentially be present. PID readings will be taken in and around all EZs. Table 9.1 presents the action levels for the on-Site Air Monitoring Program. Background concentrations of VOCs will be determined by obtaining VOC readings at an upwind location near the Site perimeter on a daily basis.

9.2 COMMUNITY AIR MONITORING PLAN (CAMP)

Air monitoring will be performed during performance of the RAWP activities to ensure that the community will not be adversely impacted during Site activities, as described below. Wind direction and speed, temperature, humidity, and amount of rainfall that occur during project activities will be recorded in a project field book.

9.2.1 COMMUNITY AIR MONITORING

This Community Air Monitoring Plan (CAMP) will be implemented during all drilling activities and any other activity which may potentially create an airborne hazard. Real-time air monitoring for VOCs will be performed within the Exclusion Zone and at the perimeter of the soil handling activities.

Community air monitoring will be conducted in accordance with the following protocols:

i) VOCs will be monitored within the exclusion zone during active drilling activities. Readings will be recorded at 15-minute intervals or sooner if an action level has been exceeded. If total organic vapor levels exceed 5 ppm above background, work activities will be temporarily halted to determine whether the total organic vapor levels decrease below 5 ppm over background and work activities can continue. All monitoring readings will be recorded and available for review.

   If total organic vapor levels are in excess of 5 ppm over background but less than 25 ppm, work activities will be halted, source of vapors identified, and corrective actions will be implemented and monitoring continued. Work activities will continue if the total organic vapor levels are below 5 ppm at a distance of 200 feet downgradient of the Exclusion Zone.

ii) A fugitive dust suppression and real-time particulate monitoring program will be conducted in accordance with the procedures presented in Section 9.3.

Work stoppages resulting from sustained organic vapor levels exceeding 5 ppm above background will be reported to the on-Site Agency Representative.

9.3 FUGITIVE DUST SUPPRESSION AND REAL-TIME PARTICULATE MONITORING PROGRAM

The following fugitive dust suppression and real-time particulate monitoring program will be employed at the Site during drilling activities or during other activities which may potentially create an airborne hazard:

i) Reasonable fugitive dust suppression techniques will be employed during all project activities, which may generate fugitive dust.

ii) Real-time particulate monitoring will be employed during waste handling activities or activities, which may generate fugitive dust.

iii) The real-time particulate monitoring will be performed using a particulate monitor that is capable of monitoring particulate matter less than 10 microns in size. Particulate levels will be monitored at the downwind perimeter of the Exclusion Zone. Readings will be based on the 15-minute average concentrations.

iv) a trained technician who fully understands the operation of the monitoring equipment and calibration procedure will perform the real-time particulate monitoring. The technician will be responsible for keeping the air monitoring log book which will contain records of equipment calibrations and all air monitoring readings.

v) the action level will be set at 150 $\mu g/m^3$ based on a 15-minute average. If particulate levels are detected in excess of 150 $\mu g/m^3$, the upwind background level will be measured immediately using the same portable monitor. If the working site particulate measurement is greater than 100 $\mu g/m^3$ above the background level, additional dust suppression techniques (water spraying, reduced rate of drilling) will be implemented to reduce the generation of fugitive dust, and corrective actions will be taken to protect project personnel and reduce the potential for off-Site contaminant migration. Corrective measures may include increasing the level of personal protection and implementing additional dust suppression techniques.

vi) If dust is observed leaving the working site, additional dust suppression techniques will be employed.

vii) If the dust suppression techniques being utilized at the Site do not lower particulates to an acceptable level (below 150 $\mu g/m^3$) work will be suspended until appropriate corrective measures are approved to remedy the situation.

9.4 PERIODIC MONITORING

Periodic monitoring for VOCs using a PID will be performed during groundwater sampling activities. PID will be recorded upon arrival at a sample location, while opening a well cap, during bailing/purging and prior to leaving the well location.

10.0 DECONTAMINATION PROCEDURES

In general, everything that enters the EZ at this Site must either be decontaminated prior to removal from the Site, or buried under the landfill cap. A temporary decontamination wash pad will be constructed and used during the completion of the project activities. All wash waters will be collected and disposed of in accordance with applicable regulations. Used PPE will also be collected in covered containers and will also be disposed of in accordance with applicable regulations.

All personnel, including any State and local officials must enter and exit the EZ through the CRZ. Prior to demobilization or moving to clean areas of the Site, potentially contaminated equipment will be decontaminated.

10.1 EQUIPMENT DECONTAMINATION PROCEDURES

All equipment that comes in contact with waste material must be decontaminated within the CRZ upon exit from the EZ. Personnel shall wear Level C or Modified Level D protection, as determined by the HSO, when decontaminating equipment. Following decontamination and prior to exit from the EZ, the HSO shall be responsible for ensuring that the item has been sufficiently decontaminated. This inspection shall be included in the Site log. The contractor's SOP for equipment decontamination will be followed.

10.2 PERSONNEL DECONTAMINATION PROCEDURES

The selected RAWP construction contractor will provide and follow their SOP for going through personnel decontamination. The general guidelines for this are described in Section 6.3.2.

11.0 MEDICAL SURVEILLANCE

In accordance with the requirements detailed in 29 CFR 1926.65 and 29 CFR 1910.134, all project personnel who will come in contact with potentially contaminated materials will have received, within one year prior to starting field activities, medical surveillance by a licensed physician or physician's group.

Their respective employers will maintain medical records for all on-Site personnel. The medical records will detail the tests that were taken and will include a copy of the consulting physician's statement regarding the tests and the employee's suitability for work.

The medical records will be available to the employee or his designated representative upon written request, as outlined in 29 CFR 1910.1020.

Each contractor working on Site will provide certifications to their on-Site HSO that their personnel involved in Site activities have all necessary medical examinations prior to commencing work. Personnel not obtaining medical certification will not perform work within any EZ or CRZ.

Interim medical surveillance will be completed if an individual exhibits poor health or high stress responses due to any project activity or when accidental exposure to elevated concentrations of contaminants occur.

12.0 EMERGENCY CONTINGENCIES

It is essential that Site personnel be prepared in the event of an emergency. Emergencies can take many forms; illnesses or injuries, chemical exposure, fires, explosions, spills, leaks, releases of harmful contaminants, or sudden changes in the weather. Prior to mobilization to the Site, the RAWP construction contractor will develop both an on-Site and off-Site contingency and emergency response plan. The development of these plans will include a meeting with appropriate authorities to discuss and develop emergency response procedures. The following sections outline the general procedures for emergencies. Emergency information should be posted as appropriate.

If required, the local fire and police departments will notify local residents of potential problems at the Site that may require evacuation. The local fire and police departments if required, will coordinate evacuations.

12.1 EMERGENCY CONTACTS

Agency/Facility/Individual	*Phone*
Police Department (Town of East Greenbush Police)	911
Fire Department (Town of East Greenbush Police)	911
Paramedics (Ambulance)	911
Albany Medical Center	(518) 262-3125
National Response Center (24 Hours)	(800) 424-8802
Poison Control Center	(800) 336-6997
Project Manager	To be determined
Project Engineer	To be determined
Project Industrial Hygienist	To be determined
Client Contact (Robert Call)	(585) 477-2012
USEPA (Emergency Response Region I)	(617) 573-5760
Spill Response Hotline	(800) 457-7362
New York State Department of Environmental Conservation (Project Manager Randy Hough)	(518) 402-9768
New York State Emergency Response Commission	(518) 457-4107

Directions from the Site to the hospital, as shown on Figure 12.1, are as follows:

- Take Riverside Ave. North to Routes 9 and 20 West
- Cross Hudson River and exist South Pearl Street (2nd exit)

- Turn left onto South Pearl Street
- Turn right onto Madison Avenue (2nd light)
- Turn left onto Eagle Street
- Turn right onto Morton Avenue
- Morton Avenue turns into Holland Avenue
- Follow Holland Avenue until end
- Albany Medical Center is at the end of Holland Avenue, 43 New Scotland Road, Albany, New York 12208

Communication between work areas and the command post, located within the CZ, will be via verbal communication, auto horn, or two-way radio. The HSO will use the nearest telephone on Site or may be in the possession of a mobile telephone to communicate with outside emergency and medical facilities.

12.2 EMERGENCY AND FIRST AID EQUIPMENT

Emergency safety equipment will be available for use by Site personnel and will be located and maintained on Site. The safety equipment will include, but is not limited to, the following:

i) Portable emergency eye wash and drench shower (pressurized)

ii) Two 20-pound ABC type dry chemical fire extinguishers

iii) Approved first-aid kit for a minimum of five personnel

iv) Fire blanket

12.3 PROJECT PERSONNEL RESPONSIBILITIES DURING EMERGENCIES

Health And Safety Officer (HSO)

As the administrator of the HASP, the HSO has primary responsibility for responding to and correcting emergency situations. The HSO will:

i) Take appropriate measures to protect personnel including: withdrawal from the EZ, total evacuation and securing of the Site or upgrading or downgrading the level of protective clothing and respiratory protection.

ii) Take appropriate measures to protect the public and the environment including isolating and securing the Site, preventing runoff to surface waters, and ending or controlling the emergency to the extent possible.

iii) Ensure that appropriate Federal, State, and local agencies are informed, and emergency response plans are coordinated. In the event of fire or explosion, the local fire department should be summoned immediately. In the event of an air release of toxic materials, the local authorities should be informed in order to assess the need for evacuation. In the event of a spill, sanitary districts and drinking water systems may need to be alerted.

iv) Ensure that appropriate decontamination treatment or testing for exposed or injured personnel is obtained.

v) Determine the cause of the incident and make recommendations to prevent the reoccurrence.

vi) Ensure that all required reports have been prepared.

12.4 MEDICAL EMERGENCIES

Any person who becomes ill or injured in the EZ must be decontaminated to the maximum extent possible. If the injury or illness is minor, full decontamination should be completed and first aid administered prior to transport. If the patient's condition is serious, at least partial decontamination should be completed as much as possible without causing further harm to the patient. First aid should be administered while awaiting an ambulance or paramedics. All injuries and illnesses must immediately be reported to the HSO, Site Superintendent, and Project Engineer.

Any person transporting an injured/exposed person to a clinic or hospital for treatment should take with them directions to the hospital and a copy of the identified chemicals on Site to which they may have been exposed.

Any vehicle used to transport contaminated personnel, will be cleaned or decontaminated as necessary.

12.5 FIRE OR EXPLOSION

In the event of a fire or explosion, the local fire department should be summoned immediately. Upon their arrival, the HSO or designated alternate will advise the fire commander of the location, nature, and identification of the hazardous materials on Site.

If it is safe to do so, Project personnel should:

i) Report to and notify the HSO, Site Superintendent, and Project Engineer

ii) Use fire fighting equipment available on Site

iii) Remove or isolate flammable or other hazardous materials which may contribute to the fire

12.6 SPILLS

On-Site

If a spill occurs, the following procedure will be followed:

i) Notify the HSO, Site Superintendent, and Project Engineer

ii) Evacuate immediate area of spill

iii) Determine the needed level of PPE

iv) Don required level of PPE and prepare to make entry to apply spill containment and control procedures

v) Absorb or otherwise clean up the spill and containerize the material, sorbent, and affected soils

The Site Superintendent has the authority to commit resources as needed to contain and control released material and to prevent its spread to off-Site areas.

Releases from drums containing solid wastes will be placed into approved containers and covered. Each container will be labeled as to its contents. Solid spills from haulage units will be placed back into haulage units.

In the event that a drum or container of liquid is spilled on Site outside of the EZ, a drum handling team will immediately respond to the spill. The spilled liquids will be confined to the immediate area of the spill and the liquids will be pumped, with the use of a portable hand pump, into a repack drum. The spilled liquids will be confined by diking around the spill with native material or with an inert absorbent. Any residual liquids which cannot be pumped will be absorbed with a sufficient quantity of inert absorbent to ensure that no free liquids remain. If the spill occurred on soil, the visibly affected soil will be excavated to limits based on a visual determination of spill contamination with the concurrence of the on-Site Agency Representative. The absorbent and excavated material will be drummed or otherwise appropriately contained.

13.0 CONFINED SPACE ENTRY PROCEDURE

A confined space provides the potential for unusually high concentrations of contaminants, explosive atmospheres, oxygen deficient atmospheres, limited visibility, and restricted movement. This section establishes requirements for safe entry into, continued work in, and safe exit from confined spaces. Additional information regarding confined space entry can be found in 29 CFR 1926.21, 29 CFR 1910.146, and NIOSH-106. During this project, it is not expected that confined spaces will be encountered during construction activities, however, if confined space entry is required, such work will only be undertaken in accordance with the selected contractor's SOP for confined space entry work.

14.0 RECORDKEEPING

The HSO shall establish and maintain records of all necessary and prudent monitoring activities as described below:

i) Name and job classification of the employees involved on specific tasks

ii) Records of fit testing and medical surveillance results for Project personnel

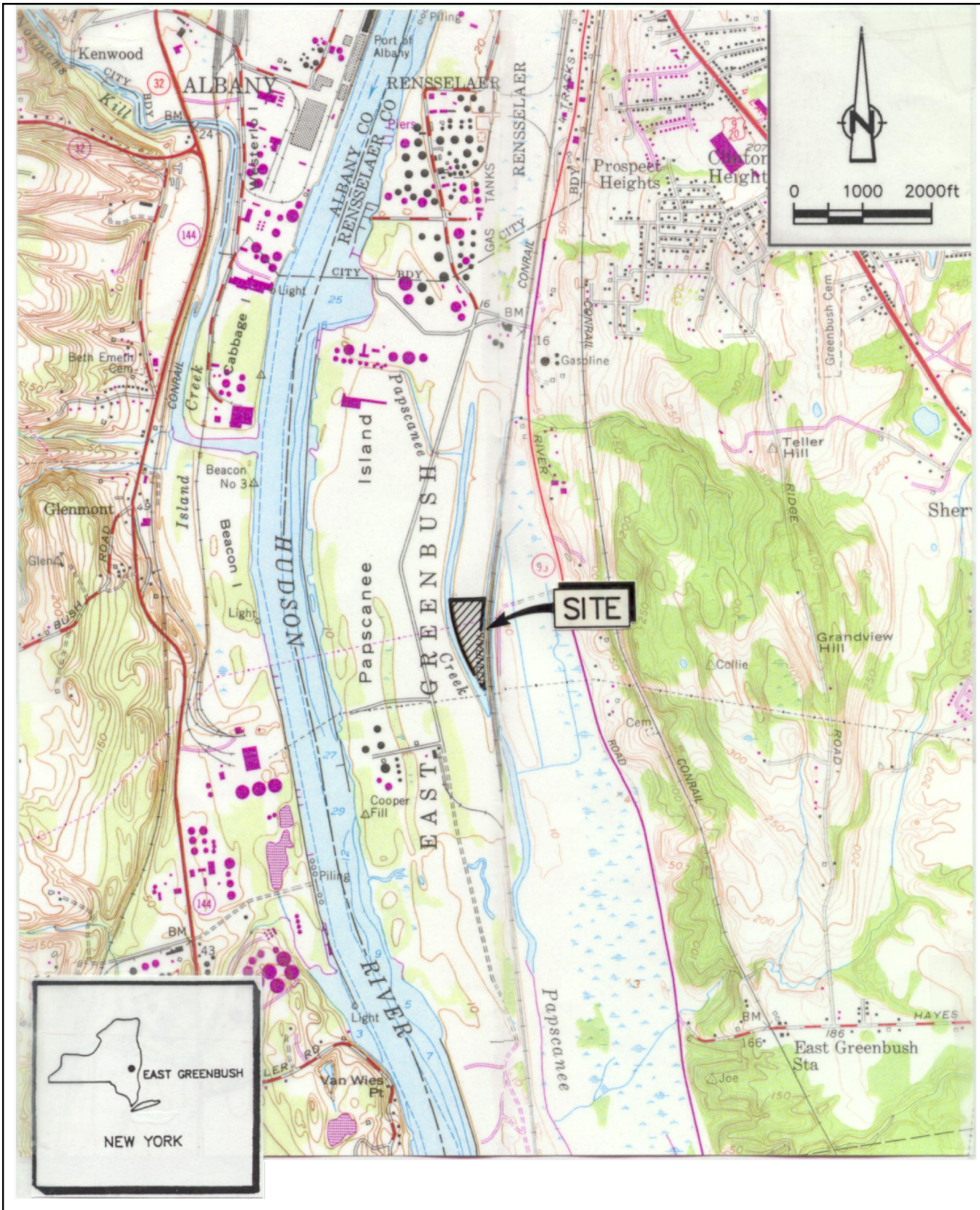
iii) Records of all OSHA training certification for Project personnel

iv) Records of training acknowledgment forms and daily safety meetings

v) Emergency report sheets describing any incidents or accidents

vi) Air monitoring equipment calibrations

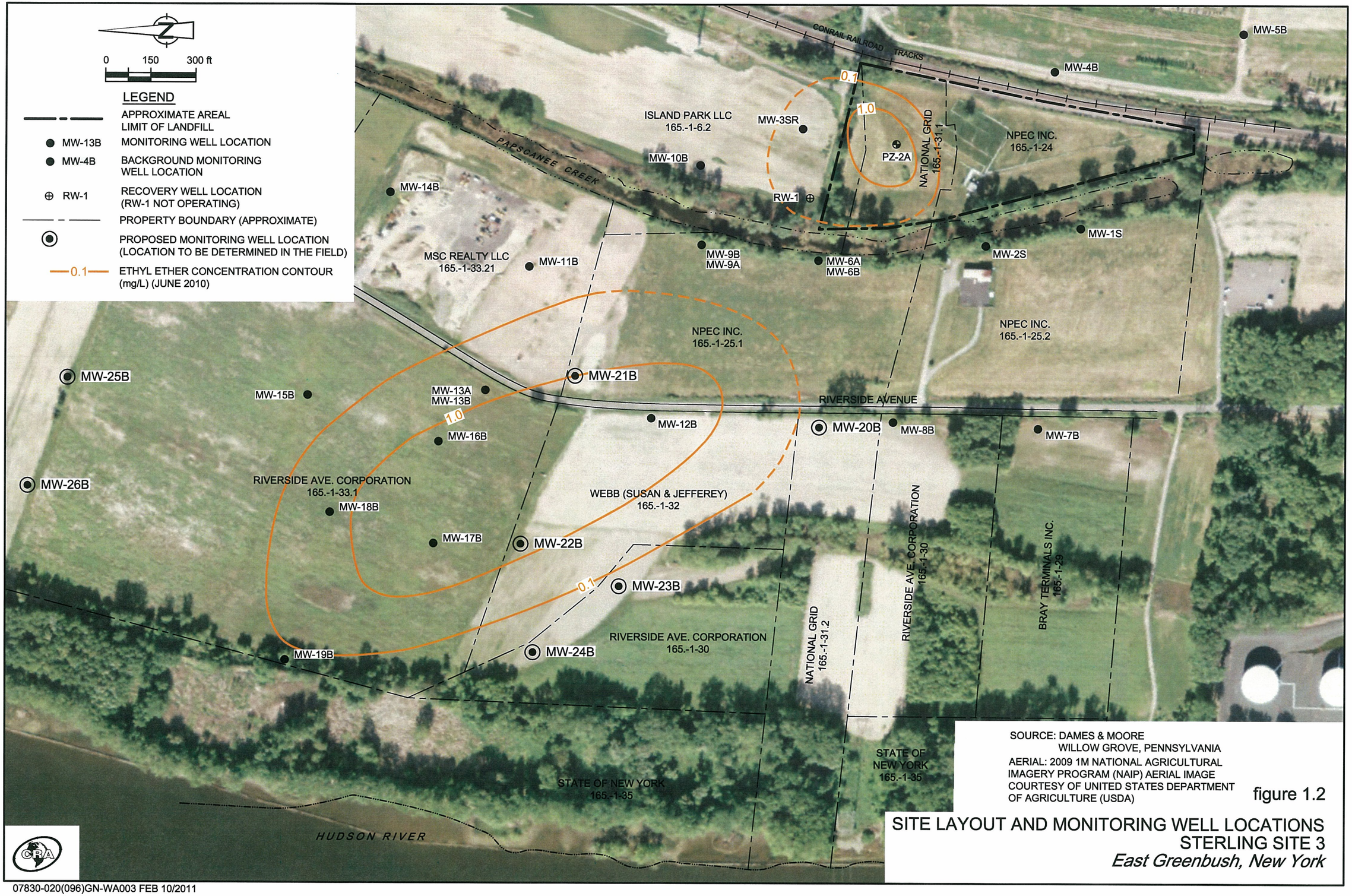
vii) Air monitoring data



SOURCE:
U.S.G.S. TOPOGRAPHIC MAP QUADRANGLE
DELMAR AND EAST GREENBUSH, N.Y.

figure 1.1

PROJECT LOCATION
STERLING SITE 3
East Greenbush, New York

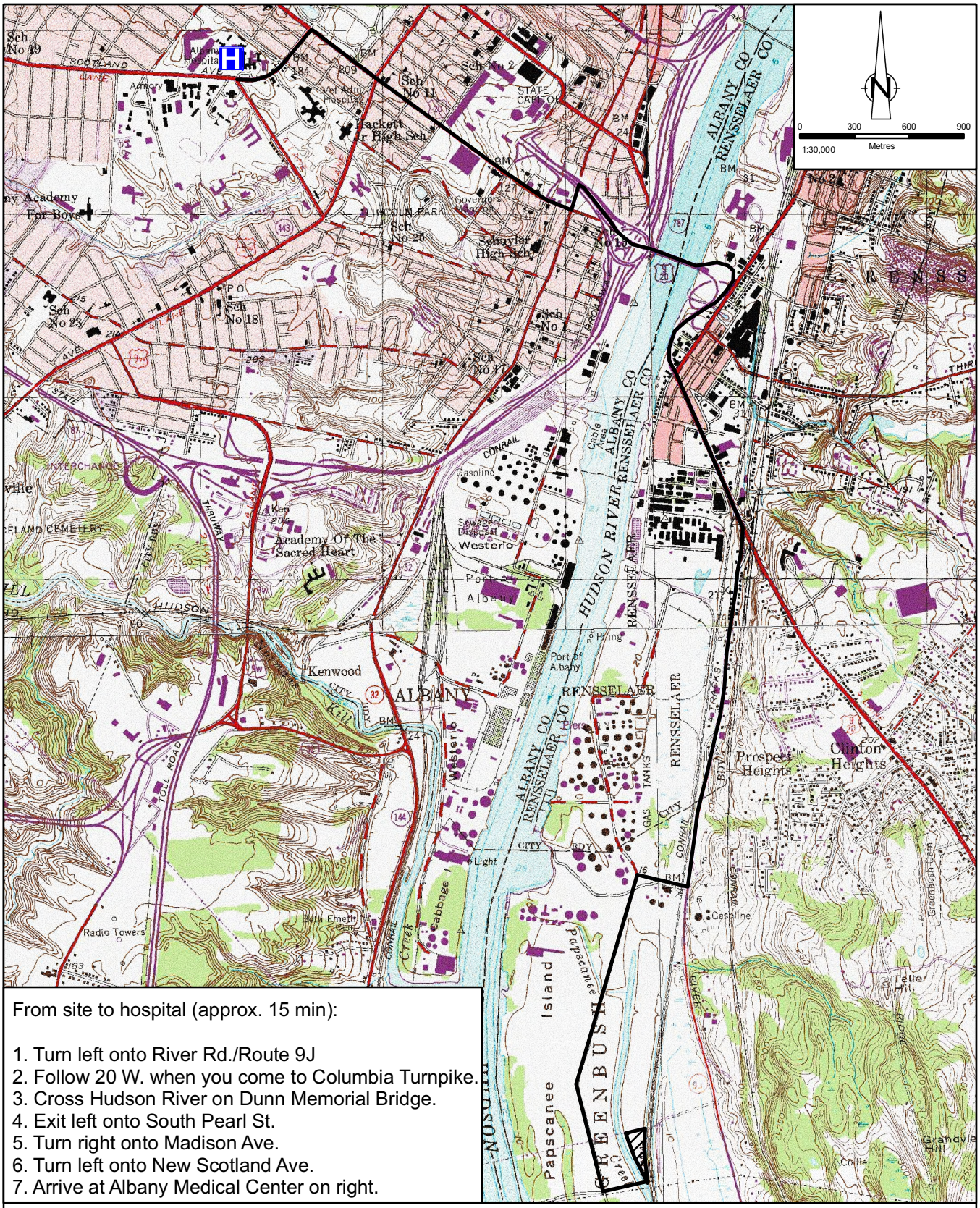


SOURCE: DAMES & MOORE
WILLOW GROVE, PENNSYLVANIA
AERIAL: 2009 1M NATIONAL AGRICULTURAL IMAGERY PROGRAM (NAIP) AERIAL IMAGE COURTESY OF UNITED STATES DEPARTMENT OF AGRICULTURE (USDA)

figure 1.2

SITE LAYOUT AND MONITORING WELL LOCATIONS
STERLING SITE 3
East Greenbush, New York

07830-020(096)GN-WA003 FEB 10/2011



From site to hospital (approx. 15 min):

1. Turn left onto River Rd./Route 9J
2. Follow 20 W. when you come to Columbia Turnpike.
3. Cross Hudson River on Dunn Memorial Bridge.
4. Exit left onto South Pearl St.
5. Turn right onto Madison Ave.
6. Turn left onto New Scotland Ave.
7. Arrive at Albany Medical Center on right.

Source: Digital Raster Graphic Albany County Mosaic by NRCS, NAD27 UTM Zone 18

figure 12.1
HOSPITAL ROUTE
ALBANY MEDICAL CENTER
STERLING SITE 3
East Greenbush, New York

TABLE 2.1

MAXIMUM DETECTED CONCENTRATIONS OF CONTAMINANTS OF CONCERN IN OU-2 GROUNDWATER REMEDIAL DESIGN/REMEDIAL ACTION WORK PLAN FOR OU-2 STERLING SITE NO. 3 EAST GREENBUSH, NEW YORK

Compounds	*Maximum Detected Concentrations during Groundwater Monitoring (mg/L)* [(1)]
Acetone	0.028 J
Bis(2-ethylhexyl)phthalate	0.003 J
Carbon disulfide	0.0027 J
Di-n-butyl phthalate	0.003 J
Ethyl ether	6.3 J
Lidocaine	0.061
Methyl ethyl ketone	0.033 J
Methylene chloride	0.0036 J
Phenobarbital	0.13
Toluene	0.037
Trichloroethylene	0.0016 J

Notes:

(1) At monitoring wells MW-6A, MW-6B, MW-8B, MW-9A, MW-9B, MW-11B, MW-12B, MW-13A and MW-13B from December 1997 to June 2010

J - Estimated value

TABLE 2.2

EXPOSURE ROUTES AND EXPOSURE LEVELS FOR THE CONTAMINANTS OF CONCERN
REMEDIAL DESIGN/REMEDIAL ACTION WORK PLAN FOR OU-2
STERLING SITE NO. 3
EAST GREENBUSH, NEW YORK

Chemical Compound	*Ionization Potential*	*Exposure Routes*	*Acceptable Exposure Levels in Air*
Acetone	9.69	Inhalation, Ingestion, Skin Contact, Eye Contact	500 ppm (1) 1,000 ppm (2) 750 ppm (3) 2,500 ppm (4)
Bis(2-ethylhexyl)phthalate	NE	Inhalation, Skin Contact, Eye Contact	5 mg/m^3 (1) 5 mg/m^3 (2) 5,000 mg/m^3 (4)
Carbon disulfide	10.08	Inhalation, Absorption (skin), Ingestion	1 ppm (skin) (1) 20 ppm (2) 500 ppm (4)
Di-n-butyl phthalate	NE	Inhalation, Ingestion, Skin Contact, Eye Contact	5 mg/m^3 (1) 5 mg/m^3 (2) 4,000 mg/m^3 (4)
Ethyl Ether	9.5	Inhalation, Ingestion	400 ppm (1) 400 ppm (2) 1,900 ppm (4)
Lidocaine	NE	Inhalation, Ingestion, Skin Contact, Eye Contact	NE
Methyl ethyl ketone	9.54	Inhalation, Ingestion, Skin Contact, Eye Contact	200 ppm (1) 200 ppm (2) 300 ppm (3) 3,000 ppm (4)
Methylene chloride	11.32	Inhalation, Ingestion, Absorption	50 ppm (1) 25 ppm (2) 2,300 ppm (4)
Phenobarbital	NE	Inhalation, Ingestion, Skin Contact, Eye Contact	NE
Toluene	8.82	Inhalation, Ingestion Absorption	20 ppm (1) 200 ppm (2) 500 ppm (4)

TABLE 2.2

EXPOSURE ROUTES AND EXPOSURE LEVELS FOR THE CONTAMINANTS OF CONCERN
REMEDIAL DESIGN/REMEDIAL ACTION WORK PLAN FOR OU-2
STERLING SITE NO. 3
EAST GREENBUSH, NEW YORK

Chemical Compound	*Ionization Potential*	*Exposure Routes*	*Acceptable Exposure Levels in Air*
Trichloroethylene	9.45	Inhalation, Ingestion Absorption	10 ppm (1) 100 ppm (2) 25 ppm (3) 1,000 ppm (4)

Notes:

(1) 2007 Values, American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs).
(2) Federal Occupational Safety and Health Administration (OSHA) Permissible Exposure Limit (PEL).
(3) Short-term Exposure Limit - 15-minute Time Weighted Average
(4) Immediately Dangerous to Life and Health (IDLH).
NE not established
mg/m^3 Milligrams per Cubic Meter.
ppm Parts Per Million.

TABLE 6.1

SPECIFIC PERSONAL PROTECTION LEVELS
REMEDIAL DESIGN/REMEDIAL ACTION WORK PLAN FOR OU-2
STERLING SITE NO. 3
EAST GREENBUSH, NEW YORK

Work Task	*Maximum Protection Level* [1]	*Alternate Protection Level* [2]
Mobilization and Demobilization activities	Modified D	D
Subcontractor oversight	Level C	Modified D/D
Drilling Activities	Level C	Modified D/D
Decontamination Activities	Level C	Modified D
Surveying Activities	Modified D	D
Groundwater Sampling and Monitoring Activities	Level C	Modified D

Notes:

Specific requirements of protection levels are detailed in Section 6.0.

(1) Level C: To be worn when the criterion for using air-purifying respirators (APRs) are met and a lesser level of skin protection is needed.
Modified D: To be worn when dermal protection is required, however, no respiratory hazards are present. It provides minimal protection against chemical hazards.

(2) Alternate protection levels will be used if monitoring indicates that conditions are appropriate or the HSO and Site Superintendent agree that there is a reduced potential of exposure.

TABLE 8.1

ANTICIPATED HAZARDS/RISKS AND HAZARD CONTROLS
REMEDIAL DESIGN/REMEDIAL ACTION WORK PLAN FOR OU-2
STERLING SITE NO. 3
EAST GREENBUSH, NEW YORK

	Activity	*Anticipated Hazards/Risks*	*Appropriate Precautions*
1.	Mobilization and Demobilization Activities, Surveying Activities	• Slip/trip/fall hazards • Potential back injuries from lifting heavy objects • Potential heat/cold stress • Severe weather • Electrical hazards from power sources • Moving or backing vehicles and equipment • Personnel injuries from sharp objects, falling debris and pinch points • Bites and/or stings from ticks, bees, mosquitoes, wasps, and snakes • Overhead utility lines • Pinch points	• Modified D or Level D personal protection • Practice safe lifting techniques • Participate in on-Site training programs • Practice good personal hygiene principles • Use a spotter around moving or backing equipment • Work activities will be reduced or suspended during severe weather conditions • Ground fault circuit interrupters (GFCIs) should be used to reduce the hazard of electrical shock. Do not stand in water when handling equipment. Electrical equipment will be approved • Keep first aid supplied readily available, including antidote kit for those allergic to bees or wasps • Wear snake chaps if snakes are present
2.	Subcontractor oversight, Drilling Activities, Decontamination Activities, Groundwater Sampling and Monitoring Activities	• Slip/trip/fall hazards • Potential back injuries from lifting heavy objects • Potential heat/cold stress • Severe weather • Electrical hazards from power sources • Moving or backing vehicles and equipment • Personnel injuries from sharp objects, falling debris and pinch points • Direct contact with potentially contaminated soils and groundwater • Hazards presented by the use of heavy equipment • Overhead and underground utility hazards (e.g., electrical lines)	• Levels C, Modified Level D, based on realtime air monitoring and established protection levels (see Table 6.1) • Practice safe lifting techniques • Participate in all on-Site training programs • Be trained with all appropriate equipment standard operating procedures • Practice good personal hygiene principles • Take proper precautions in unsafe areas • Use the "buddy system" • Perform an underground utilities search • Only essential personnel allowed in work area • Use a spotter around moving or backing equipment

TABLE 8.1

ANTICIPATED HAZARDS/RISKS AND HAZARD CONTROLS
REMEDIAL DESIGN/REMEDIAL ACTION WORK PLAN FOR OU-2
STERLING SITE NO. 3
EAST GREENBUSH, NEW YORK

Activity	*Anticipated Hazards/Risks*	*Appropriate Precautions*
	• Potential burns from hot equipment hazards presented by the use of specialized equipment (e.g., decontamination equipment) • Bites and/or stings from ticks, bees, mosquitoes, wasps, and snakes	• Identify all high temperature objects or equipment • Work activities will be reduced or suspended during severe weather conditions • GFCIs should be used to reduce the hazard of electrical shock. Do not stand in water when handling equipment. Electrical equipment will be approved • Keep first aid supplies readily available including antidote kit for those allergic to bees or wasps • Wear snake chaps if snakes are present

TABLE 9.1

ON-SITE AIR MONITORING PROGRAM ACTION LEVELS
REMEDIAL DESIGN/REMEDIAL ACTION WORK PLAN FOR OU-2
STERLING SITE NO. 3
EAST GREENBUSH, NEW YORK

Monitoring Device	*Action Level*	*Action (1)*
Photoionization Detector (PID)	1.0 to 25 ppm	Full-face air purifying respirator Level C PPE (see Notes).
	>25 ppm	Shut down activities. Notify HSO. Implement additional engineering controls.

Notes:

HSO Health and Safety Officer.
PPE Personal Protection Equipment.
ppm Parts Per Million.

APPENDIX A

TRAINING ACKNOWLEDGEMENT FORM

TRAINING ACKNOWLEDGMENT FORM

I have read and understand the HASP and/or I have attended the mandatory Site-specific initiation session and understand the information presented in the HASP. I fully understand the known potential hazards present on Site, the required levels of PPE to complete my work, and the emergency procedures for the Site. I further confirm that I have the required training to participate in the Remedial Action activities that I will be involved with. I agree to work in accordance with the guidelines presented in the HASP and I understand that failure to do so could result in removal from the Site.

Date	*Printed Name*	*Signature*	*Position*	*Company Name*

APPENDIX B

DAILY SAFETY MEETING LOG

DAILY SAFETY MEETING LOG

PROJECT: _____ LOCATION: _____

DATE/TIME: _____

1. Work Summary:
2. Physical/Chemical Hazards of Concern:
3. Protective Equipment/Procedures:
4. Emergency Procedures:
5. Signatures of Attendees

APPENDIX C

PROJECT HEALTH AND SAFETY PLAN AMENDMENTS
(FOR FUTURE USE; ADD PAGES AS NEEDED)

APPENDIX B

QUALITY ASSURANCE PROJECT PLAN

QUALITY ASSURANCE PROJECT PLAN REMEDIAL DESIGN/REMEDIAL ACTION WORK PLAN FOR OU-2

STERLING SITE NO. 3
EAST GREENBUSH, NEW YORK

Prepared by:
Conestoga-Rovers & Associates

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web: http://www.CRAworld.com

OCTOBER 2010
REF. NO. 007830 (95)

QUALITY ASSURANCE PROJECT PLAN (QAPP)

PROJECT TITLE: Sterling Site 3 QAPP – Remedial Design/Remedial Action Work Plan (RAWP)

PREPARED BY: CONESTOGA-ROVERS & ASSOCIATES (CRA)

Approved By: _____ Date: _____
Project Manager - Consultant

Approved By: _____ Date: _____
QA/QC Officer
Analytical Activities - Consultant

Approved By: _____ Date: _____
QA/QC Officer
Field Activities - Consultant

Approved By: _____ Date: _____
Project Manger - Project Laboratory

Approved By: _____ Date: _____
QA/QC Officer –
Laboratory Activities - Project Laboratory

Approved By: _____ Date: _____
NYSDEC Remedial Project Manager

TABLE OF CONTENTS

TABLE OF CONTENTS

LIST OF TABLES
(Following Text)

1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) presents the policies, organization, objectives, functional activities and specific Quality Assurance (QA) and Quality Control (QC) activities designed to achieve the data quality goals associated with the Remedial Design/Remedial Action Work Plan [Remedial Action Work Plan (RAWP)] to be implemented at the Sterling Site 3 (Site) in East Greenbush, New York. The purpose and objective of the QAPP is to ensure that the analytical results are accurate and representative of field conditions. The analytical methods and QA/QC procedures presented in this QAPP are referenced from and shall be consistent with the guidelines established in the document entitled, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", EPA SW-846, 3rd edition, November 1986 and subsequent revisions. This QAPP is an integral part of the RAWP.

2.0 PROJECT DESCRIPTION

The RAWP includes groundwater monitoring of Operable Unit 2 (OU-2) to identify the number of area properties impacted above the applicable Standards, Criteria, and Guidance (SCGs) and to provide additional information for the design of the groundwater monitoring program. The RAWP includes the testing of soil cuttings and purged groundwater for disposal purposes.

2.1 BACKGROUND

Background information concerning the Site and Scope of Work are presented in the RAWP.

2.2 SCHEDULE

The RAWP activities are tentatively scheduled for 2010 and 2011.

2.3 SAMPLING PROGRAM

The sampling program associated with the Site activities is outlined in the RAWP. The sampling program consists of groundwater sampling for organic constituents to investigate potential impacts to the groundwater within OU-2. Soil cuttings and purged groundwater will be analyzed for disposal purposes.

Details regarding sampling procedures and protocols are provided in the Field Sampling Plan.

The matrices that may potentially be sampled include liquid and solid waste materials, and soils.

3.0 PROJECT ORGANIZATION AND RESPONSIBILITY

The Engineer under the direction of NPEC, Inc. (NPEC) has overall responsibility for all phases of the Site activities. The Engineer will supervise all field investigations and, using the information compiled from this program, will make recommendations for future monitoring activities. All reports based on Site activities will be produced by the Engineer.

The project laboratory will perform all chemical analyses of samples collected during the Site activities.

Both the Engineer and the project laboratory will provide project management as appropriate to their responsibilities. The Engineer will provide administrative oversight and QA/QC for all deliverables. All final project deliverables will be issued by the Engineer.

The functional responsibilities of each of the key technical personnel will be as follows:

Project Manager

- Overview of field activities
- Overview of laboratory activities
- Decide laboratory data corrective action
- Data assessment
- Preparation and review of reports
- Technical representation of project activities
- Managerial guidance to technical group
- Approval of the QAPP
- Evidence file custodian

QA/QC Officer - Analytical Activities

- Systems audits - laboratory activities
- Overview and review field QA/QC
- Coordinate supply of performance evaluation samples
- Review laboratory QA/QC
- Data validation and assessment

- Advise on data corrective action procedures
- Preparation and review of reports
- QA/QC representation of project activities

Quality Assurance Officer - Field Activities

- Management of field activities and field QA/QC
- Data assessment
- Technical representation of field activities

Project Manager - Project Laboratory

- Ensures all resources of the laboratory are available on an as-required basis
- Overview of final analytical reports
- Approval of the QAPP

Operations Manager - Project Laboratory

- Coordinate laboratory analyses
- Supervise in-house chain-of-custody
- Schedule sample analyses
- Oversee data review
- Oversee preparation of analytical reports
- approve final analytical reports prior to submission to the Engineer

QA/QC Officer - Laboratory Activities - Project Laboratory

- Overview laboratory quality assurance
- Overview QA/QC documentation
- Conduct detailed data review
- Decide laboratory actions, if required
- Technical representation of laboratory QA procedures
- Preparation of laboratory SOPs as necessary
- Approval of the QAPP

Sample Custodian - Project Laboratory

- Receive and inspect the incoming sample containers
- Record the condition of the incoming sample containers
- Sign appropriate documents
- Verify chain of custody and its correctness
- Notify laboratory manager and laboratory supervisor of sample receipt and inspection
- Assign a unique identification number and customer number, and enter each into the sample receiving log
- With the help of the operations manager, initiate transfer of the samples to appropriate lab sections
- Control and monitor access/storage of samples and extracts

Primary responsibility for project quality control rests with the Engineer's QA/QC Officer. Ultimate responsibility for project quality rests with the Engineer's Project Manager. Independent quality assurance will be provided by the analytical laboratory project manager and QA/QC Officer prior to release of all data to the Engineer.

4.0 QUALITY ASSURANCE OBJECTIVES FOR MEASUREMENT DATA

The overall QA objective is to develop and implement procedures for field sampling, chain of custody preparation, laboratory analyses and reporting that will provide representative and accurate data. Specific procedures to be used for chain of custody preparation, calibration, laboratory analyses, reporting, quality control, audits, preventive maintenance, and corrective actions are presented in other sections of this QAPP.

Data quality objectives (DQOs) have been established in accordance with the USEPA guidance document entitled, "Data Quality Objectives for Remedial Response Activities", dated March 1987, to ensure that the database developed during the investigation meets the objectives and quality necessary for its intended use, namely, to facilitate the treatment/disposal of waste materials at the Site, and to provide a legally defensible database.

The purpose of this section is to define the goals for the level of QA effort. Objectives for accuracy, precision, sensitivity, completeness, representativeness, and comparability of measurement data from the analytical laboratory will be discussed. In addition, QA objectives for field measurements will also be discussed.

4.1 LEVEL OF QA/QC EFFORTS

4.1.1 FIELD QA/QC SAMPLING

To assess the quality of data resulting from the field sampling program, field duplicate and field blank samples will be collected (where appropriate) and submitted to the analytical laboratory as samples.

4.1.1.1 FIELD (RINSE) BLANKS

When well-dedicated equipment is not used and/or on the first sampling event in which non-certified clean equipment is used, field blanks will be used during the sampling programs to detect contamination introduced through sample collection procedures and equipment, external field conditions, sample transport, sample container preparation, sample storage, and/or the analytical process.

4.1.1.2 TRIP BLANKS

Trip blanks for volatile analyses will be prepared by the laboratory using analyte-free water and submitted with the sample collection containers. Trip blanks will be kept unopened in the field with sample bottles. Two trip blanks will be transported to the laboratory on a daily basis with each batch of aqueous volatile samples. The laboratory will analyze trip blanks as samples.

4.1.1.3 FIELD DUPLICATE SAMPLES

Field duplicate samples will be collected and used to assess the aggregate precision of sampling techniques and laboratory analysis. For every 20 investigative samples, a field duplicate sample will be collected using standard sampling procedures. This duplicate will be packed and shipped to the laboratory for analysis.

4.1.1.4 MATRIX SPIKE/MATRIX SPIKE DUPLICATE

Sufficient sample volume will be supplied to the laboratory in order to perform matrix spike/matrix spike duplicate (MS/MSD) analyses at a frequency of one per 20 investigative samples.

The sampling and analysis program is summarized in Table 4.1, which lists the parameters to be measured, the number, type and frequency of sampling, and the level of QA effort required for each matrix.

4.1.2 LABORATORY QA/QC EFFORT

4.1.2.1 ACCURACY, PRECISION AND SENSITIVITY OF ANALYSES

The fundamental QA objective with respect to the accuracy, precision and sensitivity of analytical data is to achieve the QC acceptance criteria of each analytical protocol. The sensitivities required for these analyses will be at least the targeted detection limits listed in Tables 4.2 and 4.3 for the matrices of concern, barring any chemical interferences or dilutions required due to elevated concentrations of the subject analyte(s). In these cases, the laboratory detection limits will be substituted for the targeted detection limits in accordance with the method(s) protocols.

The method(s) precision (relative percent difference) will be determined from duplicate sample analyses or MS/MSD sample analyses. A minimum of one sample per 20 investigative samples will be analyzed in duplicate or spiked and analyzed in duplicate. Results of these analyses will be compared to the acceptance criteria presented in the appropriate methods, as identified in Section 8.0.

The method accuracy (percent recovery) will be determined by spiking selected samples (matrix spikes) with test compounds or analytes. Accuracy will be reported as the percent recovery of the test compound or analyte and will be compared to acceptance criteria, as identified in Section 8.0.

4.1.2.2 COMPLETENESS, REPRESENTATIVENESS AND COMPARABILITY

The QA objective for completeness is to collect and analyze all environmental samples in a manner such that valid data is obtained. 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.

An objective of this program is the collection of samples that are representative of the matrix from which they were collected. Achievement of this objective will rely on the use of sampling procedures, as described in the RAWP, that have been designed with the goal of obtaining representative samples.

The QA objective for comparability is the generation of Site characterization data that can be used to make valid comparisons with analytical data that may be generated in the future at this Site.

This objective also involves the analysis of environmental samples collected during the sampling program in a manner that produces results comparable to the results that would be obtained by another laboratory using the same analytical procedure. This is achieved by the use of standard materials traceable to the National Institute of Standards and Technology (NIST), the use of standardized accepted procedures for sample collection and sample analysis, and analysis of quality control samples to validate the analytical results.

4.2 FIELD MEASUREMENTS

Measurement data will be generated in many field activities. These activities may include, but are not limited to, the following:

i) Documenting time and weather conditions

ii) Measuring groundwater quality parameters

The general QA objective for such measurement data is to obtain reproducible and comparable measurements to a degree of accuracy consistent with the use of standardized procedures.

5.0 SAMPLING PROCEDURES

The procedures for sample collection and for performing all related field activities are described in detail in the RAWP.

5.1 SAMPLE CONTAINERS, PRESERVATION, SAMPLE HOLDING TIMES AND SHIPPING MEANS

Required sample containers, sample preservation methods, shipping means and required sample holding times are presented in Table 5.1.

5.2 FIELD DECONTAMINATION OF SAMPLING EQUIPMENT

Procedures to be used for sampling equipment cleaning are presented in the RAWP.

6.0 SAMPLE CUSTODY AND DOCUMENT CONTROL

The following documentation procedures will be used during sampling and analysis to provide chain of custody control during transfer of samples from collection through storage. Recordkeeping documentation will include the use of the following:

i) A field logbook (bound, with numbered pages) to document sampling activities in the field

ii) Labels to identify individual samples

iii) Chain of custody forms to document the analyses to be performed

iv) Laboratory sample custody logbook

6.1 FIELD LOGBOOK

In the field, the sampler will record in the field logbook the following information for each sample collected:

i) Unique sample identification number

ii) Sample matrix

iii) Name of sampler

iv) Sample source

v) Time and date;

vi) Pertinent data (i.e., well integrity information)

vii) Analysis to be conducted

viii) Sampling method (i.e., grab, Snap Sampler)

ix) Appearance of each sample (i.e., color, turbidity, sediment)

x) Preservative added, if any

xi) Number of sample bottles collected

xii) Pertinent weather data

Each field logbook page will be signed by the sampler.

All field logbooks, sample labels and chain of custody records will be recorded in waterproof, non-erasable black ink. Entry errors, if made, shall be voided by crossing

out with a single line and the corrected information will be inserted. All such corrections shall be initialed and dated by the person making the entry.

6.2 SAMPLE IDENTIFICATION

A sample numbering system will be used to identify each collected sample by unique sample number. This system will provide a tracking number to allow retrieval and cross-referencing of sample information. A listing of the sample identification numbers with written descriptions of sample location, type and date will be maintained by the Contractor. The sample numbering system which may be used is described as follows:

Example: L-060110-AA-YYY
Where: L-Designated sample type
(L=Liquid, S=Solid)
060110: date of collection (mm/dd/yy)
AA: sampler initials
YYY: sequential number starting with 001 at the start of the project

The sample number shall be noted on the sample label in waterproof ink. Sample labels shall be firmly affixed to the samples they identify.

Field duplicate samples will also be numbered with a unique sample number.

6.3 CHAIN OF CUSTODY RECORD

A chain of custody form will be completed to document the transfer of sample containers. Custody seals will be placed around each cooler as presented in the Field Sampling Plan. The cooler will then be sealed with packing tape. Sample container labels will include sample number, place of collection and date and time of collection. Samples may be held up to 24 hours prior to shipment via overnight courier to the laboratory.

The chain of custody form, completed at the time of sampling, will include, but not be limited to, the sample number, date and time of sampling, and the name of the sampler. The chain of custody form will be signed, timed and dated by the sampler when transferring the samples. Custody transfers will be recorded for each individual sample. For example, if samples are split and sent to more than one laboratory, a record sheet

will accompany each sample. The number of custodians in the chain of possession will be kept to a minimum. The chain of custody forms will be returned to the Engineer.

A chain of custody form will be prepared for each cooler being shipped to the laboratory. Each chain of custody form will consist of four copies which will be distributed as follows:

- The shipper will retain one copy.
- Three copies will be enclosed in a waterproof envelop within the cooler with the samples.
- The cooler will then be sealed properly for shipment. The coolers will be sealed with nylon strapping tape. Custody seals will be placed over the cooler opening in such a manner as to indicate tampering during shipment.
- The laboratory, upon receiving the samples, will complete the three remaining copies.
- The laboratory will maintain one copy for their records.
- One copy will be returned to the Engineer by the laboratory upon receipt of the samples.
- One copy will be returned to the Engineer with the data deliverables package.

Upon receipt of the cooler at the laboratory, the cooler and the seal and each sample container custody seal will be inspected by the designated sample custodian. The condition of the cooler and the sample container custody seals will be noted on the chain of custody form by the sample custodian. If either the cooler seal or the individual sample container custody seals are intact, the sample containers will be accepted for analyses. The sample custodian will document the date and time of receipt of the cooler, and sign the chain of custody form.

If damage or discrepancies are noticed, they will be recorded in the remarks column of the chain of custody form, dated and signed. Any damage or discrepancies will be reported to the laboratory supervisor who will inform the laboratory manager and QA/QC Officer, who will in turn notify the Engineer.

Completed chain of custody forms describing the transport to and receipt at the laboratory are required to be returned to the Engineer with the hard copy of the analytical report in order to facilitate data validation.

6.4 SAMPLE DOCUMENTATION IN THE LABORATORY

Each sample or group of samples shipped to the laboratory for analysis will be given a unique identification number. The laboratory sample custodian will record the client name, number of samples and date of receipt of samples in the Sample Control Logbook.

The laboratory will be responsible for maintaining analytical logbooks and laboratory data. Raw laboratory data produced from the analysis of samples submitted for this program will be inventoried and maintained by the laboratory for a period of five years. The laboratory will advise the Engineer 60 days prior to expiration of the five years. The Engineer will advise the laboratory regarding the need for additional storage prior to expiration of the 60 days.

6.5 STORAGE OF SAMPLES

After the sample custodian has completed the chain of custody forms and the incoming sample log, the chain of custody forms will be checked to ensure that all samples are stored in the appropriate locations. All samples will be stored within an access controlled custody room and will be maintained under appropriate preservation requirements until all analytical work is complete.

6.6 SAMPLE DOCUMENTATION

Evidentiary files for the entire project shall be inventoried and maintained by the Engineer and shall consist of the following:

A Work Plan
B Project Logbooks
C Field Data Records
D Sample Identification Documents
E Chain of Custody Records
F Laboratory Data, etc.
G Correspondence
H Report Notes, Calculations, etc.
I References, Copies of Pertinent Literature
J Miscellaneous - Photos, Maps, Drawings, etc.
K Final Report

The evidentiary file materials shall be the responsibility of the Project Manager with respect to maintenance and document removal.

7.0 CALIBRATION PROCEDURES AND FREQUENCY

The calibration procedures that will be used for the analyses of the samples collected during the Site activities shall be in accordance with the analytical methods presented in Section 8.0, Table 8.1.

8.0 ANALYTICAL PROCEDURES

The analytical methodologies that will be used for the analysis of the samples collected during the Site activities are referenced in Table 8.1. The parameters to be analyzed will depend on the requirements of the disposal facility and, consequently, additional or fewer analyses may be required that those presented in Table 8.1.

8.1 DETECTION LIMIT REQUIREMENTS

The data generated during the Site activities will have targeted detection limits that are consistent with those presented in Tables 4.2 and 4.3. If any chemical interferences are present or dilutions are required due to elevated concentrations of the subject analyte(s), the laboratory detection limits will be substituted for the targeted detection limits in accordance with the method(s) protocols.

In addition, for samples initially analyzed by gas chromatography/mass spectrometry (GC/MS) (excluding TCLP analyses), a library search will be executed for Non-Target Compound List (TCL) sample components for the purpose of tentative identification. Up to ten substances of greatest apparent concentration for the volatile organic fraction and 20 substances of greatest apparent concentration for the base neutral/acid (BNA) extractable fraction will be tentatively identified via a forward search of the NIST Mass Spectral Library.

Computer library search routines will not use normalization routines that would misrepresent the library or unknown spectra when compared to each other. Only after visual comparison of sample spectra with the nearest library searches will the mass spectral interpretation specialist assign a tentative identification.

8.2 IDENTIFICATION

Identification of all targeted TCL analytes will be accomplished with an authentic standard of the analyte. When authentic standards are not available (i.e., for non-TCL compounds) identification will be considered tentative.

For gas chromatographic determinations of specific analytes, the relative retention time of the unknown will be compared with that of the authentic standard. Since a true identification by GC is not possible, an analytical run for compound confirmation will be followed according to the specifications in the methods. Peaks must elute within daily

retention-time windows established for each indicator parameter to be declared a tentative or confirmed identification. Retention time windows are determined by a standard 72-hour study defined in each method. Results of the study are to be filed in the laboratory and available for inspection during a QC audit.

For gas chromatographic/mass spectrometric determinations of specific analytes, the spectrum of the analyte will conform to a literature representation of the spectrum or to a spectrum of the authentic standard obtained after satisfactory tuning of the mass spectrometer. The appropriate analytical methods will be consulted for specific criteria for matching the mass spectra, relative response factors, and relative retention times to those of authentic standards.

8.3 QUANTIFICATION

The procedures for quantification of analytes are discussed in the appropriate specific analytical methods.

Estimation of the concentration of an organic compound not contained within the calibration standard may be accomplished by comparing the mass spectral response of the compound with that of an internal standard. This procedure is specified in the referenced methods.

9.0 DATA REDUCTION, VALIDATION, ASSESSMENT AND REPORTING

9.1 GENERAL

The laboratory will perform analytical data reduction and validation in-house under the direction of the laboratory QA/QC Officer. The laboratory QA/QC Officer will be responsible for assessing data quality and advising the Engineer of any qualifications, based on the QC criteria outlined in appropriate methods, which would caution the data user of possible unreliability. Laboratory data reduction, validation, and reporting will be conducted as detailed in the following:

- Raw data produced and checked by the responsible analyst will be turned over for independent review by another analyst
- The laboratory Operations Manager will review the data for attainment of the quality control criteria presented in the referenced analytical methods
- Upon completion of all reviews and acceptance of the raw data by the laboratory Operations Manager, a computerized report will be generated and sent to the laboratory QA/QC Officer
- The laboratory QA/QC Officer will complete a thorough inspection of all data
- The laboratory QA/QC Officer and area supervisor will decide whether any sample reanalysis is required
- Upon acceptance of the preliminary reports by the laboratory QA/QC Officer, final reports will be generated and signed by the laboratory Project Manager

The Engineer's QA/QC Officer will conduct an evaluation of laboratory data reduction and reporting. These evaluations will consider the finished data sheets, and recovery data for surrogate and matrix spikes. The material will be checked for legibility, completeness, correctness, and the presence of requisite dates, initials and signatures. The results of these checks will be assessed and reported to the Engineer's Project Manager noting any discrepancies and their effect upon the acceptability of the data. All information garnered from QA/QC checks will be discussed in the final report.

Validation of the analytical data will be performed by the Engineer's QA/QC Officer for analytical activities. The process of data validation includes the following:

i) Determination of sample holding times

ii) Evaluation of laboratory/reagent blank contamination

iii) Evaluation of analytical accuracy via comparison of surrogate and matrix spike results against control criteria

iv) Assessment of analytical precision based on duplicate analyses and/or MS/MSD analyses

v) Evaluation of the analytical data forms presented in Section 9.2 of the QAPP

Assessment of analytical and in-house data will include checks on data consistency by looking for comparability of duplicate analyses, comparability to previous data from the same sampling location (if available), adherence to the accuracy and precision control criteria detailed in this document and anomalously high or low parameter values. The results of the data validations will be reported to the Engineer's Project Manager, noting any discrepancies and their effect upon the acceptability of the data. Data validation will be performed utilizing the following documents for guidance:

i) USEPA National Functional Guidelines for Organic/Inorganic Data Review, 1999; or

ii) EPA-approved equivalent procedures.

9.2 REPORTING AND DELIVERABLES REQUIREMENTS

The laboratory shall be required to submit two copies of a final complete analytical report within 30 calendar days of receipt of the final sample from the sampling event.

The analytical report submitted by the laboratory shall conform to all reporting and deliverable requirements specified below. The analytical report shall include, for each sample:

- Date collected
- Date of sample receipt
- Date extracted or digested
- Date analyzed
- Method for sample preparation
- Analytical methodology
- Method of sample cleanup
- Method detection limits
- Sample dilution factor
- A case narrative including a discussion of all QC problems and corrective actions taken

The following forms will accompany the analytical data packages:

Organics

Analytical Results (Form 1)
Surrogate Recoveries (Form 2)
Matrix Spike/Matrix Spike Duplicates (Form 3)
Blank Summary (Form 4)
GC/MS Tuning (Form 5)
Initial and Continuing Calibration (Forms 6 and 7)
Internal Standard and Evaluation Standards Summary (Form 8)

The case narrative to each analytical report shall describe, in lay terms, any and all QA/QC problems encountered during analysis of the samples. For each sample for which QA/QC problems are encountered, the following specific information shall be reported in the case narrative:

- The Engineer's sample number
- Laboratory sample number
- Date of sample collection
- Date of sample receipt at the laboratory
- Date of sample analysis
- Sample matrix
- Parameters analyzed
- Data with outlying quality control
- Specific analytical problems that occurred
- The corrective action that was taken or attempted to resolve the problems

9.3 QUANTITATION TECHNIQUES - ORGANICS

Equations for calculation of measured TCL VOC and TCL SVOC parameters are presented in the methods referenced in Section 8.0, Table 8.1.

9.4 DOCUMENT CONTROL SYSTEM

A document control system ensures that all documents are accounted for when the project is complete.

The Engineer shall assign a project number to this project. This number will appear on sample identification tags, logbooks, data sheets, control charts, project memos and analytical reports, document control logs, corrective action forms and logs, QA plans and other project analytical records.

10.0 INTERNAL QUALITY CONTROL CHECKS AND FREQUENCY - LABORATORY QC

Specific procedures related to internal laboratory QC samples (namely matrix spikes, surrogate spikes, blanks, QC check samples and matrix spike duplicates) are detailed in the following subsections.

10.1 BLANKS

A reagent blank will be analyzed by the laboratory at a frequency of one blank per 20 analyses or, in the event that an analytical round consists of less than 20 samples, one reagent blank will be analyzed. The reagent blank, an aliquot of analyte-free water or solid will be carried through the entire analytical procedure.

10.2 MATRIX SPIKE/MATRIX SPIKE DUPLICATES

A MS/MSD sample will be analyzed at a frequency of one per 20 investigative samples. Table 10.1 presents a summary of the compounds and/or analytes and acceptable criteria for TCL VOC and TCL SVOC constituents. Percent spike recoveries will be used to evaluate analytical accuracy while relative percent difference (RPD) between the spike and matrix spike duplicate will be used to assess analytical precision. Acceptable criteria for all other constituents will be as identified in the appropriate methods (see Section 8.0) or established by the laboratory.

10.3 SURROGATES

Surrogates are used in all GC/MS and GC analyses. Every blank, standard and environmental sample, including MS/MSD samples, will be spiked with surrogate compounds prior to purging volatiles or extracting semi-volatiles.

Surrogates will be spiked into samples according to the appropriate analytical methods. Surrogate spike recoveries will fall within the control limits set by procedures specified in the method for analytes falling within the quantitation limits without dilution. Dilution of samples to bring the analyte concentration into the linear range of calibration may dilute the surrogates out of the quantification limit; assessment of analytical quality in these cases will be based on the quality control embodied in the check and the MS/MSD samples.

Table 10.2 presents a summary of the surrogate recovery control limits for TCL VOC and TCL SVOC parameters.

10.4 BLIND CHECK SAMPLES

Check samples may be included with other samples submitted for analyses. In general, the check sample will be obtained from NYSDEC and supplied to the Engineer. The analytes contained in the check sample will be a representative subset of the analytes of interest.

Results of any check sample analyses will be compared to method accuracy and precision criteria. Accuracy and precision are defined in Section 13.0.

11.0 PERFORMANCE AND SYSTEM AUDITS AND FREQUENCY

For the purpose of external evaluation, performance evaluation check samples from the NYSDEC are analyzed periodically by the analytical contractor.

Internally, the evaluation of data from these samples is done on a continuing basis over the duration of a given project.

The Engineer's QA/QC Officer may carry out performance and/or systems audits to ensure that data of known and defensible quality are consistently produced during the program.

System audits are qualitative evaluations of all components of field and laboratory quality control measurement systems and they determine if the measurement systems are being used appropriately. The audits may be carried out before all systems are operational, during the program, or after the completion of the program. Such audits typically involve a comparison of the activities given in the QAPP described herein with activities actually scheduled or performed. A special type of systems audit is the data management audit. This audit addresses only data collection and management activities.

The performance audit is a quantitative evaluation of the measurement systems used for a monitoring program. It requires testing the measurement systems with samples of known composition or behavior to evaluate precision and accuracy. During an early sampling event for this program, a performance audit may be conducted by or under the auspices of the Engineer's QA/QC Officer without the knowledge of the analyst.

In addition, one external QA audit may be conducted by the Engineer prior to the analysis of any investigatory samples. Additional external QA audits will only be performed if deemed necessary by the Engineer's QA/QC Officer. The project laboratory may also undergo QA audit(s) by the NYSDEC, if so requested.

12.0 PREVENTIVE MAINTENANCE

Specific preventive maintenance protocols for laboratory equipment will be consistent with the laboratory's standard operation procedures.

Routine maintenance of the GC/MS instruments will be performed as per manufacturer's recommendations. The GC/MS operations manager is responsible for the preventive maintenance of the GC/MS instruments.

The preventive maintenance of the GC instruments will be done on an "as-needed" basis. Several maintenance procedures will be conducted on a routine basis. Manufacturer's recommendations provide the primary basis for the established maintenance schedule.

Manufacturer's service contracts provide primary maintenance for most major instruments (i.e., GC instruments, atomic absorption spectrometers, analytical balances, etc.). All aspects of routine and non-routine instrument maintenance are recorded in logbooks, and the logbook is dedicated to each instrument.

13.0 SPECIFIC ROUTINE PROCEDURES USED TO ASSESS DATA PRECISION, ACCURACY AND COMPLETENESS

13.1 QA MEASUREMENT QUALITY INDICATORS

13.1.1 PRECISION

Precision will be assessed by comparison of the analytical results between duplicate samples or duplicate matrix spike samples (MS/MSDs) (see Equation i, Section 13.2).

13.1.2 ACCURACY

Accuracy will be assessed by comparing a set of analytical results to the accepted or "true" values that would be expected (see Equation ii, Section 13.2). In general, MS/MSD and check sample recoveries will be used to assess accuracy.

13.1.3 OUTLIERS

Procedures discussed previously will be followed by documenting deviations. In the event that a result deviates significantly from established control limits, this deviation will be noted and its effect on the quality of the remaining data assessed and documented.

13.2 STATISTICAL EVALUATIONS

Standard statistical formulae shall be used in examination of the data and determination of their precision and accuracy. Statistical formulae which will be applied include:

i) Relative Percent Difference (RPD)

$$RPD = \frac{X_1 - X_2}{\frac{X_2 + X_2}{2}} \times 100$$

X_1 = Result of original analysis
X_2 = Result of duplicate analysis

RPD will be used to assess analytical precision.

ii) Percent Recovery

Percent recovery of spikes and check samples will be used to establish analytical accuracy and will be evaluated as follows:

$$\text{Matrix Spike Recovery} = \left(\frac{A-B}{C}\right) \times 100$$

Where:

A = The analyte concentration determined experimentally from the spike sample

B = The background level determined by a separate analysis of the unspiked sample

C = The amount of the spike added

Accuracy will be assessed from spike percent recoveries, audit sample performance, and QC check sample recoveries.

14.0 CORRECTIVE ACTION

The need for corrective action may be identified by system or performance audits or by standard QC procedures. The essential steps in the corrective action system will be:

i) Identifying and defining the problem and checking the predetermined limits for data acceptability beyond which corrective action is required

ii) Assigning responsibility for investigating the problem

iii) Investigating and determining the cause of the problem

iv) Determination of a corrective action to eliminate the problem (this may include reanalysis or resampling and reanalysis)

v) Assigning and accepting responsibility for implementing the corrective action

vi) Implementing the corrective action

vii) Verifying that the corrective action has eliminated the problem

viii) Documenting the corrective action taken

For each measurement system, the Engineer's QA/QC Officer will be responsible for initiating the corrective action and the laboratory supervisor will be responsible for implementing the corrective action.

15.0 QUALITY ASSURANCE REPORT TO MANAGEMENT

Management will receive reports on the performance of the measurement system and the data quality following the conclusion of the project.

Minimally, these reports will include:

i) Assessment of measurement quality indicators (i.e., data accuracy, precision and completeness)

ii) Results of system audits

iii) QA problems and recommended solutions

The Engineer's QA/QC Officer will be responsible for preparing these reports. The final report for the project will include a separate QA section which will summarize data quality information and detail an overall data assessment and validation in accordance with the data quality objectives outlined in this QAPP.

TABLE 4.1

SUMMARY OF SAMPLING AND ANALYSIS PROGRAM
REMEDIAL DESIGN/REMEDIAL ACTION WORK PLAN FOR OU-2
STERLING SITE 3
EAST GREENBUSH, NEW YORK

Sample Matrix	*Laboratory Parameters*	*Number of Samples*	*QC Samples*			
			*Field Blanks**	*Trip Blanks*	*Field Duplicates*	*MS/MSD*
Groundwater	TCL VOCs	TBD	1/20	1/day	1/20	1/20
	TCL SVOCs plus TICS	TBD	1/20	-	1/20	1/20
Waste Characterization	TCLP VOCs	TBD	-	-	-	-
	TCLP SVOCs	TBD	-	-	-	-
	Ignitability	TBD	-	-	-	-
	Corrosivity	TBD	-	-	-	-
	Reactivity	TBD	-	-	-	-

Note:

* Field blanks will only be necessary if non-dedicated equipment or non-certified clean equipment is used

TABLE 4.2

TARGETED DETECTION LIMITS FOR GROUNDWATER SAMPLES
REMEDIAL DESIGN/REMEDIAL ACTION WORK PLAN FOR OU-2
STERLING SITE 3
EAST GREENBUSH, NEW YORK

Compound	*Cas No.*	*Targeted Detection Limits (µg/L)*
Volatile Compounds		
Chloromethane	74-87-3	10
Bromomethane	74-83-9	10
Vinyl chloride	75-01-4	10
Chloroethane	75-00-3	10
Methylene chloride	75-09-2	10
Acetone	67-64-1	10
Carbon disulfide	75-15-0	10
1,1-Dichloroethene	75-35-4	10
1,1-Dichloroethane	75-34-3	10
1,2-Dichloroethene (Total)	40-59-0	10
Chloroform	67-66-3	10
1,2-Dichloroethane	107-06-2	10
2-Butanone	78-93-3	10
1,1,1-Trichloroethane	71-55-6	10
Carbon tetrachloride	56-23-5	10
Vinyl acetate	108-05-4	10
Bromodichloromethane	75-27-4	10
1,2-Dichloropropane	78-87-5	10
cis-1,3-Dichloropropene	10061-01-5	10
Trichloroethene	79-01-6	10
Dibromochloromethane	124-48-1	10
1,1,2-Trichloroethane	79-00-5	10
Benzene	71-43-2	10
trans-1,3-Dichloropropene	10061-02-6	10
Bromoform	75-25-2	10
4-Methyl-2-pentanone	108-10-1	10
2-Hexanone	591-78-6	10
Tetrachloroethene	127-18-4	10
Toluene	108-88-3	10
1,1,2,2-Tetrachloroethane	79-34-5	10
Chlorobenzene	108-90-7	10
Ethyl Benzene	100-41-4	10
Styrene	100-42-5	10
Xylenes (Total)	1330-20-7	10
Base/Neutral/Acid Compounds		
Phenol	108-95-2	10
bis(2-Chloroethyl) ether	111-44-4	10
2-Chlorophenol	95-57-8	10
1,3-Dichlorobenzene	541-73-1	10
1,4-Dichlorobenzene	106-46-7	10
Benzyl alcohol	100-51-6	10
1,2-Dichlorobenzene	95-50-1	10
2-Methylphenol	95-48-7	10

TABLE 4.2

TARGETED DETECTION LIMITS FOR GROUNDWATER SAMPLES
REMEDIAL DESIGN/REMEDIAL ACTION WORK PLAN FOR OU-2
STERLING SITE 3
EAST GREENBUSH, NEW YORK

Compound	*Cas No.*	*Targeted Detection Limits (µg/L)*
bis(2-Chloroisopropyl) ether	108-60-1	10
4-Methylphenol	106-44-5	10
N-Nitroso-di-n-dipropylamine	621-64-7	10
Hexachloroethane	67-72-1	10
Nitrobenzene	98-95-3	10
Isophorone	78-59-1	10
2-Nitrophenol	88-75-5	10
2,4-Dimethylphenol	105-67-9	10
Benzoic Acid	65-85-0	50
bis(2-Chloroethoxy) methane	111-91-1	10
2,4-Dichlorophenol	120-83-2	10
1,2,4-Trichlorobenzene	120-82-1	10
Naphthalene	91-20-3	10
4-Chloroaniline	106-47-8	10
Hexachlorobutadiene	87-68-3	10
4-Chloro-3-methylphenol (para-chloro-meta-cresol)	59-50-7	10
2-Methylnaphthalene	91-57-6	10
Hexachlorocyclopentadiene	77-47-4	10
2,4,6-Trichlorophenol	88-06-2	10
2,4,5-Trichlorophenol	95-95-4	50
2-Chloronaphthalene	91-58-7	10
2-Nitroaniline	88-74-4	50
Dimethylphthalate	131-11-3	10
Acenaphthylene	208-96-8	10
2,6-Dinitrotoluene	606-20-2	10
3-Nitroaniline	99-09-2	50
Acenaphthene	83-32-9	10
2,4-Dinitrophenol	51-28-5	50
4-Nitrophenol	100-02-7	50
Dibenzofuran	132-64-9	10
2,4-Dinitrotoluene	121-14-2	10
Diethylphthalate	84-66-2	10
4-Chlorophenyl-phenyl-ether	7005-72-3	10
Fluorene	86-73-7	10
4-Nitroaniline	100-01-6	50
4,6-Dinitro-2-methylphenol	534-52-1	50
N-Nitrosodiphenylamine	86-30-6	10
4-Bromophenyl-phenylether	101-55-3	10
Hexachlorobenzene	118-74-1	10
Pentachlorophenol	87-86-5	50
Phenanthrene	85-01-8	50
Anthracene	120-12-7	10
Di-n-butylphthalate	84-74-2	10
Fluoranthene	206-44-0	10

TABLE 4.2

TARGETED DETECTION LIMITS FOR GROUNDWATER SAMPLES
REMEDIAL DESIGN/REMEDIAL ACTION WORK PLAN FOR OU-2
STERLING SITE 3
EAST GREENBUSH, NEW YORK

Compound	*Cas No.*	*Targeted Detection Limits (µg/L)*
Pyrene	129-00-0	10
Butylbenzylphthalate	85-68-7	10
3,3'-Dichlorobenzidine	91-94-1	20
Benzo(a)anthracene	56-55-3	10
Chrysene	218-01-9	10
bis(2-Ethylhexyl)phthalate	117-81-7	10
Di-n-Octylphthalate	117-84-0	10
Benzo(b)fluoranthene	205-99-2	10
Benzo(k)fluoranthene	207-08-9	10
Benzo(a)pyrene	50-32-8	10
Indeno(1,2,3-cd)pyrene	193-39-5	10
Dibenz(a,h)anthracene	53-70-3	10
Benzo(g,h,i)perylene	191-24-2	10
Lindocaine	137-58-6	10
Phenolbarbital	50-06-6	10

Notes:

-- Detection limits are provided for guidance purposes only as they may not always be technically achievable due to such factors as matrix interference and elevated analyte concentrations which would require sample dilution. In these cases, the laboratory detection limits will be substituted for the targeted detection limits in accordance with the method(s) protocols.

TABLE 4.3

TARGETED DETECTION LIMITS FOR WASTE CHARACTERIZATION ANALYSES
REMEDIAL DESIGN/REMEDIAL ACTION WORK PLAN FOR OU-2
STERLING SITE 3
EAST GREENBUSH, NEW YORK

	Regulatory Limits (mg/L)
TCLP Volatiles	
Vinyl chloride	0.2
1,1-Dichloroethene	0.7
Chloroform	6.0
1,2-Dichloroethane	0.5
2-Butanone	200
Carbon Tetrachloride	0.5
Trichloroethene	0.5
Benzene	0.5
Tetrachloroethene	0.7
Chlorobenzene	100
TCLP Semi-Volatiles	
Pyridine	5.0
1,4-Dichlorobenzene	7.5
2-Methylphenol	200
3- and/or 4-Methylphenol	200
Hexachloroethane	3.0
Nitrobenzene	2.0
Hexachlorobutadiene	0.5
2,4,6-Trichlorophenol	2.0
2,4,5-Trichlorophenol	400
2,4-Dinitrotoluene	0.13
Hexachlorobenzene	0.13
Pentachlorophenol	100
RCRA Characteristics	
Ignitability (˚F)	<140
Cyanide, Reactive (mg/K)	250
Corrosivity by pH (S.U.)	2.0-12.5
Sulfide, Reactive (mg/K)	500

TABLE 5.1

CONTAINER, PRESERVATION, SHIPPING AND PACKAGING REQUIREMENTS
REMEDIAL DESIGN/REMEDIAL ACTION WORK PLAN FOR OU-2
STERLING SITE 3
EAST GREENBUSH, NEW YORK

Analysis	*Sample Containers*	*Preservation*	*Maximum Holding Times (1)*	*Volume of Sample*	*Shipping Means*	*Packaging*
MATRICES						
Water						
TCL VOCs	Snap Samplers	pH <2, HCl Cool, 4°C	14 days from collection to analysis	Fill completely	Federal Express Priority 1	Vermiculite or Foam Chips or equivalent
TCLP VOCs	2 x 40 ml glass teflon septum	Cool, 4°C	7 days from collection to analysis	Fill completely	Federal Express Priority 1	Vermiculite or Foam Chips or equivalent
TCL SVOCs	Snap Samplers	Cool, 4°C	14 days from collection to extraction, 40 days extraction to analysis	Fill to neck of bottles	Federal Express Priority 1	
TCLP SVOCs	2 x 1L amber glass bottles	Cool, 4°C	14 days from collection to extraction, 40 days extraction to analysis	Fill to neck of bottles	Federal Express Priority 1	Vermiculite or Foam Chips or equivalent
Ignitability, Corrosivity, Reactivity	1 x 1L amber glass bottle	Cool, 4°C	28 days from collection to analysis	Fill to neck of bottle	Federal Express Priority 1	Vermiculite or Foam Chips or equivalent
Solid						
TCLP VOCs	1 x 4 oz wide mouth glass jar	Cool, 4°C	14 days from collection leaching, 14 days from leaching to analysis	Fill completely	Federal Express Priority 1	Vermiculite or Foam Chips or equivalent
TCLP SVOCs	2-100 mL glass	Cool, 4°C	14 days from collection leaching, 7 days from leaching to extraction, 40 days extraction to analysis	Fill to shoulder of bottle	Federal Express Priority 1	Vermiculite or Foam Chips or equivalent
Ignitability, Corrosivity, Reactivity	1 x 8 oz wide mouth glass jar	Cool, 4°C	28 days from collection to analysis	Fill to shoulder of bottle	Federal Express Priority 1	Vermiculite or Foam Chips

Note:

(1) Maximum holding times are based from time of sample collection.

TABLE 8.1

SUMMARY OF ANALYTICAL METHODS
REMEDIAL DESIGN/REMEDIAL ACTION WORK PLAN FOR OU-2
STERLING SITE 3
EAST GREENBUSH, NEW YORK

Chemical Composition

Organics	
TCL VOC	EPA SW-846, Method 8260 (1)
TCL SVOCs plus TICs	EPA SW-846, Method 8270

Hazardous Characteristics

Reactivity	EPA SW-846, Section 7.3, Chapter 7
Corrosivity/pH	EPA SW-846, Methods 9040/9045
Ignitability	EPA SW-846, Method 1010
TCLP VOCs	EPA SW-846, Method 1311/8260
TCLP SVOCs	EPA SW-846, Method 1311/8270

Notes:

(1)	EPA SW-846, Test Methods for Evaluating Solid Waste, Third Edition, 1986 and subsequent revisions.
SVOCs	Semi-Volatile Organic Compounds
TICs	Tentatively Identified Compounds
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
VOCs	Volatile Organic Compounds

TABLE 10.1

MATRIX SPIKE/MATRIX SPIKE DUPLICATE
RECOVERY CONTROL LIMITS - ORGANICS (1)
REMEDIAL DESIGN/REMEDIAL ACTION WORK PLAN FOR OU-2
STERLING SITE 3
EAST GREENBUSH, NEW YORK

Matrix Spike Compounds	*Liquid Recovery (2) Control Limits (Percent)*	*Solid Recovery (3) Control Limits (Percent)*
Volatiles:		
1,1-Dichloroethene	65 - 138 (16)	65 - 153 (22)
Trichloroethene	74 - 123 (16)	77 - 129(24)
Chlorobenzene	72 - 120 (25)	76 - 124 (25)
Toluene	70 - 122 (15)	74 - 128 (20)
Benzene	71 -124 (13)	79 - 127 (20)
Base/Neutral and Acid Compounds:		
1,2,4-Trichlorobenzene	40 - 120 (30)	39 - 120 (30)
Acenaphthene	60 - 120 (24)	53 - 120 (35)
2,4-Dinitrotoluene	59 - 125 (20)	55 - 125(20)
Pyrene	58 - 136 (19)	51 - 133 (35)
N-Nitroso-Di-n-Propylamine	56 - 120 (31)	46 - 120 (31)
1,4-Dichlorobenzene	32 - 120 (36)	34 - 120 (35)
Pentachlorophenol	39 - 136 (37)	33 - 136 (35)
Phenol	17 - 120 (34)	36 - 120 (35)
2-Chlorophenol	48 - 120 (25)	38 - 120 (25)
4-Chloro-3-Methylphenol	64 - 120 (27)	49 - 125 (27)
4-Nitrophenol	16 - 120 (48)	43 - 137 (25)

Notes:

(1) Values in parentheses indicate maximum acceptable relative percent differences (RPD) between matrix spike/matrix spike duplicate (MS/MSD) analyses.
(2) Control limits applicable to all liquid matrices.
(3) Control limits applicable to all solid matrices.

TABLE 10.2

SURROGATE RECOVERY LIMITS (%)
REMEDIAL DESIGN/REMEDIAL ACTION WORK PLAN FOR OU-2
STERLING SITE 3
EAST GREENBUSH, NEW YORK

	Liquid (1)	***Solid (2)***
Volatiles		
Toluene-d8	71 - 126	71 - 125
Bromofluorobenzene	73 - 120	72 - 126
1,2-Dichloroethane-d4	66 - 137	64 - 126
Base/Neutral and Acids:		
Nitrobenzene-d5	46 - 120	34 - 132
2-Fluorobiphenyl	48 - 120	37 - 120
Terphenyl-d14	24 - 136	58 - 147
Phenol-d6	16 - 120	11 - 120
2-Fluorophenol	20 - 120	18 - 120
2,4,6-Tribromophenol	52 - 132	39 - 146

Notes:

(1) Control limits applicable to all liquid matrices.
(2) Control limits applicable to all solid matrices.