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1996 CLEAN WATER/CLEAN AIR BOND ACT
ENVIRONMENTAL RESTORATION PROJECTS
TITLE 5

SITE INVESTIGATION WORK PLAN

FREDERICK PROPERTY ENVIRONMENTAL RESTORATION PROJECT

NYSDEC SITE B00131-8

MANCHESTER, NEW YORK

Submitted To:

**NYS DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF ENVIRONMENTAL REMEDIATION
AND
NYS DEPARTMENT OF HEALTH**

Submitted By:

VILLAGE OF MANCHESTER, NEW YORK

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1. INTRODUCTION

This document constitutes a workplan for a Site Investigation/Remedial Alternatives Report (SI/RAR) for New York State Department of Environmental Conservation (NYSDEC) Environmental Restoration Project B00131-8 (the site). This project is funded by the Environmental Restoration Projects fund established with the Clean Water/Clean Air Bond Act of 1996. Known as the Brownfields Program, the fund provides financial assistance to municipalities to investigate and/or remediate potentially contaminated properties ('brownfields'). These properties may then be redeveloped by the municipality for a variety of uses including industrial, commercial, residential or public use. The site that will be investigated in this brownfields project is referred to as the Frederick Property Site.

1.1 SITE DESCRIPTION AND BACKGROUND.

The site is located at 147 State Street, in the Village of Manchester, New York, amidst a mixed commercial/industrial and residential neighborhood as shown in Figure 1 - Project Location Map. It is approximately ½ acre in size and contains a 30 by 40-foot, one-story cinderblock building. The site is bounded by private residences on the east, a commercial property on the west, State Street on the north, and a former railroad right-of-way on the south. The Village of Manchester, which is the current owner of the site, has not used it except for occasional storage. Previous owners operated the site as a gas station from approximately the 1930's to the 1960's. Two abandoned underground storage tanks are located on the site at the approximate location shown in Figure 2. The tanks are believed to be 2,000-gallon and 3,000-gallon capacity and filled with water. To the north, between the site building and State Street a concrete slab marks the area of the former gasoline pump-island. The remainder of the site consists of gravel driveway (north and west of site building) and lawn (south of building). The topography of the site is level. No surface water is present on the site.

The gas station ceased operation in the 1960's, and eventually the Village of Manchester took possession of the property for back taxes. It is believed that the tanks were abandoned and filled with water by previous owners when they ceased operation of the gas station. It is not known if any spills or gasoline leaks occurred at the Frederick Property Site. No records or reports of spills have been discovered in publicly available information databases.

1. INTRODUCTION (continued)

1.2 OBJECTIVES.

The objectives of the study outlined in this workplan are:

- to register and remove the existing underground storage tanks;
- to determine if contamination exists on the property; and (if contamination is found)
- to determine the source and extent of contamination.

If contamination is found during the course of the investigation and if the levels of contamination exceed NYSDEC clean-up guidance values, two additional objectives will be:

- to evaluate the risk to human health and the environment due to contamination; and
- to evaluate alternatives for the remediation of contaminated media.

2. HEALTH AND SAFETY PLAN

The Health and Safety Plan developed for the Frederick Property Site will be followed for all work tasks performed for this study. The Health and Safety Plan addresses personnel protection, decontamination, community monitoring and emergency procedures for each work scope item covered in this work plan. All personnel involved in the Site Investigation will have to read and sign this Health and Safety Plan prior to commencement of work. A copy of the Health and Safety Plan is attached as Appendix A.

3. TANK REGISTRATION AND REMOVAL

Prior to the site investigation, the existing underground storage tanks will be registered with the NYSDEC – Petroleum Bulk Storage Section and removed from the site. Removal of the tanks will be in accordance with 6 NYCRR Part 613.9, the NYSDEC guidance entitled "Permanent Closure of Petroleum Storage Tanks", March 1987, and the SPOTS Memo #14.

The tanks and associated piping will be excavated and removed. Any liquid present in the tanks will be pumped out and disposed of in accordance with regulations. Excavated soil will be screened for volatile organic compounds (VOCs) using an instrument with a photo-ionization detector (PID). If based on field observations and/or VOC screening results it appears that the soil around the tanks is contaminated, then the removed soil will be staged on plastic sheeting and will not be placed back in the excavation. Soil will be deemed contaminated if odors or visual staining are observed, or if PID screening results in a reading of 5 parts-per-million (ppm) or greater.

Contaminated soil will be staged on plastic sheeting and will be assessed in accordance with STARS Memo #1, Petroleum-Contaminated Soil Guidance Policy, August 1992. Representative soil samples will be collected for laboratory testing from the contaminated soil pile. Depending on testing results, the soil will be disposed of either as hazardous waste or as commercial/industrial waste and transported to an appropriate facility following all applicable regulations.

To assess residual petroleum contamination, soil samples will be collected from the excavation. Grab samples will be collected from each side wall (approximately one third up from the bottom) and from the bottom of the excavation at an interval of approximately one sample every 20 feet (minimum one sample per side wall and one for the bottom). In addition, soil samples may be collected from the area where tank piping is removed, depending on the subsurface conditions encountered. The samples will be analyzed for VOCs (volatile organic compounds) using USEPA Method 8260 (including STARS Memo #1 VOCs), semi-VOCs, TAL metals, and PCBs.

If applicable, a spill notification will be made to the NYSDEC Bureau of Spill Prevention and Response.

Excavated soil (if not contaminated) and granular backfill (crusher run or equivalent) will be used to backfill the tank excavation.

4. SITE INVESTIGATION

Due to the past use of the site and the presence of underground storage tanks, there is a potential that the environment has been adversely impacted. The site investigation will be performed to evaluate which media have been impacted and to what extent.

4.1 LITERATURE REVIEW AND MAGNETOMETER SURVEY.

Part of a preliminary step to investigation will be to review sources such as published geologic and topographic maps, available aerial photographs, soil surveys, etc. to determine geologic and physiographic conditions in the study area. In addition, a survey of the existing building will be performed to determine the presence of drains, sumps, dry wells, septic tanks, leach fields, etc.

The NYS Department of Health (DOH) will be contacted for groundwater usage information in the area and available information on private wells within a quarter-mile radius of the site will be reviewed. Information regarding private wells will be solicited from the nearby residents as part of the citizen participation plan. In addition, available records for the nearby Village of Manchester public water supply wells will be reviewed.

In conjunction with the literature review, a magnetometer survey will be performed across the entire site to verify that all underground tanks have been identified. The results of the literature review and magnetometer survey will be evaluated and the locations of borings and/or wells will be adjusted based on results and concurrence by NYSDEC.

4.2 INVESTIGATIVE APPROACH.

A phased approach will be used for investigation of the site. The following phases are outlined below:

- Phase 1: Geoprobe/Test Pit Investigation
- Phase 2: Supplemental Soil Investigation
- Phase 3: Groundwater Investigation
- Phase 4: Off-site Investigation

If the analytical results from one investigative phase indicate that environmental impact at the site is negligible or is not likely to extend beyond the study area of that particular phase, the further investigative phases may not be performed (upon approval by the NYSDEC). The minimum scope would include the tank removal and the geoprobe investigation, and the groundwater investigation. The groundwater investigation will be performed after the underground storage tanks have been removed.

4. SITE INVESTIGATION (continued)

4.3 INVESTIGATIVE MEDIA.

Media potentially impacted at the site are surface soil, subsurface soil, groundwater, and air. Surface water and sediment do not occur at the site. Air is potentially impacted if soil and/or groundwater are impacted. However, no direct sampling of air will be performed, unless data indicate a concern for off-site exposure (such as indoors in adjacent basements) or if requested by NYSDOH. If applicable, potential impact of air will be evaluated during the exposure evaluation by applying partition coefficients.

4.4 ANALYTICAL PARAMETERS.

For the first phase of investigation, soil samples will be analyzed for the following parameters:

- VOCs (Target Compound List plus STARS compounds)
- Semi-VOCs
- TAL Metals
- PCBs

One soil sample per location will be collected for testing for the above parameters. For subsequent phases of investigation, soil and groundwater analytical parameters may be reduced to those compounds detected above background values. (upon NYSDEC approval).

The initial laboratory analyses will be reported in NYS 1995 Analytical Services Protocol (ASP) category B deliverables format for data validation. A portion of subsequent analyses may be reported in the standard laboratory format, as approved by NYSDEC.

4.5 GEOPROBE/TEST PIT INVESTIGATION.

The first phase of investigation will be performed utilizing a direct push-sampling drill rig (Geoprobe or equivalent) for borings and a backhoe for test pits. The advantages over conventional drilling of the Geoprobe are the faster completion of subsurface sampling and minimal generation of soil-cuttings. Typically, samples are collected into a plastic liner from which soil is transferred into laboratory jars. Once advanced to the desired depth, a temporary micro-well or piezometer (3/4-inch diameter PVC) can be installed in the borehole to obtain a groundwater grab-sample and a water level reading. See Appendix B for further information.

4. SITE INVESTIGATION (continued)

4.5 GEOPROBE/TEST PIT INVESTIGATION. (continued)

Figure 2 shows the approximate location of the geoprobe borings (numbered GP101 - GP110) and test pits (TP101 & TP102). Specific locations may change and additional locations may be added depending on results from the literature search/magnetometer survey or conditions encountered in the field.

Two test pits will be excavated near the former pump island. During test-pit excavation, potential soil contamination will be delineated using visual observations and by screening soil with a PID. One soil sample per test pit will be collected for testing based on field observations/screening.

Three of the geoprobe locations will be used for installation of micro-wells/piezometers (P101 - P103). Geoprobe borings will be advanced to a depth of:

- 5 ft. below the groundwater table if PID screening results are less than 5 ppm,
- greater than 5 ft. below the groundwater table at a depth when PID screening results drop to below 5 ppm, or
- bedrock refusal, if it is encountered prior to reaching the above points.

Soil samples from borings will be screened for VOCs using an instrument with a PID (HNU or equivalent). From each boring the soil sample with the highest reading will be submitted for analysis. If no VOCs are detected, the soil sample obtained immediately above the groundwater table will be submitted. All soil samples will be logged by a geologist and information recorded on a boring log.

To evaluate impact of surface soils, up to six surface soil samples will be collected for testing at a depth of 0-2 inches below the ground surface or vegetative cover. Locations will be chosen in the field in areas of visible staining or where contamination is most likely to be encountered (such as near tanks or pump islands) as directed by NYSDEC/NYSDOH.

4. SITE INVESTIGATION (continued)

4.6 SUPPLEMENTAL SOIL INVESTIGATION.

This task, if necessary, will be additional soil sampling using the geoprobe to fill in data gaps or to better define a potential contaminant plume. Locations and analytical testing parameters for the additional sample borings will be determined after evaluation of the analytical data from the first investigative phase and upon concurrence by NYSDEC. This task may be combined with the next task (groundwater investigation).

4.7 GROUNDWATER INVESTIGATION.

This task includes groundwater sampling of micro-wells, as well as potential installation and sampling of conventional monitoring wells (2-inch diameter PVC screen and casing) at approximate locations shown in Figure 2. Locations for monitoring wells will be finalized after checking water levels in the initial three piezometers (P101-P103) and establishing a direction of groundwater flow at the site.

Installation of conventional monitoring wells may be necessary if micro-wells yield insufficient water for sample collection for chosen parameters. Monitoring wells will be installed in the overburden. However, if the groundwater table is not encountered in the soil horizon at the site or if it is necessary to determine vertical extent of contaminant migration, bedrock-monitoring wells will be installed. The depth of bedrock monitoring wells will be determined after reviewing all available information and with NYSDEC concurrence. Well/micro-well installation, development, and sampling procedures are described in Appendix B.

Monitoring wells will be installed at the following locations (subject to adjustment as explained above, locations are plotted assuming a northeast groundwater flow direction):

- Upgradient (MW-1);
- Downgradient of the tank area (MW-2);
- Downgradient of the former pump island (MW-3);
- Downgradient of the building (MW-4);
- Halfway between the building and the southern property boundary (MW-5);
and
- At the southern property boundary (MW-6).

4. SITE INVESTIGATION (continued)

4.7 GROUNDWATER INVESTIGATION. (continued)

The initial piezometers may satisfy some of the above locations, depending on the groundwater gradient. Additional wells may be installed based on the literature search/magnetometer survey or investigation findings. Any adjustments to final locations or number of wells will be made with NYSDEC approval.

In addition to sampling of groundwater, monitoring wells will be used to measure groundwater levels, and to perform rising head tests. Rising head tests to determine hydraulic conductivity of the water-bearing zone will be performed following the Hvorslev method. Two rounds of groundwater sampling will be conducted: the first round two weeks after well installation and the second round three months after the first round. This will allow evaluation of the variability of groundwater concentrations.

4.8 OFF-SITE INVESTIGATION.

This task will be performed if the data indicate that the soil and/or groundwater contaminant plume likely extends beyond the site property boundaries. Prior to commencement of this task, the Village of Manchester will have to obtain permission from adjoining property owners to locate soil boring/wells on their property. A sufficient number of borings and monitoring wells will be installed to define the extent of the contaminant plume. In addition, existing nearby water supply wells (private or municipal) may be sampled if they are likely affected. Actual well/boring locations, number of locations, and analytical testing parameters will be determined (with concurrence by NYSDEC) once the previous data has been reviewed and permission from adjoining property owners has been obtained.

4.9 SITE SURVEY.

After completion of the investigation tasks, the location and elevation of soil samples, micro-wells/piezometers, and groundwater monitoring wells will be surveyed. The survey will be tied to a site benchmark, with an assigned elevation of 100.00 ft. Elevation of wells and piezometers will be measured to the nearest 1/100th of one foot. Horizontal distances will be measured to within 1/10th of one foot, and will be tied to a site-specific grid.

5. DATA ANALYSIS

5.1 DATA VALIDATION.

The analytical data package from the first phase of investigation (full parameter list) will be validated by an experienced chemist. The qualifications of the person performing this task will be transmitted to the NYSDEC, along with a brief report summarizing the data validation as an appendix in the SI/RAR.

5.2 PHYSICAL AND GEOLOGIC CHARACTERIZATION.

Data gathered from the research and the boring/well logs will be synthesized to interpret the geologic conditions and to describe the physical characteristics of the site and vicinity. A geologic cross section will be prepared, which will visually demonstrate the geologic interpretation of the data.

5.3 GROUNDWATER FLOW ANALYSIS.

In order to predict migration of dissolved contaminants, the groundwater elevation data will be used to prepare a groundwater contour map. Linear interpolation will be used to infer contours between data points. Groundwater flow velocity will be calculated from the gradients off the contour map, hydraulic conductivities calculated from rising-head tests and an assumed value for porosity (based on published values for similar soils).

5.4 NATURE AND EXTENT OF CONTAMINATION.

The objective of the study is to fully define the nature and extent of potential contamination both on-site and off-site. To that end, analytical data from the soil and groundwater sampling will be assembled and summarized in tables. Compounds detected in soil will be compared to NYSDEC guidance values tabulated in (or derived in accordance with) NYSDEC Technical and Administrative Guidance Memorandum (TAGM) 4046. Compounds detected in groundwater will be compared to NYSDEC groundwater standards. If feasible, a map showing the interpreted lateral extent of the soil- and groundwater contaminant plume will be prepared. The potential source-areas of contamination will be evaluated. For those compounds that exceed guidance values, their fate and persistence in the environment will be discussed. If applicable, future migration of contaminants will be addressed.

6. EXPOSURE EVALUATION

This task (performed only if contamination is detected above guidance values) will consist of evaluating potential human exposure to detected compounds. It will include evaluation of exposure pathways, and an analysis of which routes of exposure are complete or are likely to be complete in the future. Taking into account the current use of the site and the surrounding properties and the proposed future use, the likely exposure scenarios will be evaluated. This task will include research into current and potential future use of groundwater in the study area. In addition, under this task contaminant migration into air will be evaluated utilizing partition coefficients commonly used in risk-based modeling.

For petroleum-product derived contaminants, the current exposure-assessment guidelines for petroleum-spill site inactivation will be used to quantify risks associated with residual contamination.

7. EVALUATION OF REMEDIAL ALTERNATIVES

The development and evaluation of remedial alternatives will follow NYSDEC guidelines for development and analysis of alternatives. A quantification of volume/mass of impacted media and development of remedial objectives will be included in this task. If applicable, this task will also include a detailed analysis of remedial alternatives. The objective of this task is development of a remedial action plan.

Due to the nature and previous history of this site, the remedy for contamination found during this investigation might be as simple as excavation of contaminated soil and disposal of the soil in a landfill.

8. PROJECT SCHEDULE

The tentative schedule for completion of the tasks outlined in this plan is presented in the table below.

TASK	SCHEDULED TIME FRAME	DECISION AFTER COMPLETED TASK
Tank Removal/Soil Excavation	Week 1 October 2000	--
Literature Review/ Magnetometer Survey	Week 2 October 2000	Finalize boring locations
Geoprobe Investigation and Lab Turnaround	(4 Weeks) Week 3 October 2000 through Week 4 November 2000	Is additional investigation required? Which compounds will be included in further testing?
Groundwater Investigation/ Supplemental Soil Investigation and Lab Turnaround	Week 4 November 2000 through Week 4 December 2000	Is off-site investigation required?
Off-Site Investigation and Lab Turnaround	Week 1 January 2001 through Week 1 February 2001	
Second Round of Groundwater Sampling and Lab Turnaround	Week 2 February 2001 through Week 3 March 2001	
Site Survey	Week 3 January 2001	--
Data Validation	Week 4 January 2001	--
Physical and Geologic Characterization	Week 1 December 2000 through Week 3 February 2001	--
Groundwater Flow Analysis	Week 1 December 2000 through Week 3 February 2001	--
Nature and Extent of Contamination	Week 2 February 2001 through Week 4 March	--

VILLAGE OF MANCHESTER, NEW YORK

FREDERICK PROPERTY ENVIRONMENTAL RESTORATION PROJECT

NYSDEC SITE B00131-8

ESTIMATED PROJECT COST

<u>TASK</u>	<u>LABOR</u>	<u>SUB-CONSULTANT</u>	<u>MATERIALS/ EXPENSES</u>	<u>SUB-CONTRACTS</u>	<u>ANALYTICAL</u>	<u>TOTAL</u>
Workplan	\$12,500	\$1,500	\$500			\$14,500
Project Coordination/ Project Management	\$3,000	\$3,000	\$500			\$6,500
Literature Review & Magnetometer Survey	\$300	\$1,500	\$100	\$3,000		\$4,900
Tank Removal & Liquid Disposal	\$2,500	\$1,000	\$300	\$15,000	\$5,348	\$24,148
Soil Excavation & Disposal	\$2,500	\$1,000	\$300	\$36,000		\$39,800
Geoprobe Investigation & Test Pit Inst.	\$300	\$2,500	\$500	\$3,000	\$16,043	\$22,343
Well Installation & Supplemental Inv.	\$300	\$2,000	\$400	\$3,600	\$1,323	\$7,623
Well Sampling & Hydro. Testing	\$300	\$1,000	\$300		\$13,248	\$14,848
Site Survey	\$300			\$1,500		\$1,800
Data Validation		\$150		\$1,000		\$1,150
Data Analysis/ Report Preparation	\$1,000	\$6,000				\$7,000
Exposure Evaluation		\$1,000				\$1,000
Evaluation Of Remedial Alternatives	\$1,000	\$2,000				\$3,000
Report Typing & Reproduction	<u>\$1,500</u>		<u>\$200</u>			<u>\$1,700</u>
Subtotal:	\$25,500	\$22,650	\$3,100	\$63,100	\$35,962	\$150,312
Bedrock Well Inst. (Contingency)	\$300	\$1,500	\$450	\$4,500	\$966	\$7,716
Off Site Study (Contingency)	<u>\$300</u>	<u>\$3,000</u>	<u>\$500</u>	<u>\$5,000</u>	<u>\$1,449</u>	<u>\$10,249</u>
Subtotal:	\$600	\$4,500	\$950	\$9,500	\$2,415	\$17,965
TOTAL:	\$26,100	\$27,150	\$4,050	\$72,600	\$38,377	\$168,277

VILLAGE OF MANCHESTER, NEW YORK
 FREDERICK PROPERTY ENVIRONMENTAL RESTORATION PROJECT

NYSDEC SITE B00131-8

ESTIMATED PROJECT BUDGET

BUDGET SUMMARY

ANALYTICAL COST		\$35,962	
SUB-CONTRACTOR COST		\$63,100	
CONSULTANT COST		\$51,250	
	Subtotal		\$150,312

BUDGET SUMMARY OF CONTINGENCIES

ANALYTICAL COST		\$2,415	
SUB-CONTRACTOR COST		\$9,500	
CONSULTANT COST		\$8,050	
	Subtotal		\$17,965

TOTAL \$168,277

BUDGET DETAIL

ANALYTICAL COST BREAKDOWN

COST USED FOR ANALYSIS:

	ASP		NON-ASP	
	SOIL	H2O	SOIL	H2O
8260/05-1	\$135	\$125	\$115	\$105
8270/95-2	\$275	\$250	\$215	\$205
8080/95-3	\$175	\$165	\$145	\$135
TAL MTLs	\$190	\$180	\$160	\$150
TOTAL	\$775	\$720	\$635	\$595

	SAMPLES	UNIT COST	QA/QC		
TANK SAMPLING (FULL LIST, ASP)	6	\$775	15%	\$5,348	
PHASE 1 (FULL LIST, ASP)	18	\$775	15%	\$18,043	
PHASE 2 (8260 NON-ASP ONLY)	10	\$115	15%	\$1,323	
PHASE 3 (FULL LIST, ASP)	16	\$720	15%	\$13,248	
				Subtotal	\$35,962
Contingencies					
PHASE 3 BEDROCK CONT. (8260)	8	\$105	15%	\$966	
PHASE 4 (8260 NON-ASP ONLY)	12	\$105	15%	\$1,449	
				Subtotal	\$2,415
				TOTAL	\$38,377

SUB-CONTRACTOR COST BREAKDOWN

TANK REMOVAL (2 TANKS)		\$10,000
LIQUID DISPOSAL (5,000 GAL TANK CONTENTS @ \$1/GAL)		\$5,000
SOIL EXCAVATION AND DISPOSAL (800 TON @ \$60/TON)		\$36,000
GEOPROBE DRILLING (2 DAYS @ \$1,250/DAY)		\$2,500
WELL INSTALLATION (8 WELLS @ \$600/WELL)		\$3,600
BACKHOE (1 DAY)		\$500
SITE SURVEY		\$1,500
DATA VALIDATION		\$1,000
MAGNETOMETER SURVEY		\$3,000
	Subtotal	\$63,100
Contingencies		
BEDROCK WELLS (3 WELLS @ \$1,500/WELL)		\$4,500
OFF SITE BORINGS/WELLS (CONTINGENCY LUMP SUM)		\$5,000
	Subtotal	\$9,500
	TOTAL	\$72,600

CONSULTING COST BREAKDOWN

WORKPLAN		\$14,000
PROJECT COORDINATION/MANAGEMENT & MEETINGS		\$6,000
LITERATURE REVIEW		\$1,800
FIELD WORK (TANK REMOVAL, SOIL EXC., PHASE 1-4)		\$13,400
SITE SURVEY		\$300
DATA ANALYSIS AND REPORT PREPARATION		\$7,150
EXPOSURE EVALUATION		\$1,000
REMEDIAL ALTERNATIVES EVALUATION		\$3,000
REPORT TYPING & REPRODUCTION		\$1,500
MATERIALS/EXPENSES		\$3,100
	Subtotal	\$51,250
Contingencies		
LABOR		\$800
SUBCONSULTANT		\$4,500
MATERIALS/EXPENSES		\$950
	Subtotal	\$8,050
	TOTAL	\$57,300
GRAND TOTAL		\$168,277

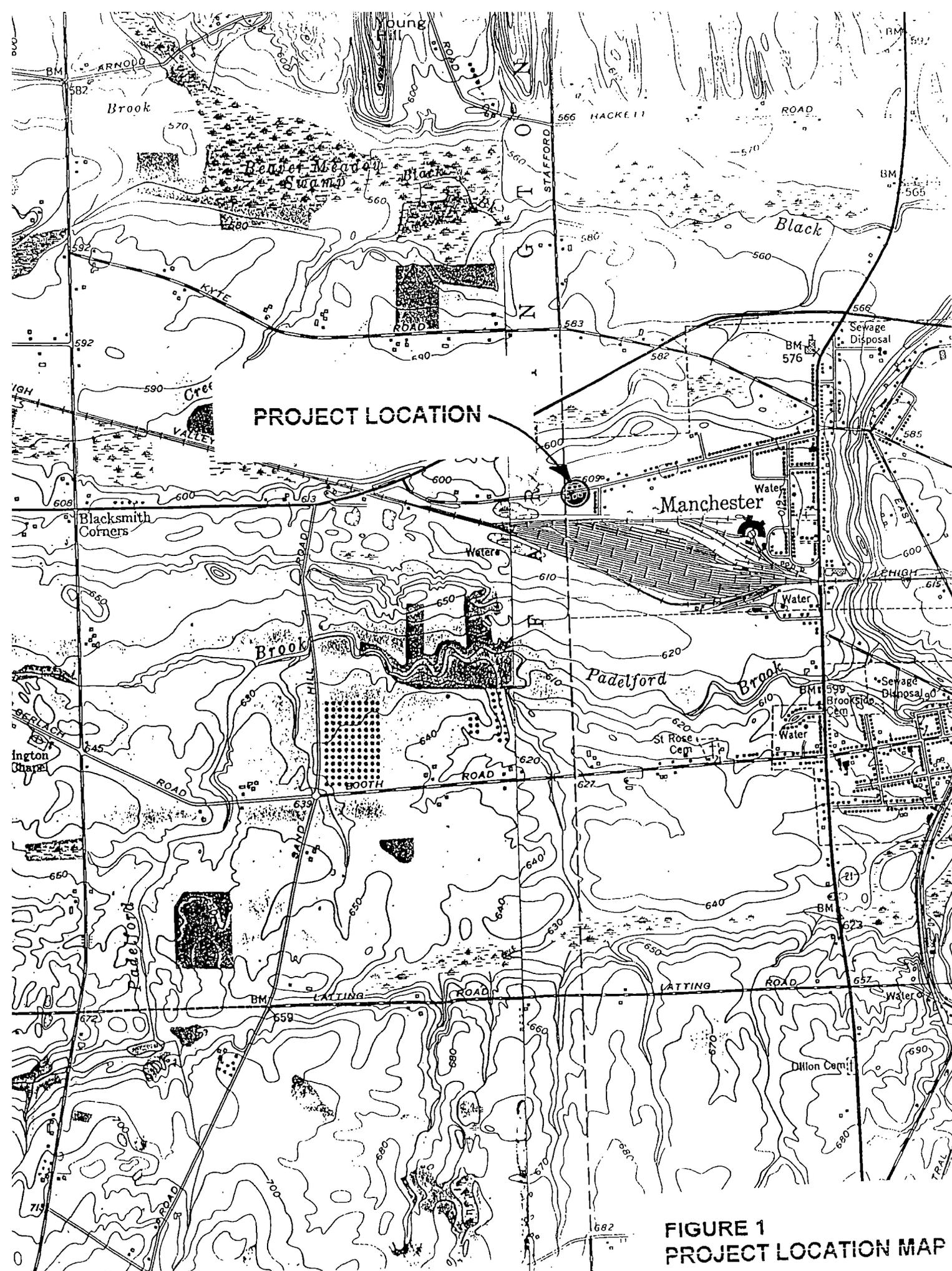
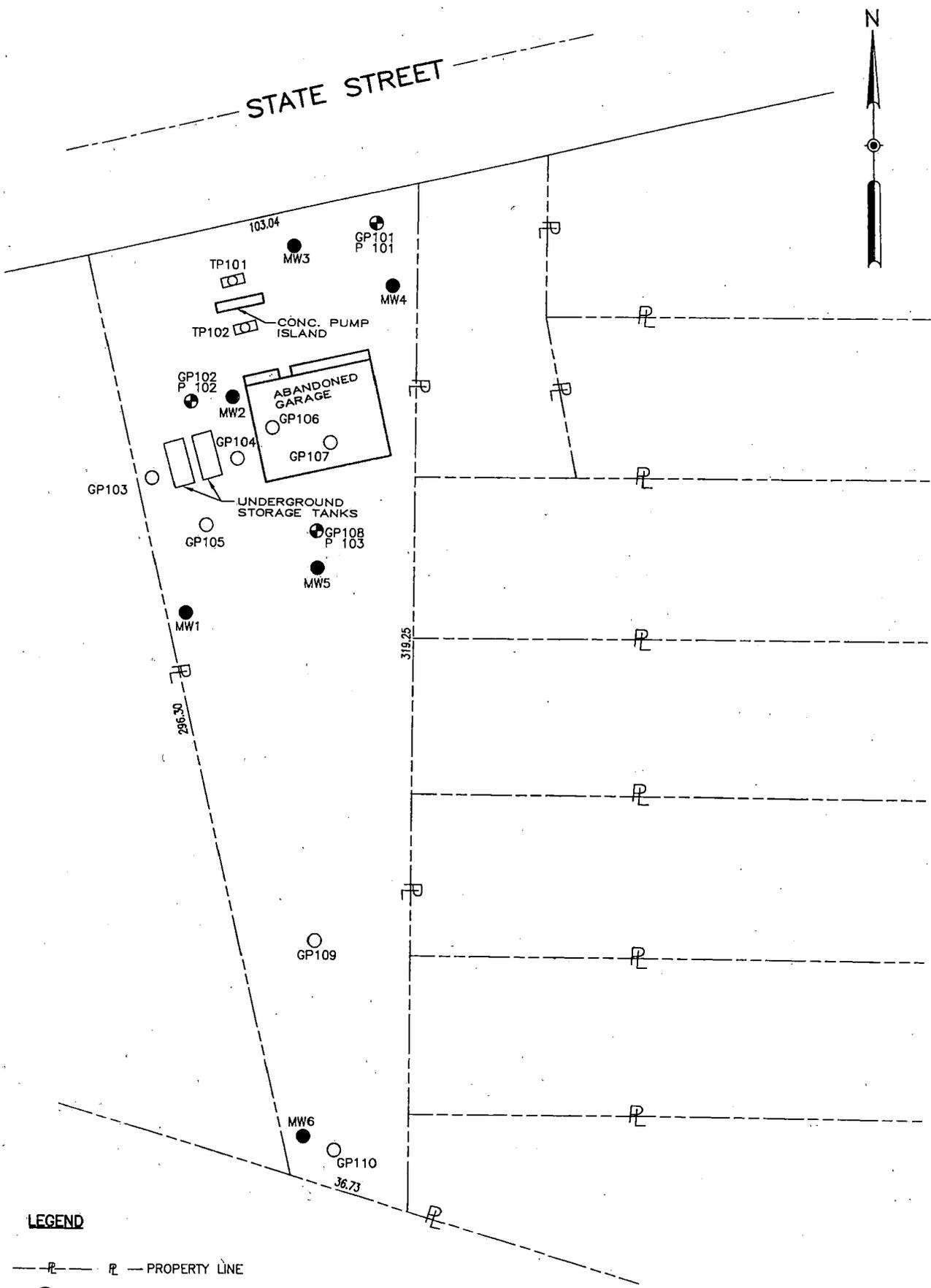


FIGURE 1
PROJECT LOCATION MAP



LEGEND

- P — PROPERTY LINE
- GP — GEOPROBE LOCATION
- GP — TEMPORARY MICROWELL LOCATION
P — PIEZOMETRIC WELL
- MW — MONITORING WELL LOCATION
- TP — TEST PIT

SCALE APPROXIMATE
1" = 40'

**FIGURE 2
SITE PLAN**

APPENDIX A

Health and Safety Plan

For The

FREDERICK PROPERTY ENVIRONMENTAL RESTORATION PROJECT

NYSDEC SITE B00131-8

MANCHESTER, NY

Prepared by:

Village Of Manchester, New York

January 2000
Revised June 2000

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INTRODUCTION

1.1 General

This Health and Safety Plan (HASP) has been prepared to identify the health and safety procedures, methods, and requirements for activities performed during the Site Investigation (SI) at the Frederick Property project site (the site) in Manchester, New York. This plan applies to the activities to be performed by employees of the Village of Manchester and/or Sniedze Associates, (Sniedze) during implementation of SI activities as outlined in the SI/RAR Work Plan.

This HASP sets forth the minimum safety requirements pursuant to OSHA regulations. It should be acknowledged that the employees of other consulting and/or contracted companies must review this HASP. The protection of the health and safety of employees is a responsibility of their employers. Contractors and/or consultants may use this HASP as a guide to develop their own independent Health and Safety Plans for use by their employees, provided that the minimum requirements of this HASP are fulfilled. Each contractor performing work on this project performs different aspects of the tasks and there may be unique or special hazards to their work that require precautions above and beyond those outlined in this HASP.

This HASP addresses health and safety issues related to the presence of specific physical and/or chemical hazards potentially present during the performance of SI activities. An Emergency Response/Contingency Plan (Section 9) has been prepared to outline the procedures to be followed in an emergency or unusual situation. During development of this HASP, consideration was given to current health and safety standards as defined by the Occupational Safety and Health Administration and/or National Institute for Occupational Safety and Health (OSHA/NIOSH).

This document will be periodically reviewed to ensure that it is current and technically correct. Any changes in site conditions and/or the scope of work will require a review and modification of this HASP. Such changes will be completed in the form of an addendum.

1.2 Project Background

A detailed description of the site is presented in the SI/RAR Work Plan. The overall objectives of this SI are to remove two underground gasoline storage tanks, and to assess the environmental impact on ground water, surface water, and soil/sediments resulting from past activities at the site. The site may contain petroleum compounds and potentially other parameters such as metals, volatiles, and semi-volatiles compounds whose levels and extent have not been characterized.

1.3 Definitions

The following definitions will apply to this HASP:

- a. Site - The area where the work is to be performed.
- b. Project - All work performed on the site under the scope of work presented in the SI/RAR Work Plan.
- c. Subcontractor - Includes on-site subcontractor personnel hired by Sniedze Associates or Village of Manchester.
- d. On-Site Personnel – All Village of Manchester, Sniedze Associates, State of New York, and subcontractor personnel performing/observing work tasks for this project.
- e. Visitor - All other personnel, except the on-site personnel, entering the site during project work. Visitors will need to receive approval from the on-site health and safety supervisor to enter the Work Zone.
- f. Community – Members of the public potentially affected by project work, such as neighbors and passers-by.
- g. Health and Safety Supervisor (HSS) - is a Sniedze Associates or Village of Manchester employee so designated, and will be primarily responsible for the implementation and enforcement of the HASP. The HSS will be familiar with applicable state and federal occupational safety and health regulations and have formal training in occupational safety and health (OSHA Supervisory Training).
- h. Work Zone - Any portion of the project where hazardous substances are, or may reasonably be suspected, to be present in the air, water, or soil/sediment.
- i. Decontamination Zone - Area between the Work Zone and Support Zone that provides a transition between contaminated and clean areas. Decontamination stations are located in this Zone.
- j. Support Zone - The rest of the site. Support equipment is located in this Zone.
- k. Monitoring - The use of field instrumentation to provide information regarding the levels of contaminants in air. Monitoring will be conducted to evaluate on-site personnel, visitors, and community exposures to chemical and physical hazards.
- l. HASP - Health and Safety Plan approved for this Project.
- m. Buddy System - A system of grouping workers in hazardous areas developed to ensure that workers are able to provide assistance when needed, observe partner for signs of chemical or heat exposure, and contact HSS or others if emergency assistance is needed.

IDENTIFICATION OF KEY HEALTH AND SAFETY PERSONNEL

2.1 Key Personnel

Implementation of this HASP will be accomplished through an integrated team effort. The names of key personnel involved with this project are provided below:

Village of Manchester

Philip J. D'Arduini, Mayor
Village of Manchester
8 Clifton Street
Manchester, NY 14504
(716) 289-4340

Angela D'Arduini, Clerk/Treasurer
Bruce E. Miles, Trustee
Norm Folts, Trustee
Jeff Liberati, Public Works

Sniedze Associates (Consultant for Village of Manchester)

Robert H. Raeman, Project Manager
Sniedze Associates
482 North Main Street
Canandaigua, NY 14424
(716) 394-2630 - office
(716) 721-3546 - cell phone

Walter Lanik (Sub-Consultant), Health and Safety Supervisor
PO Box 16
Webster, NY 1480
(716) 217-9961 - office
(716) 233-2172 - cell phone (during field activities)

New York State Department of Environmental Conservation:

Rob W. Ryan, P.E., Supervising Project Manager
6274 East Avon-Lima Road
Avon, NY 14414-9519
(716) 226-5353

New York State Department of Health:

Dave Napier, Regional Toxics Coordinator
42 South Washington Street
Rochester, NY 14608
(716) 423-8071

2.2 Assignment of HASP Responsibilities

2.2.1 Project Manager - Roles and Responsibilities.

The Project Manager (PM) will direct work outlined in the SI/RAR Work Plan in a manner consistent with generally accepted professional principles and practices. PM will provide for the health and safety of all Sniedze personnel on-site during any job function covered by this HASP. It is the responsibility of PM to:

- Name a HSS who has the health and safety responsibility for tasks listed in this HASP;
- Assure medical examinations and training requirements for all Sniedze on-site personnel are current and comply with 29 CFR 1919.120 and 134;
- Be responsible for scheduling the pre-job indoctrination of all Sniedze personnel with regard to this HASP and other safety requirements, including but not limited to: (a) potential hazards; (b) personal hygiene principles; (c) personal protective equipment (PPE); (d) respiratory protection equipment usage; and (e) emergency procedures dealing with fire and medical situations;
- Be responsible for the implementation of the HASP, special safety considerations, and the emergency response/contingency plan;
- Ensure that all Sniedze on-site personnel are properly protected and equipped; and
- Comply with OSHA health and safety regulations.

2.2.2 HSS Roles and Responsibilities.

It is the responsibility of the HSS and/or designated alternate to:

- Maintain a daily logbook for recording all significant health and safety activities and incidents, including an on-site personnel and visitor log;
- Have authority to suspend work due to health and/or safety related concerns;
- Provide on-site technical assistance;

2.2 Assignment of HASP Responsibilities (continued)

2.2.2 HSS Roles and Responsibilities.

- Conduct routine air monitoring (including community monitoring, if required), including equipment maintenance and calibration, assure that a basic first aid kit is on-site during the completion of the project;
- Conduct periodic health and safety audits;
- Ensure that appropriate personnel have received the necessary training, including safety equipment and personal protective equipment;
- Provide regular pre-task health and safety briefings;
- Ensure that appropriate personnel have received the necessary physical examinations;
- Review the adequacy of the HASP;
- Draft necessary amendments to the HASP for review;
- Assure that all site, oversight, project and authorized personnel are made aware of the provisions of the HASP and have been informed of the nature of any physical and/or chemical hazards associated with the site activities; and
- Maintain control of required documents for record keeping purposes.

TASK HEALTH AND SAFETY RISK ANALYSIS

3.1 Scope

The purpose of this section is to identify the physical, chemical, and biological hazards associated with the job tasks/operations being performed during this project. A brief description of the project activities is contained in Section 1.2 - Project Background. The following subsections discuss each task and/or operation in terms of the associated potential hazards. Also identified are the protective measures to be implemented during completion of the specific activity.

3.2 Task-by-Task Analysis

Activities conducted under this HASP are discussed by tasks, which have been grouped together according to similar potential hazards. The tasks covered are as follows:

Task No.	Task Description
1	Underground Storage Tank Removal
2	Soil Sampling and Completion of Soil Borings
3	Groundwater Monitoring Well and Piezometer Installation
4	Groundwater Sampling

Physical hazards and associated protection mechanisms for each task are listed in Table 1. Section 3.7 (Physical Hazards) of this HASP also provides supplemental information regarding general physical hazards that require additional consideration during site activities. As mentioned in Section 1.2, the site may contain petroleum compounds and potentially other parameters such as metals, volatiles, and semi-volatile compounds. Biological hazards that may be encountered, identification of those tasks associated with potential for contact with biological hazards, and a description of suggested preventive measures are listed in Table 2. All tasks will be performed in the level of protection outlined in each of the following task-specific subsections. Section 4 (Personal Protective Equipment [PPE] and Equipment Reassessment Program) provides information describing the protective equipment ensembles.

The potential routes of exposure for chemical constituents include inhalation, skin absorption, ingestion, and skin/eye contact. The potential for exposure through any of these routes will depend on the specific activity conducted by the worker. Because of general operating procedures (Section 7.5) (i.e., no eating or smoking), ingestion is not considered a likely exposure route. The other potential routes of exposure for the activities to be conducted during the SI are discussed in the following task-specific subsections.

3.3 Task 1 – Underground Storage Tank Removal

3.3.1 Description of Activity

This task will consist of excavation and removal of two tanks and associated piping at approximate locations indicated in the SI/RAR Workplan. Any liquid present in the tanks will be pumped out and disposed of in accordance with regulations. Excavated soil will be screened for volatile organic compounds (VOCs) using an instrument with a photo-ionization detector (PID). If based on field observations and/or VOC screening results it appears that the soil around the tanks is contaminated, then the removed soil will be staged on plastic sheeting and will not be placed back in the excavation. In addition, a total of five composite soil samples will be collected from the excavation to assess residual petroleum contamination. One sample will be collected from each sidewall (total of four) and one from the bottom.

This task includes back-filling the excavation. Excavated soil (if not contaminated) and granular backfill will be used to backfill the tank excavation.

3.3.2 Hazard Assessment

Potential chemical hazards associated with excavating and removing underground tanks include skin or eye contact with soil or liquid containing chemical constituents and inhalation of organic vapors. Potential physical hazards include injury from equipment error or operator error, or soil failure at the sides of the excavated pit. Other physical hazards include falling into the pit and tripping over obstacles.

3.3.3 Health and Safety Mitigation Actions

Workers will be required to wear modified Level D protection during this task. The worker breathing-zone will be monitored using a photoionization detector (PID). If total volatile organic levels and particulate levels are higher than the criteria specified in Section 4.0, field personnel may be required to upgrade to Level C protection, and community monitoring as outlined in Section 4.4 will be implemented.

Field personnel will be required to wear hard-hats and steel-toed boots during the sampling, excavating, and back-filling activities to reduce the risk of physical injury. No field personnel will be allowed to enter excavations over four feet deep. Workers will utilize caution when working adjacent to the excavation and the area around the excavation will be kept free of equipment and obstacles to avoid tripping. The excavation shall be terminated if conditions are encountered which make the excavation sidewalls unstable, and the excavation must be shored.

3.4 Task 2 - Soil Sampling and Completion of Soil Borings

3.4.1 Description of Activity

This task will consist of collecting surface soil samples at locations indicated in the SI/RAR Workplan. The surface soil samples for each sampling location will be collected in the first split spoon sample during Geoprobe boring installation.

This task also includes the initial completion of eleven Geoprobe borings at locations indicated in the SI/RAR Workplan. Additional borings may be installed as part of the supplemental soil investigation. One soil sample will be collected from each boring as described in the Work Plan.

3.4.2 Hazard Assessment

Potential chemical hazards associated with collecting soil samples and advancing soil borings include skin or eye contact with soil or groundwater containing chemical constituents and inhalation of organic vapors. Potential physical hazards include injury from equipment error or operator error. Other physical hazards include tripping over obstacles.

3.4.3 Health and Safety Mitigation Actions

Workers will be required to wear modified Level D protection. The worker breathing-zone will be monitored with a PID. If the monitoring results exceed the criteria listed in Section 4, workers will be required to upgrade to Level C protection, and community monitoring as outlined in Section 4.4 will be implemented. Rubber (chemical-resistant) gloves will be used during sampling activities to minimize the potential for dermal contact with soil and groundwater potentially containing chemical constituents.

3.5 Task 3 - Groundwater Monitoring Well and Piezometer Installation

3.5.1 Description of Activity

This task includes the installation of four piezometers/micro-wells at the locations indicated in the SI/RAR Workplan. Piezometers/micro-wells will be installed in completed Geoprobe borings. Soil samples will be obtained continuously via split-spoon sampler at the piezometer location. Soil samples will be screened using a PID.

This task also includes the installation of potentially several monitoring wells (shallow overburden monitoring wells or bedrock monitoring wells) at the locations indicated in the SI/RAR Workplan. Prior to monitoring well installation, soil borings will be drilled using a hollow-stem auger driller. Soil samples will be obtained continuously via a split-spoon sampler at each bedrock well location. Bedrock core samples will be obtained from each bedrock well installation using NX coring equipment. Soil and bedrock core samples will be screened using a PID.

3.5.2 Hazard Assessment

Potential chemical hazards associated with installation of monitoring wells and piezometers include contact of soil or groundwater containing chemical constituents with skin or eyes. Inhalation of organic vapors is also a potential chemical hazard. Potential physical hazards include injury from equipment or operator error and tripping over obstacles.

3.5.3 Health and Safety Mitigation Actions

Workers will be required to wear modified Level D protection. The worker breathing zone will be monitored with a PID during the sampling activities and if monitoring levels exceed the criteria specified in Section 4.0, workers will be required to upgrade to Level C, and community monitoring as outlined in Section 4.4 will be implemented. Chemical-resistant (rubber) gloves will be used to minimize the potential for dermal contact with chemical constituents during sampling. Steel-toed boots and a hard hat will be used to reduce the risk of physical injury. The work area will be kept dry and clean to avoid tripping.

3.6 Task 4 - Groundwater Sampling

3.6.1 Description of Activity

The groundwater sampling program will involve uncapping, purging (pumping water out of the well), and sampling monitoring wells. In addition, rising-head permeability testing will be performed on the wells. A mechanical pump may be utilized to purge the wells and can be hand-gas-, or electric operated. Water samples taken from the wells are then placed in containers and shipped to a laboratory for analysis.

3.6.2 Hazard Assessment

Potential chemical hazards associated with ground-water sampling include inhalation of volatile organic vapors emanating from the well head after initial opening, and contact of groundwater containing chemical constituents with skin or eyes. Potential physical hazards include electric shock from improper grounding of electrical equipment, slipping on wet surfaces, and tripping over obstructions.

3.6.3 Health and Safety Mitigation Actions

Workers will be required to wear modified Level D protection. Because there is a potential for the inhalation of organic vapors venting from the well cap upon opening, breathing zone monitoring will be conducted using a PID. The level of personal protection may be adjusted (upgraded to Level C, or downgraded back to modified Level D) during ground-water sample collection in accordance with the reassessment program described in Section 4. If necessary, community monitoring will be implemented as outlined in Section 4.4. Splash goggles and rubber gloves will be used to minimize the potential for dermal contact with ground water containing chemical constituents during sampling. The work area will be kept dry and clean (to the extent possible) to avoid slipping and unnecessary exposure to ground water potentially containing chemical constituents.

Whenever possible, pumps will be used to purge wells, thereby avoiding the potential for muscle strain and heat stress. Electrical equipment will have the following safeguards: ground fault interrupters or properly grounded circuitry, and protection of extension cords from damage. Workers must ensure that all power cords, etc., for sampling devices are in good working condition to minimize the hazard of electrocution. All personnel will operate in a manner to reduce exposure to these hazards.

3.7 Physical Hazards

Physical hazards and associated protective mechanisms are listed in Table 1. The purpose of this section is to provide information regarding health and safety approaches to general physical hazards associated with site-activities.

3.7.1 Heat Stress

One of the most frequently encountered problems during field investigations is heat stress. Heat stress manifests itself in two forms: heat stroke and heat exhaustion. Depending on ambient conditions, the worker, and the work being performed, heat stress can adversely affect a worker in as little as 15 minutes. This is especially important as ambient temperatures exceed approximately 70°F at high humidity. For this reason, all workers will be observed for heat stress using the following indicators: worker appearance and responses. The field staff will take care to monitor ambient conditions, the type of protective equipment, and personnel fitness. Work loads will be adjusted to account for potentially unsafe conditions.

Early symptoms of heat stress can include rashes, cramps, discomfort, irritability, and drowsiness. These symptoms can cause impaired functional ability, which may threaten the safety of operations. Advanced symptoms of heat exhaustion include pale, clammy skin, profuse perspiration, and extreme tiredness or weakness.

Heat stroke is a much more dangerous form of heat stress. Symptoms of heat stroke include high body temperatures and red or flushed, hot, dry skin. Other symptoms may include dizziness, nausea, headache, rapid pulse, and unconsciousness. First aid for all forms of heat stress includes cooling the body by removing PPE, moving to a safe zone, and allowing the worker to rest in a cooler environment.

3.7.2 Cold Stress

Persons working outdoors in temperatures at, or below, freezing may be frostbitten. Frostbite may be categorized into three types:

Frostbite or incipient frostbite characterized by sudden blanching or whitening of the skin.

Superficial frostbite - skin has a waxy or white appearance, is firm to the touch, but tissue beneath is resilient.

Deep frostbite - tissues are cold and hard, indicating an extremely serious injury.

3.7 Physical Hazards (continued)

3.7.2 Cold Stress (continued)

Signs and symptoms of frostbite include:

The skin changes to white or grayish-yellow in appearance.

Pain is sometimes felt early but subsides later (often there is no pain.)

Blisters may appear later.

The affected part feels intensely cold and numb.

The person frequently is not aware of frostbite until someone tells him or he observes the pale, glossy skin.

As time passes, the affected worker may become confused, stagger, experience eyesight impairment, lose consciousness, and/or stop breathing. First aid for frostbite includes protecting the frozen area from further injury, bringing the victim indoors, warming the affected areas quickly with warm water, and maintaining respiration according to first aid procedures. Medical help should be called immediately.

Frostbite may be prevented by the use of insulated gloves, socks, and other protective clothing capable of keeping moisture away from the skin. All clothing should be chosen so that it is compatible with the PPE required for certain activities.

3.8 Potential Compounds of Concern

As previously mentioned in Section 1.2, constituents likely present in the ground water and soil at the site are petroleum compounds and potentially metals, volatiles, and semi-volatile compounds. The site use as a service station for 30± years was used to determine the compounds of concern for the environmental media as referenced in the SI/RAR Work Plan. The levels of PPE associated with each work task were selected based on petroleum compounds, the most likely to be present in the different environmental media. Of the petroleum compounds present in gasoline, benzene is the most toxic. The OSHA limit (TWA) for benzene in air is 1 ppm. However, the field instrument specified in Section 4.3 detects the sum of all volatile organics. Since benzene is typically 2% of total volatile hydrocarbons at a petroleum spill (NYSDEC Air Guide-29: estimation of benzene emissions from SVE systems), the action level was set at 3 ppm. This provides a safety factor of greater than 10 times. PPE is discussed in Section 4.

PERSONNEL PROTECTIVE EQUIPMENT (PPE) AND REASSESSMENT

4.1 Personal Protective Equipment (PPE) Selection Criteria

PPE ensembles chosen for each individual task were specified in Section 3 - Task Health and Safety Risk Analysis. Equipment selection was based upon the mechanics of the task and the nature of the hazards anticipated. The following criteria were used in the selection of equipment ensembles:

Chemical hazards known or suspected to be present;

Routes of entry through which the chemicals could enter the body, e.g., inhalation, ingestion, skin contact; and

Potential for contaminant/worker contact while performing the specific task or activity.

It is anticipated that the work activities will be performed using Level D protection; however, Level C protection will be available for potential upgrade.

4.2 Selected PPE Ensembles

The following components of modified Level D PPE will be available and used as appropriate in accordance with the specifications presented in Section 4.2.1:

1. Coveralls;
2. Steel-toed boots;
3. Gloves (Rubber outer, rubber inner); and
4. Safety glasses or face shields.

Level C protection will be utilized, if necessary, as determined by the levels indicated by the PID. Level C protection will consist of the following:

1. Polyethylene-coated Tyvek disposable coveralls;
2. Rubber over-boots;
3. Outer protective gloves; and
4. Full-face respirator with combination organic vapor, acid gases, and particulates cartridges (NIOSH/MSHA approved).

4.2 Selected PPE Ensembles (continued)

Levels of Protection

In general, the following levels of protection will be used for specific work activities. Adjustments to these levels may be required given the site conditions encountered:

a. Underground Storage Tank Removal

This work will be conducted in modified Level D protective gear including:

- Coveralls;
- Steel-toed boots;
- Rubber over-boots;
- Gloves (rubber outer, rubber inner); and
- Safety glasses or face shields.

Additional protective gear to be worn during this task includes:

Hard hat.

Based on air monitoring results, PPE may be upgraded to Level C protective gear by the addition of a full-face purifying respirator with combination organic vapor, acid gases, and particulate cartridges (NIOSH/MSHA approved).

b. Soil Sampling and Completion of Soil Borings

This work will be conducted in modified Level D protective gear including:

- Coveralls;
- Steel-toed boots;
- Rubber over-boots;
- Gloves (rubber outer, rubber inner); and
- Safety glasses or face shields.

Additional protective gear to be worn during this task includes:

Hard hat.

Based on air monitoring results, PPE may be upgraded to Level C protective gear by the addition of a full-face purifying respirator with combination organic vapor, acid gases, and particulate cartridges (NIOSH/MSHA approved).

4.2 Selected PPE Ensembles (continued)

c. Groundwater Monitoring Well and Piezometer Installation

This work will be conducted in modified Level D protective gear including:

- Coveralls;
- Steel-toed boots;
- Rubber over-boots;
- Gloves (rubber outer, rubber inner); and
- Safety glasses or face shields.

Additional protective gear to be worn during this task includes:

Hard hat.

Based on air monitoring results, PPE may be upgraded to Level C protective gear by the addition of a full-face purifying respirator with combination organic vapor, acid gases, and particulate cartridges (NIOSH/MSHA approved).

d. Groundwater Sampling

This work will be conducted in modified Level D protective gear including:

- PE-coated Tyvek coveralls;
- Steel-toed boots;
- Rubber over-boots;
- Gloves (rubber outer, rubber inner); and
- Safety glasses or face shields.

Based on air monitoring results, PPE may be upgraded to Level C protective gear by the addition of a full-face purifying respirator with combination organic vapor, acid gases, and particulate cartridges (NIOSH/MSHA approved).

4.4 Community Air Monitoring Plan

Real-time air monitoring for volatile compounds to protect the community will be performed as outlined in this section. Volatile organic compounds will be monitored at the downwind perimeter of the work area on a continuous basis. If TOV levels exceed 5 ppm above background, work activities will be halted and monitoring continued under the provisions of the Vapor Emission Response Plan.

Vapor Emission Response Plan

If the TOV concentrations exceed 5 ppm above background at the perimeter of the work area, activities will be halted and monitoring continued. If the TOV level decreases below 5 ppm above background, work activities can resume. If the TOV levels are greater than 5 ppm over background but less than 25 ppm over background at the perimeter of the work area, activities can resume provided:

- The TOV level 200 feet downwind of the work area or half the distance to the nearest residential or commercial structure, whichever is less, is below 5 ppm above background.

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

Major Vapor Emission

If any TOV levels greater than 5 ppm above background are identified 200 feet downwind from the work area or half the distance to the nearest residential or commercial property, whichever is less, all work activities must be halted.

If, following the cessation of the work activities, or as the result of an emergency, TOV levels persist above 5 ppm above background 200 feet downwind or half the distance to the nearest residential or commercial property from the work area, then the air quality must be monitored within 20 feet of the perimeter of the nearest residential or commercial structure (20 Foot Zone).

If efforts to abate the emission source are unsuccessful and if TOV levels are approaching 5 ppm above background for more than 30 minutes in the 20 Foot Zone, then the Major Vapor Emission Response Plan shall automatically be placed into effect.

However, the Major Vapor Emission Response Plan shall be immediately placed into effect if TOV levels are greater than 10 ppm above background in the 20 Foot Zone.

4.4 Community Air Monitoring Plan (continued)

Major Vapor Emission Response Plan

Upon taking effect, the following activities will be undertaken:

Appropriate Emergency Response Contacts as listed in Table 3 will be notified.

The local police authorities will immediately be contacted by the HSS and advised of the situation and emergency response will be initiated (see Section 9.6.5).

The HSS will assess actions to immediately reduce high TOV levels, such as capping of borings and covering of excavations or contaminated soil. In addition, the HSS will assess changing of work practices to minimize releasing vapors or implementing engineering controls to better disburse vapors. The objective of any assessment will be to reduce TOV concentrations to below action levels.

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

4.5 Daily Logbook

The findings of all direct-reading measurements will be documented in the daily logbook maintained by the HSS and/or the designated alternate. The daily logbook entry will document the task, time, meter reading, and level of protection being worn by workers involved with the activity. Actions taken in response to releases or recordings above pre-established action levels will also be recorded in the daily logbook. The daily logbook will also document personnel conducting work activities, visitors, and activities completed and will be available for state (NYSDEC and NYSDOH) personnel to review.

PERSONNEL TRAINING REQUIREMENTS

5.1 Training Requirements

All on-site personnel, and visitors, must be trained commensurate with their job responsibilities. Such training will be provided by their employer prior to being allowed to engage in project work that could expose personnel to health and safety hazards. The Project Manager (PM) has the responsibility to check that appropriate training was provided by obtaining documentation for all on-site personnel. Every worker is required to read and understand the HASP prior to commencement of work activities in which the worker is involved. On-site personnel are also required to sign a training acknowledgment form. Signing this form documents that they have completed all required training, that they understand the activity to be carried out and the hazards involved, and that they will abide by all the safety rules.

5.1.1 Site Orientation

The following is a listing of general site information/training provided to all on-site personnel during the initial site orientation:

- Names of all site health and safety personnel and alternates;
- Work rules and safe work practices;
- Use of personal protective equipment;
- Site chemical and physical hazards;
- Safe use of engineering controls and site equipment;
- Medical surveillance requirements;
- Symptoms associated with exposure to site hazards;
- Site control measures;
- Decontamination procedures;
- Provisions of the emergency response plan;
- Standard operating procedures, e.g., confined space entry, spill containment, etc.

This listing of health and safety topics essentially incorporates a thorough review of this HASP.

5.1 Training Requirements

5.1.2 Pre-Assigned Training

On-site personnel and visitors entering the Work and/or Decontamination Zones will have pre-assigned training in accordance with the provisions outlined in 29 CFR 1910.120(e) Training, prior to engaging in their work activities.

The project manager (PM) is responsible for checking and documenting that personnel assigned to this project are trained in accordance with 29 CFR 1910.120(e) Training. For this purpose, all on-site personnel must supply copies of company issued wallet training cards and/or training certificates.

5.1.3 First Aid/Cardiopulmonary Resuscitation (CPR)

The HSS and designated alternate must possess current certification in first aid and CPR. At least one of these individuals must be present during each work-shift while on-site personnel are performing work tasks. Documentation of current certification will be filed with this HASP.

5.2 Periodic Health & Safety Meetings

The HSS or designated alternate will conduct periodic health and safety meetings. These meetings will be a review of existing protocols as well as a means to update personnel on new site requirements or conditions. The meetings will also provide an opportunity for site personnel to express any health and safety concerns. Topics for discussion would include, but not be limited to, the following:

- Review of available analytical or relevant process data, which may relate to a potential for worker exposure during task execution;
- Review of the type and frequency of environmental and personal monitoring (if any) to be performed;
- Task-specific levels of protection and anticipated potential for upgrading;
- Review of emergency procedures; and
- Review of existing and/or new health and safety issues.

5.3 Documentation/Record Keeping

For documentation of compliance with the training requirements specified in this section, all on-site personnel are required to sign a training acknowledgement form. Signed forms will be filed with this HASP.

MEDICAL SURVEILLANCE

6.1 General Medical Program

Medical surveillance for this project will reflect the provisions established under Title 29 CFR 1910.120(f), OSHA's medical surveillance requirements for hazardous waste operations (medical clearance is not required for individuals who will visit the Support Zone).

Before working on tasks covered by this HASP, verification of current health status and medical restrictions for personnel performing the tasks must be provided to the HSS. Such verification must be in the form of company issued wallet cards or other equivalent documentation.

6.2 Respirator Certification

Prior to authorizing the use of any air-purifying or air-supplied respirator, OSHA--under 29 CFR 1910.134, 29 CFR 1926.58--requires that a determination be made regarding the prospective wearer's physical ability to safely use such equipment. Consequently, individuals scheduled to work in areas that may require the use of a respirator must provide the HSS with current documentation (not older than 24 months) regarding the individual's physical abilities to wear a respirator. The inability to provide current or complete documentation will be sufficient grounds to preclude any individual from areas or tasks requiring such protection. Any worker performing sampling activities who may have to wear a respirator, must have been trained in the proper use of the respirator, must have 40 hours of OSHA training, and must have passed a respirator fit test.

6.3 Exposure/Injury Medical Emergency

As a follow-up to an injury/illness or possible excessive exposure to a chemical or physical hazard, all on-site personnel are entitled to and encouraged to seek appropriate medical attention. The HSS or designated alternate must be appraised of the need for seeking such medical attention and assist in determining the immediacy of the situation.

During and immediately following the emergency medical situation, the HSS (or designated alternate) have the following responsibilities:

- Ensure that the examining medical facility is fully appraised of the site condition and/or hazard that caused the medical emergency;
- Conduct an investigation of the site condition that caused the medical situation prior to reassigning the task;
- Complete an accident report;
- Ensure the injured/ill worker receives written medical clearance prior to return to the site; and,
- Provide a copy of the medical clearance and accident report for the employee's medical records.

Injuries/illnesses and/or possible excessive exposure to a chemical or physical hazard requiring emergency medical treatment must be reported within 24 hours to the Health and Safety Manager. Fatalities must be reported immediately.

SITE CONTROL MEASURES

7.1 Site Control

Site control will minimize potential contamination of workers and observers, protect the public from potential on-site hazards, and prevent vandalism of equipment and materials. Site control measures also enhance response during an emergency.

Most, if not all, work under this program will be done under Level D conditions. If an upgrade is necessary, the site of field operations will be divided into three distinct areas. The actual dimensions of the areas are considered task and location specific and will be determined on a task-specific basis. When utilized, the work areas at each location will be divided into the three following zones: Work Zone, Decontamination Zone, and Support Zone. Work activities that will require the establishment of Work Zones are tank excavation, soil sampling, monitoring well installation, and ground-water sampling.

7.1.1 Work Zone

The Work Zone is the area in which excavation, soil sampling, monitoring-well installation, and groundwater sampling will occur. Workers entering this must be protected as previously defined in Section 4.2. During work activities, only OSHA-trained workers will be allowed into this Zone. Within this Zone, the levels of protection may be changed by the HSS or designated alternate based on the degree of hazard present.

7.1.2 Decontamination Zone

The Decontamination Zone is the area that is set up adjacent to the Work Zone where equipment and personnel are decontaminated. One centralized Decontamination Zone will be set up to service all the sampling locations to facilitate decontaminating equipment that is reused throughout the sampling procedure (e.g., spatulas, scoops, beakers) and worker cleanup. The location of the Decontamination Zone will depend on the prevailing wind direction and physical site features.

7.1.3 Support Zone

A Support Zone may be set up outside the Decontamination Zone. The Support Zone will be used to store equipment and first aid supplies. Administrative and other support functions will occur within the Support Zone, including communications and documentation. Protective clothing worn in the Work Zone may not be worn in a Support Zone except in emergencies.

7.2 Site Security

It is the responsibility of the HSS (or designated alternate) to control access to the active work Zones and assure proper security. Any evidence of unauthorized entry should be noted in the daily field report.

Open excavations will be secured with fencing and/or barriers if left unattended (overnight). The monitoring wells will all be equipped with locking protective casings.

7.3 The Buddy System

Most activities in contaminated or otherwise hazardous areas should be conducted with a "buddy" who is able to:

- Provide partner with assistance;
- Observe partner for signs of chemical or heat exposure;
- Periodically check the integrity of partner's protective clothing; and
- Notify the HSS or others if emergency help is needed.

7.4 Site Communications

Communications will be conducted through verbal communications. When out of audible range, verbal communications will be assisted (if necessary) using portable telephones or a two-way radio.

Communications between workers in the various Zones shall consist of either: mutually agreed-upon hand signals, voice, or radio transmissions. A portable telephone will be used to contact appropriate agencies in an emergency.

7.5 Safe Work Practices

Operating procedures consist of general safety rules for all workers. All workers will be conscientious of others working around them and check that they are safe, and working in a safe manner.

General safety rules which will be enforced at the site including the following:

1. Smoking will be prohibited in any area within the fenced portion of the site, in any Work Zone and Decontamination Zone, and during any sampling activities;
2. Eating and chewing gum will be prohibited in any area within the fenced portion of the site, in any Work Zone and Decontamination Zone, and during sampling activities;
3. Field work will be conducted only during daylight hours;
4. Anyone authorized to enter the fenced portion of the site or any Work Zone or Decontamination Zone, who does not participate in routine activities, will be entered in the daily log book and will be required to follow all procedures in this HASP; and
5. Workers must thoroughly wash their hands prior to leaving the Work Zone and Decontamination Zone, or after any other sampling activities, before eating, drinking, or any other activities;

7.6 Visitors

Visitors will be permitted in the immediate area of active operations only with approval from the HSS. Approval for entry into Work Zones and Decontamination Zones will require physical examination and compliance with training requirements (OSHA 29 CFR 1910.120). All site visitors must be briefed on appropriate sections of the Emergency Response/Contingency Plan (Section 9) and the Task/Operation Health and Safety Risk Analysis (Section 3). Visitors will be documented on the daily log of all site activities prepared by the HSS (or designated alternate). Visitor vehicles are restricted to Support Zones.

7.7 Nearest Medical Facility

First Aid supplies will be located near the area of work activity and/or in the appropriate field vehicle. Additional medical assistance can be summoned by dialing 911.

The nearest medical facility is the Clifton Springs Hospital & Clinic located at 2 Coulter Street in Clifton Springs, New York. Figure 1 shows the emergency route with directions to the hospital from the site. Additional information regarding medical assistance, evacuation routes, emergency procedures, etc., are contained in Section 9.

7.8 Safety Equipment

In addition to the PPE necessary to conduct work activities, the following inventory of safety equipment will be available:

1. Industrial first aid kit;
2. Scissors/knife for emergency equipment removal;
3. Emergency eye-wash;
4. Rope for securing objects and use as a lifeline;
5. Electrolyte replacement drink - stored in clean area and used to prevent heat stress; and
6. Fire extinguisher for Class A, B, and C fires.
7. Hand-held air horn.

DECONTAMINATION

8.1 Decontamination Plan

The various tasks and specific levels of protection required for each task are put forth in Section 3 of this HASP. Consistent with the levels of protection required, Figure 2 provides a step-by-step representation of the personnel decontamination process for Levels C and D.

All reusable personnel gear will be cleaned with a detergent and water. Personnel gear may include overboots, hard hats, respirators, and air monitors. Personnel with equipment working within the site or any work area shall proceed directly to the Decontamination Zone upon completion of work.

Prior to removal of protective gear, personnel will remove soil from boots and gloves using designated wash basins. If other protective gear or clothing is thoroughly soiled, the HSS or designated alternate may decide to dispose of this equipment, rather than try to clean it.

8.2 Equipment Decontamination

Sampling equipment will be decontaminated in accordance with procedures defined in the SI/RAR Workplan (Field Procedures and Sampling Plan) for this site. Decontamination of equipment will be completed either in the Work Zone or in the Decontamination Zone.

Cleaning of small reusable equipment will be performed by hand washing. All sampling equipment will be cleaned prior to use and between samples using the procedure identified in the workplan.

The disposal requirements for wastes generated during the decontamination procedures are presented in the workplan.

8.3 Emergency Decontamination Procedures

In the event of an emergency, the first priority is for all workers to move to a safe location before removing PPE. All workers will quickly and calmly remove disposable equipment and place all reusable equipment at a secured location within the Decontamination Zone for later cleaning. In the event of an injury, the person closest to the injured person will perform the appropriate emergency first aid procedures, and then will remove the injured person's PPE in the Decontamination Zone prior to transporting to an appropriate safe location.

EMERGENCY RESPONSE/CONTINGENCY PLAN

9.1 General

The following Emergency Response/Contingency Plan includes instruction and procedures for emergency-vehicle access, evacuation procedures for personnel, methods of containing fires, and procedures for medical emergencies. All emergency conditions require concise and timely actions that are conducted in a manner that minimizes the health and safety risks.

9.2 Emergency Response/Contingency Plan

All workers shall be familiar with the Emergency Response/Contingency Plan described in this section. The following procedures shall be implemented in an emergency:

1. First aid or other appropriate initial action will be administered by those closest to the accident/event. This assistance will be coordinated by the HSS or designated alternative and conducted in a manner to minimize health and safety risks to those rendering assistance to other workers;
2. Workers shall report all accidents and unusual events to:
 - a. HSS; and
 - b. Project Manager.
3. The HSS or designated alternate is responsible for conducting the emergency response in an efficient, rapid, and safe manner. The HSS or designated alternate will decide if outside assistance and/or medical treatment is required and shall be responsible for alerting local authorities and arranging for their assistance.

9.3 Incident Reporting Procedures

The HSS will provide to the Project Manager an accident report, which will include the following:

1. A description of the emergency (including date, time, and duration);
2. Date, time, and name of all persons/agencies notified and their response; and
3. A description of corrective actions implemented or other resolution of the incident.

9.4 Responsibilities

The HSS (or designated alternate) shall have the responsibility for directing response activities in the event of an emergency, specifically:

1. Assess the situation;
2. Determine required response measures;
3. Notify appropriate response teams; and
4. Determine and direct workers during the emergency.

The HSS or designated alternate shall coordinate any response activities with those of public agencies and is responsible for implementing the emergency response procedures for all workers. All workers are responsible for conducting themselves in a mature, calm manner during an accident or unusual event.

9.5 Public Response Agencies

A list of public response agencies that may be contacted in an emergency, depending on the nature of the situation, is included in Table 3. This table presents the local emergency numbers including the local hospital (Clifton Springs Hospital), Health Department, ambulance service, fire and police departments, and utility numbers. In addition, nationwide hotline numbers provided by the United States Environmental Protection Agency (USEPA) for emergency assistance are included. This contact list should be retained by all workers.

The route to the closest hospital is provided in this HASP on Figure 1. Directions to the hospital are listed below. The HSS will provide direction and/or maps to the hospital to all on-site personnel prior to commencement of on-site activities.

9.5.1 Emergency Route from the Site to the Clifton Springs Hospital

Directions	Distance	Time
Start: Depart 147 State Street (Frederick Property), Manchester, NY 14504 on State Street (East)	0.7	0:02
1. Turn LEFT (North) onto NYS Route 21	0.4	0:01
2. Turn RIGHT (East) onto NYS Route 96	4.5	0:08
3. Turn RIGHT (South) onto Kendall Street	0.6	0:01
4. Turn LEFT (East) onto East Main Street	<0.1	<1 min.
5. Turn RIGHT (South) onto Local road	<0.1	<1 min.
End: Arrive 2 Coulter Street, Clifton Springs, NY 14432		
Total Route	6.3 mi	14 min.

9.6 Accidents and Non-Routine Events

Several types of emergencies are outlined in the following subsections. These are not intended to cover all potential situations, and the corresponding response procedures should be followed using common sense. Every accident is a unique event that must be dealt with by trained personnel working in a calm, controlled manner. In an accident/unusual event, the prime consideration is to provide the appropriate initial response to assist those in the accident while minimizing risks to other workers and the community.

9.6.1 On-Site Personal Injury

If a worker is physically injured, appropriate first aid procedures shall be followed. Depending on the severity of the injury, emergency medical response may be sought. If the worker can be moved, he/she will be taken to the edge of the work area where protective clothing (if any) will be removed, emergency first aid administered, and transportation to a local emergency medical facility provided.

If the injury to the worker is exposure to chemicals, the following first aid procedures are generally initiated as soon as possible:

- a. Eye Exposure - If solid or liquid gets into the eyes, wash eyes immediately with water lifting the lower and upper lids occasionally. Obtain medical attention immediately.
- b. Skin Exposure - If solid or liquid gets on the skin, wash skin immediately at the emergency wash station using water. Obtain medical attention if skin is damaged.
- c. Inhalation - If a person inhales large amounts of organic vapor, move him/her to fresh air at once. If breathing has stopped, appropriately trained personnel should perform cardiopulmonary resuscitation. Keep the affected person warm and at rest. Obtain medical attention immediately.
- d. Ingestion - If solid or liquid is swallowed, medical attention shall be obtained immediately.

The HSS (or designated alternate) shall inform the Project Manager of the injury/accident, and provide a written report detailing the accident, its causes and consequences within one day of the accident.

9.6 Accidents and Non-Routine Events (continued)

9.6.2 Temperature-Related Problems

Excessive heat or cold may affect workers' health and the ability to function. These are discussed in Section 3.7, including first aid procedures.

9.6.3 Fires

Workers will be knowledgeable in fire-suppression techniques. They shall be instructed in proper use of the fire extinguisher(s) supplied. Fire extinguishers should be used only for small fires in the early stages of development. When the fire cannot be controlled through extinguisher use, the area should be evacuated immediately. The local fire department should be called to fight the fire.

9.6.4 Precipitation

In general, field and sampling activities can be conducted during rain, snowfall, or light fog. If rain (or snow) becomes heavy it may be necessary to cease work activities. All on-site activities will be halted during a thunder and lightning storm.

9.6.5 Emergency Evacuation Procedures

The HSS (or designated alternate) will initiate emergency evacuation procedures, should an incident be determined to be sufficiently serious to require evacuation of an area. Air monitoring action levels that would require evacuation are discussed in Section 4.3 and 4.4. In addition, fire or other uncontrolled situations would require evacuation. In the event of an evacuation:

- a. The HSS or designated alternate will contact all workers by voice or the two-way radio. All workers are to stop work immediately and report to a designated area.
- b. A worker count will be conducted.
- c. The area in question will be evacuated through the Decontamination Zone, if feasible (provided that Zone is not affected). All workers will reassemble at a safe distance.

9.6 Accidents and Non-Routine Events (continued)

9.6.5 Emergency Evacuation Procedures (continued)

- d. The HSS (or designated alternate) will assess potential adverse impact on the community (see Section 4.4 for community monitoring) and contact emergency-response agencies--as warranted--for potential community evacuation.
- e. If evacuation is due to high TOV readings in the Work Zone, the HSS (or designated alternate) will assess actions to reduce TOV levels in air. Such actions may include back-filling open excavations, capping of borings, or implementing engineering controls.
- f. Engines and motorized equipment will be shut off before the site is evacuated.

TABLE 1

PHYSICAL HAZARDS

Physical Hazard	Tasks	Protection Mechanism
Noise	2	Hearing protection when elevated noise levels exist
Heavy Manual Lifting	1,2,3,4	Lift with legs; get assistance
Housekeeping	1,2,3,4	Store equipment properly Remove rubbish/scrap material from work area
Compressed Gases (calibration gas)	3	Store properly
Vehicle Traffic	1,2,3,4	Warning signs; away from work area
Heavy Equipment	1,2,3	Trained/licensed operators; warning signs Backup alarms
Materials Handling	1,2	Material stacked/stored to prevent collapsing Machinery properly braced
Hazardous Material Storage	1,3,4	Segregate flammable/combustible liquid from ignition Sources, Store in approved containers, Solvent waste, oily rags and liquids kept in fire resistant containers
Fire Prevention	1, 2, 3, 4	Training in fire extinguisher use and classes
Electrical	4	Approved grounding and bonding procedures Electrical lines/cords/cables guarded and maintained Damaged equipment tagged/removed from service
Hand/Power Tool	1,2,3,4	Guards and safety devices in place
Tools	1,2,3,4	Defective tools tagged/removed from service Tools maintained and inspected; intrinsically safe Proper eye protection used

TABLE 2

BIOLOGICAL HAZARDS

Hazard	Task Nos.	Location/Source	Route of Exposure*	Immunization Required	Prevention
Poisonous Plants	1, 2, 3, 4	Fields Brush-covered and wooded areas	I, C, G	No	Avoid contact with plants. Wear long sleeves and pants.
Insects	1, 2, 3, 4	All areas	D	No	Insect repellent Wear long sleeves and pants.
Deer Tick (potential vector of Lyme's Disease)	1, 2, 3, 4	Fields, Brush-covered and wooded areas	D	No	Insect repellent Wear long sleeves And pants. Avoid contact with plants. Check yourself for bites and rashes.

* I - Inhalation, G - Ingestion, C - Contact, D - Direct Penetration (Bite, Inject., Open Wound or Sore)

TABLE 3

EMERGENCY RESPONSE CONTACT LIST

Agency	Contact/Function	Phone Number
Manchester Fire Department	Report Fire	911
Local Ambulance	Ambulance	911
Clifton Springs Hospital & Clinic	Hospital	315-462-9561

Contingency Plan Contact List

Ontario County Sheriffs Department	Report Incidents	911
New York State Police	Report Incidents	911

National Emergency Contact List

USEPA Emergency Response Team, Region 2	(212) 340-6656
Chemtrec - Chemical Emergencies (Washington, D.C.)	(800) 424-9300
National Foam Center - Emergency Response (Pennsylvania)	(215) 363-1400

Utility Contact List

New York State Electric & Gas	Electrical Interruption	(800) 572-1131
	Natural Gas Odor	(800) 572-1121
Rochester Gas & Electric		(888) 253-8888
Telephone Company (Alltel Communication)		(800) 542-6204
Underground Utility (UFPO)		(800) 962-7962

New York State Department of Environmental Conservation Contact List

Oil Spill or Hazardous Material Spill	(800) 457-7362
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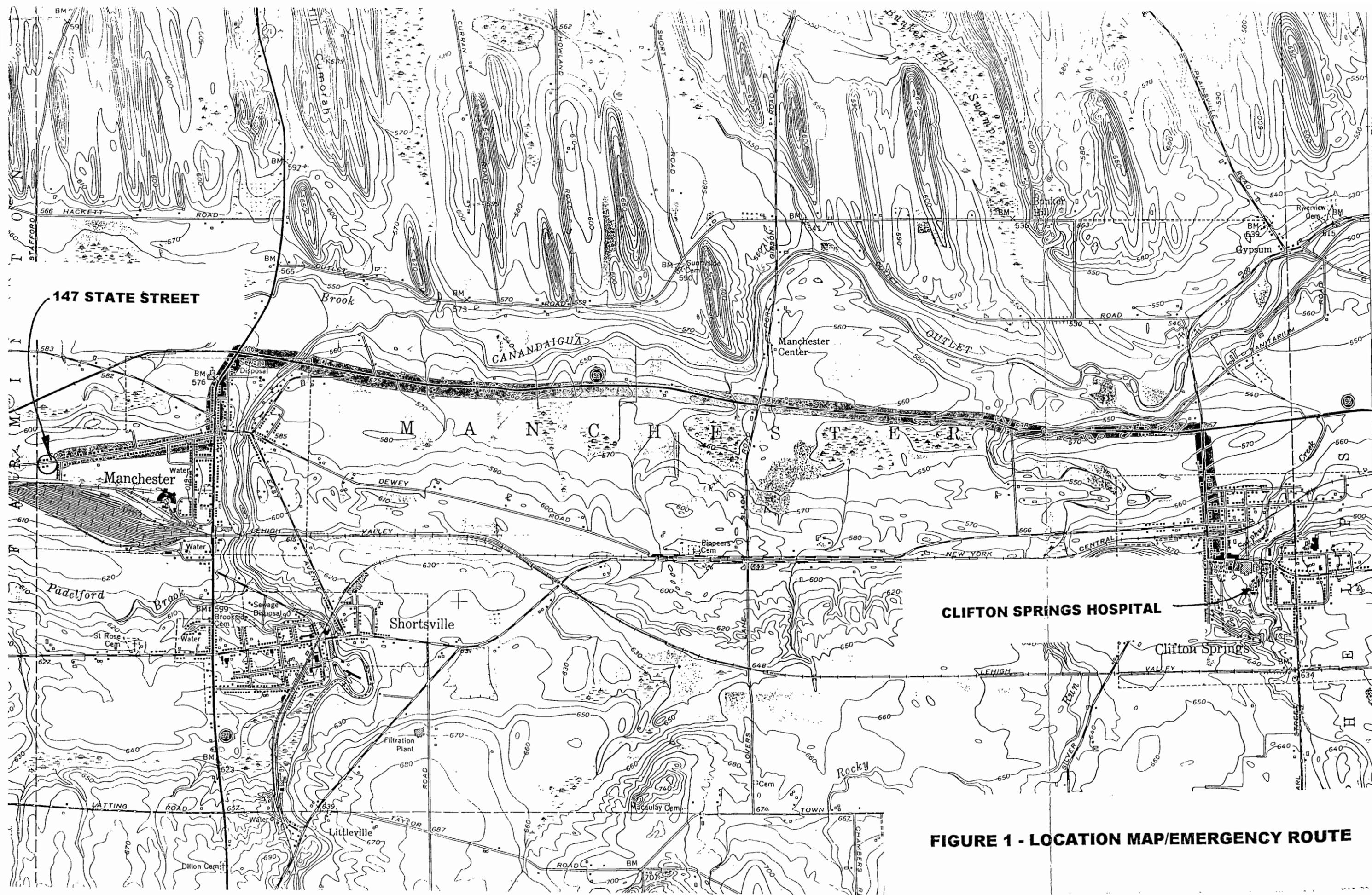


FIGURE 1 - LOCATION MAP/EMERGENCY ROUTE

MINIMUM DECONTAMINATION LAYOUT
LEVEL C & LEVEL D PROTECTION

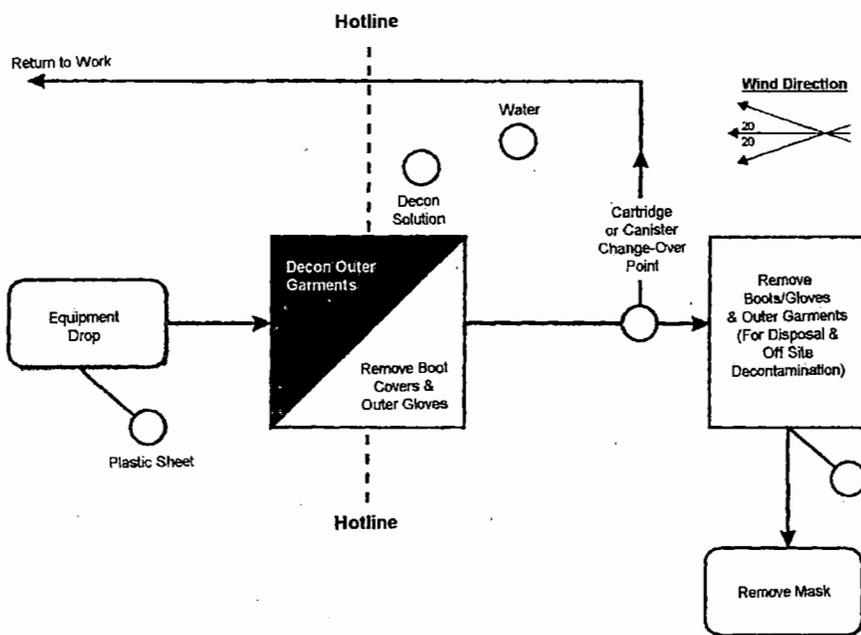


FIGURE 2

APPENDIX B

Field Procedures And Sampling Plan

For The

FREDERICK PROPERTY ENVIRONMENTAL RESTORATION PROJECT

NYSDEC SITE B00131-8

MANCHESTER, NY

Prepared by:

Village Of Manchester, New York

January 2000

Revised June 2000

APPENDIX B

FIELD PROCEDURES AND SAMPLING PLAN

In general, field procedures will be performed in accordance with the following ASTM standards:

- D1586 - Standard Penetration Test for Sampling of Soils;
- D1587 - Practice for Thin-walled Tube Sampling of Soils;
- D2487 - Test Method for Classification of Soils for Engineering Purposes;
- D2488 - Practice for Description and Identification of Soils;
- D4044-96 - Standard Test Method (Field Procedure) for Instantaneous Change in Head (Slug) Tests for Determining Hydraulic Properties of Aquifers; and
- D5092 - Standard Practice for Design and Installation of Groundwater Monitoring Wells in Aquifers.

SOIL SAMPLING PROCEDURES

Auger Rig

Samples will be collected using the following procedures:

1. Advance the borehole to the desired depth and remove excess cuttings.
2. Attach one 24-inch-long by 2.0-inch-outside diameter split-spoon sampler to the drill rods or wireline drop hammer and lower into the borehole. Do not allow the sampler to drop into the soil being sampled.
3. Reset the dead weight of the sampler, rods, or wireline drop hammer, and drive weight on the bottom of the boring and apply a seating blow. If excessive cuttings are encountered at the bottom of the borehole, withdraw the sampler from the borehole and remove the cuttings.
4. Mark drills rods or wireline in three successive 6-inch increments so that the advance of the sampler under the impact of the hammer can be easily observed for each 6-inch increment.
5. Drive the sampler with blows from a calibrated 140(\pm 1)-pound hammer and count the number of blows applied in each 6-inch increment until no advancement is observed or 6 inches has been achieved.
6. Record the number of blows required for each 6-inch increment of penetration. The first 6 inches is considered a seating drive. If the sampler is driven less than 24 inches, the number of blows for each complete 6-inch increment and each partial increment should be recorded on the boring log. For partial increments, report the depth of penetration to the nearest inch, in addition to the number of blows. If the sampler advances below the bottom of the boring under the static weight of the drill rods and hammer, note this information on the boring log.

7. The raising and dropping of the 140-pound hammer can be accomplished using either of the following two methods:
 - a. A trip, automatic, or semi-automatic hammer drop system that drops the hammer 30 inches.
 - b. A cathead to pull a rope attached to the hammer. The cathead should be essentially free of rust, oil, or grease. For each hammer blow, employ a 30-inch lift and drop. The operation of pulling and throwing the rope should be performed rhythmically without holding the rope at the top of the stroke.
8. After driving the sampler to the desired depth, withdraw the sampler from the borehole and set aside. To minimize the potential for volatilization, do not open the split-spoon sampler until the samples are ready to be placed in jars. Record the length of sample recovered; describe the soil including composition, color, stratification, and condition following the Unified Soil Classification System; and field screen for potential contaminants using a Photo-ionization detector (PID).
9. Place samples in clean laboratory-supplied glass jars with proper labels. Be sure to label the tag carefully and clearly, addressing all the categories or parameters.
10. Store sample jars in a portable cooler containing blue ice or ice for transport to the laboratory. Complete all chain-of-custody documents and record information in the field logbook (See Sample Handling Section).
11. Decontaminate sampling equipment between sample locations and sampling intervals to reduce the potential for cross-contamination.
12. At the completion of drilling, either backfill the boreholes with grout to the surface or install a well in the borehole as discussed in the following section.

Geoprobe Rig

The same procedures will be used to obtain soil samples with the Geoprobe rig as with the auger rig with the exception of the following:

- The borehole will be advanced directly with the soil sampler.
- The soil sampler is driven by a hydraulic hammer and the downward force of the weight of the drill rig.
- No blow counts will be recorded.
- The soil sampler will be lined with polyethylene sampling sleeves.
- Sampling sleeves will be split with a knife when samples are ready to be placed into jars.

Boreholes will be advanced to a depth of 10-15 ft. below ground surface or to refusal, if refusal is at a shallower depth.

Sample Containers and Preservation. Sampling jars will be supplied by the laboratory and only new, unused jars will be used. The soil samples will be sealed in laboratory-supplied jars, and stored on ice pending transfer to the analytical laboratory. Quality control samples (trip blanks, field blanks) will be prepared using 40-ml VOA vials preserved with HCl and filled with de-ionized water. The VOA vials and all sample containers will be supplied by the analytical laboratory and will be transported in a common container.

WELL INSTALLATION

The following section describes standard operating procedures for the installation of wells.

Prior to drilling at the site, an underground utility-clearance survey will be completed to reduce the potential for encountering subsurface utilities and structures. A drill rig equipped with 4.0-inch inside diameter hollow-stem augers (HSA) will be used to drill the boreholes for the wells. If wells are to be installed into bedrock, a temporary casing will be installed to the top of rock and coring (NX core) will be performed to the final depth. The borehole will then be reamed with a nominal 6-inch roller-bit.

New, factory-wrapped well casing (10 ft. length) will be placed in the borehole and suspended from the ground surface so as not to rest on the borehole bottom. The augers will sufficiently center the screen and casing, therefore, centralizers will not be needed. For bedrock wells, centralizers will be utilized. Filter pack material will be placed in the annular space by free-fall within the drill casing. The filter pack material will be placed in lifts, sounded, and any bridges observed will be broken by washing with potable water. However, water will not be added to borings unless approved by the NYSDEC representative. The casing will be removed in 2-foot increments and the free-fall placement of filter pack within the casing continued until the screen interval is covered. The sand-pack will extend 0.5 feet below and 2 feet above the well screen.

A bentonite seal will be placed directly on top of the filter pack by free-falling granular bentonite down the borehole after removing the drill casing and hydrating the bentonite with potable water. The remaining annulus will be grouted by pumping grout into the borehole to the desired level. Grout will consist of Portland Cement with 3 to 5 pounds of powdered bentonite per sack of cement. The grout will be mixed with 6.5 gallons of potable water per sack of cement. The wellhead will be completed with a flush-mounted, traffic-rated well vault having a tamper-resistant lid, or an above-ground steel protective casing, which will be clearly marked with the well identification. Grout will be allowed to cure for 48 hours prior to any well development or sampling.

Micro-Wells

Due to the small boring diameter created with the geoprobe drill rig, small-diameter ($\frac{3}{4}$ inch) wells/piezometers will be installed at select locations. The main purpose for these wells will be to obtain groundwater level information and to obtain a groundwater grab sample. They are not useful for long term monitoring wells, and may not yield sufficient water for all types of laboratory analyses.

Installation procedure is as follows. Wells will consist of 10 ft. of $\frac{3}{4}$ inch PVC screen attached to a sufficient length of PVC riser to complete wells flush with the ground surface. Wells will be installed through the center of the geoprobe tooling, or the tooling will be withdrawn from the boring and wells placed into the open borehole. Due to the small annulus, it is sometimes difficult to place a sand pack around the well screen. A sand pack and bentonite seal will be placed around the well screen to the best possible extent. A protective, flush-mounted roadway box will be installed at ground surface to complete the wells.

WELL DEVELOPMENT

The purpose of well development is to enhance natural hydraulic conditions after drilling to enhance yield and remove finer materials to enable groundwater that is representative of the aquifer to move into the well screened zone to be monitored. The development of each monitoring well will be performed after the grout has cured adequately (a minimum of 48 hours) so it is not drawn into the well bore. Development will be accomplished using mechanical surging, bailing, and pumping. Development will be initiated by removal of excess sediment in the well, will be started at the slowest possible rate, and will be gradually increased as development proceeds. Development of the wells will be performed as guided by the following criteria and continued until these criteria are met:

1. Well water has a turbidity of less than 5 Nephelometric Turbidity Units (N.T.U.) or is the best attainable, as determined by field personnel.
2. Sediment remaining in the bottom of the well bore does not exceed 5 percent of the total screened casing length.
3. Removal of a minimum of 3 to 5 casing and filter pack (30 percent porosity assumed) volumes of water.

Temperature, specific conductivity, and pH may be measured during the latter stages of development to aid in assessing when development is complete or the best attainable. Development will be considered complete when successive parameter measurements are within 10 percent of the previous reading. Wells will not be sampled less than one week following development activities.

HYDRAULIC CONDUCTIVITY TESTING

Hydraulic conductivity testing will be performed in each of the monitoring wells in general accordance with ASTM method D4044. At the start of the test, a water level measurement will be obtained. A rising head test will be performed by removing a slug of water using a bailer. Water level readings will be obtained at a frequency to obtain sufficient data for a smooth curve. Readings will continue until the water level has recovered to within 10% of the static water level, or for one hour, whichever occurs first. Data will be analyzed by the Hvorslev method.

WELL/BORING SURVEY

Following completion of the boring program and installation of monitor wells, a New York-licensed surveyor will be contracted to survey the exploration locations and elevations and having an accuracy of plus or minus 0.01 feet. Well heads will be surveyed relative to an on-site datum with an assumed elevation of 100 feet. The survey is necessary to calculate the relative elevation of the groundwater and evaluate the direction of groundwater flow. Well locations will be plotted relative to site buildings and property boundaries.

GROUNDWATER SAMPLING PROCEDURES

1. Groundwater samples will be collected in order; first from monitoring wells considered least impacted, followed by those considered most impacted.
2. Measurements of total organic vapor concentrations, using a Photoionization Detector (PID), will be performed by removing the well vault cover and opening the well cap slightly and placing the instrument probe beneath the cap. After the reading has been obtained, the well cap will be completely removed and the well will be allowed to ventilate for a period of 3 to 5 minutes. After the wellhead has been ventilated, a measurement in the breathing zone will be collected. See the Health and Safety Plan for specific health and safety procedures.
3. Depth to water will be measured from the top of the well casing to the top of the water surface to the nearest 0.01-foot during sampling. Ground surface and top of casing elevations will be surveyed to within 0.01 foot so that water elevation can be calculated.
4. An interface-sounding device capable of detecting free-phase hydrocarbons will be used if free product is detected in well.
5. Length of the interval from the top of the water surface to the water-sediment interface will be measured to the nearest 0.01 foot to calculate total casing water-volume for purging of the monitoring well prior to sampling.
6. The elevation of groundwater in feet will be calculated and recorded given the elevation of the top of the wellhead and depth to water.
7. A minimum of three to five casing volumes of water will be removed from the well prior to sampling using a bailer or submersible pump.
8. Specific conductance, pH, and temperature will be recorded at 5-gallon intervals. Samples will be collected when at least three to five casing volumes of water are removed or the above parameters stabilize (10 percent or less difference between successive readings).
9. A groundwater sample will be collected immediately after purging is complete. Samples will be collected with a disposable bailer. If low yields are observed, a minimum of three casing volumes will be removed prior to sampling, or wells will be purged to dryness. If a well is pumped dry during removal of casing water (and recovery is slow), samples will be obtained as soon as possible after the well has recovered.
10. Departures from the standard sampling procedure will be documented in the field logbook.

11. Samples to be analyzed for volatile organic compounds will be obtained so that the sample container is headspace free. All such samples will be collected in 40-milliliter (ml) vials with Teflon septa. The container will be immediately capped so that volatilization is minimized. This will be achieved by filling the container to slightly overflowing, forming a meniscus at the mouth of the container. The cap will be placed upon the convex meniscus and tightly sealed. To check that the sample is air-free, the container will be inverted and the cap gently tapped. The absence of entrapped air indicated a successful seal. When air is evident in the container, the entire sample will be discarded and another sample will be collected. Evacuation and sampling data for each well will be recorded in the field logbook at the time of sampling.

SAMPLE HANDLING

Sample Labeling. Samples of soil and groundwater collected in the field will be labeled immediately. Labels with adhesive backing will be completed with indelible ink and affixed to the side of the sample container. Information written on sample labels will include:

- a. Project number
- b. Site location
- c. Sample location (monitor well, or borehole number and depth)
- d. Analyses required
- e. Sample number
- f. Initials of sampler
- g. Date
- h. Time.

The label will be attached securely to the sample container to minimize loss or mutilation. Each label will be filled out as completely as possible prior to collecting the sample.

Sample Seals. If samples are to be sent to a fixed-base laboratory via courier, seals will be placed over the container lids to discourage and detect unauthorized tampering with the samples. The sample seals will include the following information:

- a. Project number
- b. Sample number
- c. Initials of sampler
- d. Date
- e. Time.

Chain-of-Custody Procedures. The chain-of-custody for possession and responsibility of samples must be documented from the time and place of sample acquisition to the time and place of their final destination. To maintain and document sample possession, chain-of-custody procedures will be followed that include the completion of chain-of-custody records and various other requirements.

1. Chain-of-custody is defined as a documented record of the transfer of responsibility for the care and safekeeping of acquired samples from one person or organization to another.
2. A sample is under custody if it is: 1) physically in one's possession, 2) in plain view after being placed in one's physical possession, or 3) locked in a designated and identified secure area where tampering is prevented.
3. The field personnel initially taking the sample are responsible for the care and custody of the sample until it is properly transferred to delivery or laboratory personnel.
4. Records concerning sample handling and transportation will be kept in the field logbook.
5. All samples will be accompanied by a chain-of-custody record. The chain-of-custody record will provide the project number, sample name, name of sampler, site location, sample matrix, number of containers, and the analysis required. Each person or organization who relinquishes and/or receives responsibility for the samples shall sign, date, and retain one copy of the record for his/her files.
6. The chain-of-custody record will be filled out completely. Each sample will be described completely on separate lines. No duplication or ditto marks will be used. An individual record will be completed for each final destination.
7. All ice chests will be sealed with duct tape until received by the laboratory receiving-agent to prevent unauthorized tampering.

DECONTAMINATION PROCEDURES

Sampling equipment and down-hole drilling tools will be decontaminated between samples and/or sampling locations. Drilling tools will be decontaminated using a steam cleaner before start of work and after each sampling location. Sampling equipment (split spoons, tube sampler, submersible pump, water-level probe, etc.) will be decontaminated prior to and between taking samples. The following steps are to be followed:

Remove excess soil with knife or spatula.

Clean in solution ofalconox and water.

Rinse using potable water.

Let air dry.

If free-phase product is encountered during sampling, an additional rinse of dilute methanol followed by a potable water rinse will be added to the above procedure.

DISPOSAL OF WASTE

Wastes generated during field work will be stored on plastic (soil from tank excavation) or containerized (soil from drilling and decontamination/purge water). Upon receipt of laboratory analysis, waste will be disposed of in accordance with current hazardous waste regulations. All waste containers will be properly labeled, as to date of generation, content, pending laboratory testing, and telephone number of contact person. Once hazardous waste determination has been made, labels will be updated to reflect proper waste codes.

Used protective clothing will be disposed of as solid waste unless covered with free-phase product, in which case it will be containerized and disposed of with the other containerized waste.

APPENDIX C

Quality Assurance/ Quality Control

For The

FREDERICK PROPERTY ENVIRONMENTAL RESTORATION PROJECT

NYSDEC SITE B00131-8

MANCHESTER, NY

Prepared by:

Village Of Manchester, New York

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APPENDIX C

QUALITY ASSURANCE/QUALITY CONTROL

The purpose of this appendix is to present the quality assurance/quality control (QA/QC) procedures to be implemented during performance of the tasks outlined in the SI/RAR Work Plan. These procedures must provide data quality that is sufficient to meet the Work Plan objectives. The overall objective of the Work Plan is to provide supportable data that can be used to assess current site conditions and to evaluate whether future remedial activities may be necessary at the site. Based on this general objective, the following specific objectives have been established for the Work Plan:

1. Characterize nature and extent of chemical constituents in on-site soil and groundwater.
2. Evaluate off-site groundwater quality.
3. Provide information necessary to implement remedial measures to address the potential presence of chemical constituents in environmental media at the site.

DATA QUALITY OBJECTIVES

Based on the site history, the Work Plan activities covered under the Field Sampling Procedures include the following on-site field investigation activities:

1. Soil investigation
2. Groundwater investigation

Preliminary Data Quality Objectives were identified to ensure that the data generated during field investigations will be of adequate quality and sufficient quantity to form a sound basis for decision making purposes relative to the above objectives. Data quality objectives have been specified for each data collection activity or investigation.

A Data Quality Objectives summary for each of the investigation efforts is presented below. The summary consists of Data Quality Objectives relative to the following items:

- A. Data Uses
- B. Data Types
- C. Data Quality
- D. Data Quantity
- E. Sampling and Analytical Methods
- F. Data Precision, Accuracy, Representativeness, Completeness, Comparability and Sensitivity (PARCCS) Parameters

The analytical levels discussed in the following sections with regard to data quality are defined as follows:

Field Screening - This level is characterized by the use of field instruments that can provide real-time data to assist in choosing of samples for laboratory testing, record physical parameters such as pH and temperature, and for health and safety support. This data can be used in revising sampling plans and determining the extent or presence/absence of chemical constituents at a site.

Laboratory Analysis Using ASP Methods - This level involves the use of ASP protocols containing rigorous QA/QC, with Category B deliverables for data validation. ASP data are used for initial site characterization to obtain an overall assessment of the environmental impact on the site media. Analytical methods for future investigation will be based on an evaluation of this data. This data is the highest quality obtained during investigation.

Laboratory Analysis Using Methods Other Than ASP - This level involves the use of standard USEPA SW-846 approved methods. Some procedures are equivalent to ASP, containing the same rigorous QA/QC protocols as used in ASP analyses, but without the ASP requirements for documentation. Non-ASP data are used for additional site characterization, groundwater monitoring, and for confirmation of field screening data. This data is still usable and reliable since rigorous SW-846 protocols are adhered to.

Non-Standard Methods - Analyses which may require method modification and/or development. Non-Standard Methods are used to provide data that cannot be obtained through standard methods. Analysis of samples at this level may involve research, development, and documentation of a new method or the modification of an existing method.

Soil Investigation

A. Data Uses

The soil investigation is designed to generate data to support the following evaluations:

1. Determine the presence and extent of chemical constituents in soil at the site.
2. Characterize surface and subsurface soils at the site.
3. Evaluate soil conditions at the site to determine whether chemical constituents may be migrating from the site.
4. Evaluate applicable remedial alternatives, if necessary.

B. Data Types

The soil investigation will include the collection and analysis of soil samples a wide range of compounds, including compounds of interest (petroleum-product constituents). Later phases will focus on identified compounds of concern. The types and frequency of QA/QC samples to be collected are outlined in the next section of this appendix. Visual examination and PID screening of soil samples from test borings will be conducted to evaluate subsurface conditions at the site and to select soil samples for laboratory analysis as described in the Work Plan.

The soil chemical parameters selected for analysis are provided in the Work Plan.

C. Data Quality

Both ASP and Non-ASP (SW-846) analytical methods will be used.

Field Screening methods will be used for the screening of soil samples with a PID to pick samples for laboratory testing.

D. Data Quantity

The soil investigation will involve the collection of eight samples from five locations for the complete list of parameters listed in the work plan during the first phase. Additional samples will be collected for petroleum compounds if warranted by screening or visual observation and to fill data gaps (supplemental investigation). The frequency of QA/QC samples is listed in the next section.

E. Sampling and Analytical Methods

The soil sampling and handling procedures are provided in Appendix B. The laboratory analytical methods for soil will be ASP for compounds listed in the work plan. Methods for additional samples will be determined once the first phase of soil data has been evaluated.

F. PARCCS Parameters

Data representativeness is achieved by location of soil sampling locations across the site. Data precision and comparability is achieved through employing standard USEPA-/NYSDEC-approved methods. Sensitivity is evaluated by analyzing matrix spikes/matrix-spike duplicates (MS/MSD). Data completeness will be assessed after receipt of the round of data.

Groundwater Investigation

A. Data Uses

The groundwater investigation is designed to generate hydrogeologic and water quality data to support the following evaluations:

1. Determine groundwater quality at the site.
2. Determine the groundwater flow direction and hydraulic gradient in overburden at the site.

The groundwater data will also be used to assess risks to human health and the environment associated with any chemical constituents detected, and to evaluate applicable remedial alternatives, if necessary.

B. Data Types

Hydrogeologic and water quality data are required to meet the objectives of the groundwater investigation. Hydrogeologic data will consist of water level information from monitoring wells and conductivity testing. Water quality data will consist of field parameters, including pH, temperature, and conductivity as well as any laboratory parameters.

During the installation of groundwater monitoring wells, overburden soil samples will be obtained for visual characterization for color, texture, moisture, and soil types. Soil samples will be collected and selected samples submitted for laboratory analysis if staining, odors, or elevated PID readings are encountered.

C. Data Quality

Non-ASP (SW-846) analytical methods will be used.

Field Screening will be used for the groundwater elevation measurements and water quality field parameters.

D. Data Quantity

The groundwater investigation will involve the collection of groundwater samples from six monitoring wells and possible four piezometers/micro-wells to be installed as part of the Work Plan. Groundwater elevation measurements will also be obtained from each monitoring well and piezometer. The quantity of groundwater samples will be a minimum of four and up to eight on-site samples. In addition, up to eight off-site groundwater samples will be collected if contamination has spread beyond the site. The frequency of QA/QC samples is listed in the next section. Two rounds of groundwater samples will need to be collected.

E. Sampling and Analytical Methods

The groundwater level measurement procedures, water-quality measurement procedures, and groundwater sampling procedures are provided in Appendix B. The laboratory analytical methods for groundwater samples will be determined once soil data have been evaluated.

F. PARCCS Parameters

Data representativeness is achieved by location of monitoring wells across the site. Data precision and comparability is achieved through employing standard USEPA/NYSDEC-approved methods. Sensitivity is evaluated by analyzing matrix spikes/matrix-spike duplicates (MS/MSD). Data completeness will be assessed after receipt of the round of groundwater data.

QA/QC SAMPLES

Duplicate soil samples will not be collected during this program due to the difficulty in obtaining true duplicates of inhomogeneous soil. However, the laboratory will be requested to run a series of duplicate analyses on sample extracts as a check on laboratory procedures (MS/MSD). One duplicate groundwater sample will be collected for each round of groundwater sampling.

One equipment-blank per sampling day will be collected to ensure that non-dedicated sampling devices have been effectively decontaminated. The equipment blanks will be collected after the sampling equipment has been decontaminated by running the de-ionized water through the equipment and into two 40-ml VOA vials. The equipment blank will be analyzed for volatiles only.

One trip blank per sample shipment will be submitted for analysis to the laboratory to evaluate the possibility of air-borne cross-contamination of samples in the field. The trip blank will be prepared and supplied by the laboratory and will accompany samples in the field and to the laboratory. The trip blank will be analyzed for volatiles only.