VOLUNTARY CLEANUP PROGRAM

SUPPLEMENTAL INVESTIGATION WORK PLAN

for

SITE NO. V00264

VOLUNTARY CLEANUP AGREEMENT NO. A7-0493-0903

Prepared by:

PLUMLEY ENGINEERING

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Project No. 2010150

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1.0 INTRODUCTION AND PURPOSE

The project site is located at 1501 Brewerton Road (US Route 11) in the Town of Salina, Onondaga County, New York. The property is approximately 65 feet along the road, 270 feet deep, 185 feet across the back and 0.8 acres in size. The attached *Figure 1 – Site Plan* details the main features on the property. The property contains a 3,600-square foot manufacturing building and a 700-square foot garage. The building is surrounded by paved areas for vehicle traffic and parking. A grass area is located at the rear of the property. The main building was formerly used as an electroplating operation.

The Volunteers entered into the State's Voluntary Cleanup Program (VCP) to address concerns about environmental impacts to the site from past operations. A Phase I Environmental Site Assessment (ESA) was completed on the site by O'Brien & Gere Engineers, Inc. in May 1999. A subsurface environmental investigation was completed on this site in 2004 under an approved Investigation Work Plan prepared by ENSR International, dated July 2004. The results of the investigation were summarized in a report by ENSR, dated February 2005. This investigation work identified soil and groundwater impacts with metals and chlorinated solvents [trichloroethene (TCE)].

This Supplemental Investigation Work Plan is being prepared to address additional investigation work requested by the New York State Department of Environmental Conservation (DEC) in their letter dated September 27, 2010. An Interim Remedial Measures (IRM) Work Plan is being submitted separately which proposes a remedial excavation of the main source of the site impacts – a sump in the manufacturing building.

2.0 RESULTS OF PREVIOUS INVESTIGATIONS

The main findings of the investigation work are briefly summarized as follows:

Soil:

- A soil sample from under the former wastewater sump in the building had the highest level of solvent impact on the site with a total volatile organic compound (VOC) concentration of 38.7 milligrams per kilogram (mg/kg) [equivalent to parts per million (ppm)], exceeding protection of groundwater soil cleanup objectives (SCOs)[1] for TCE and cis and trans-1,2-dichloroethene (DCE).

- No soil samples (collected from 0 to 2 feet depth) exceeded restricted industrial use SCOs for metals or VOCs.

- Soil samples (0 to 2 feet depth) in the area west of the rear parking lot exceeded groundwater and ecological SCOs for some metals (Cd, Ni, Ag).

Groundwater:

- No VOCs exceeding groundwater standards were identified west of the rear parking lot.

- Groundwater impacts were identified south of the building at the property line and downgradient of the sump, with 410 micrograms per liter (µg/L) total chlorinated VOCs.

- Groundwater flow was determined to be to the south toward the adjacent Salina Landfill, a State Superfund Site.

Soil borings generally indicated fine-grained silts and clays across the site. Groundwater was shallow at the time of the groundwater sampling (December 2004) at about 3 feet below grade.

Refer to the investigation report for additional information..

[1]New York Codes, Rules and Regulations, Title 6 (6NYCRR) Part 375-6, *Remedial Program Soil Cleanup Objectives (SCOs),* dated December 14, 2006.

3.0 SCOPE OF WORK

The DEC's specific requests for additional investigation and proposed measures to address each are summarized as follows:

Comment: *<u>Building Sump Area</u>: The Department agrees with the ENSR recommendation that additional soil borings are warranted around the sump to characterize the extent of the soil contamination there.*

Response: The Volunteer wishes to proceed with an IRM to excavate and remove the sump and impacted soil in the immediate sump area, rather than further investigate the area at this time. A separate work plan for the IRM is being submitted together with this work plan. The IRM will include soil confirmation sampling to assess residual soil impacts and a groundwater monitoring well (MW-4) will be installed in the excavation.

Comment: *<u>Site Groundwater</u>: The limited site groundwater elevation data produced to date and the analytical results from MW-2 show that site contaminants are migrating southward. Additional sampling is needed on the south border of the site to provide information regarding whether site contaminants are migrating off the sit property. Monitoring wells must be placed on the southern property line in locations that are truly downgradient from the sump. A minimum of two wells must be installed there. Since there is limited groundwater elevation data available, the Department cannot be certain that two wells will intercept groundwater truly downgradient of the sump. Additional wells may be needed. Groundwater must be analyzed for all site contaminants (metals and VOCs).*

Response: The groundwater flow direction determined by ENSR is southerly, consistent with local topography, which would indicate a south to southwesterly flow direction. To help confirm this, two additional wells (MW-5 and MW-6) are proposed to be located along the southern property line. Refer to the attached *Figure 1 – Site Plan* for additional information.

Comment: *<u>Site Soils</u>: TCE was found in SS-3. Additional soil sampling for VOCs is needed on the western edge of the pavement (near SS-4 and SS-5).*

Response: TCE was identified in sample SS-3A (0 to 2 feet) at a concentration of 0.31 mg/kg, below the unrestricted use SCO of 0.47 mg/kg. A groundwater sample from this area did not identify TCE present. One VOC was present in groundwater, chlorobenzene, but at a concentration below drinking water standards. Two additional VOC soil samples will be collected at locations SB-1 and SB-2 in the 0 to 2-foot interval and analyzed for VOCs.

Comment: *Deeper soil borings are needed at the western edge of the pavement to provide information regarding the vertical extent of metals contamination. In addition, deeper soil samples on the south side of the site, possibly from the monitoring well installation, must be analyzed for site contaminants (metals and VOCs).*

Response: No metals exceeded industrial SCOs in soil and none of the three metals that marginally exceeded the protection of groundwater SCOs were present in the groundwater exceeding State standards.[2] We feel these results do not indicate a need for further deep investigation of the area west of the pavement. We will collect a deeper soil sample from proposed well MW-5, and analyze it for VOCs and metals.

Comment: *If site background data are to be used to determine cleanup goals, a background location must be used that is further removed than SS-1 from the plating operations.*

Response: We do not anticipate using background concentrations.

Comment: *<u>General Comments</u>: A downgradient groundwater sample must be analyzed for total TAL VOCs/SVOCs/metals/PCBs. Surface soils that will remain on-site must be analyzed for the same analytes. This sampling may be done after the southern extent of site VOCs is determined.*

[2]DEC Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1, *Ambient Water Quality Standards and Guidance Values*, dated June 1998 and April 2002 Addendum.

Response: After wells MW-5 and MW-6 are installed, we will measure groundwater elevations and determine the groundwater flow direction before collecting a round of groundwater samples from all the wells (MW-1 through MW-6). We will analyze a groundwater sample from the well most directly downgradient of the sump for Target Analyte List (TAL) VOCs, semi-volatile organic compounds (SVOCs), metals and polychlorinated biphenyls (PCBs). The samples from the remainder of wells will be analyzed for VOCs only.

Comment: *Laboratory detections found in blanks must be included in report tables and flagged appropriately.*

Response: Agreed.

Comment: *Since chlorinated VOCs are present at the site, the potential for soil vapor migration and intrusion into existing and future structures on and around the property must be addressed.*

Response: The need vapor intrusion assessment will be deferred until after the IRM and this investigation work is completed.

Other issues discussed at a meeting with the DEC on October 26, 2010 included requirements to perform a Qualitative Human Health Exposure Assessment (HHEA) and a Fish and a Wildlife Resources Impact Analysis (FWIA), and the need to investigate deep groundwater impacts.

Response: For the HHEA, there will need to be surface soil samples collected (0 to 2 inches deep). We propose to collect four surface soil samples across the rear grass area and have them analyzed for TAL VOCs, SVOCs, metals and PCBs.

We propose to defer the FWIA until the extent of surface impacts is assessed.

We propose to defer the decision on the need for a deep groundwater investigation until after the IRM and soil boring for MW-5 are completed so subsurface hydrogeologic conditions can be better assessed.

4.0 FIELD ACTIVITIES PLAN

The supplemental investigation work will involve the following anticipated sequence of main tasks:

4.1 Soil Borings, Well Installation and Sampling

- Complete drilling logistics.
- Implement the site Health and Safety Plan (HASP) included in the approved ENSR Investigation Work Plan for the investigation activities.
- Complete the soil boring using a hollow-stem auger drill rig, complete borings SB-1 and SB-2 and install wells MW-5 and MW-6. Well MW-4 will be installed as part of the IRM.
- Sample the boring at a continuous interval using 2-inch diameter, 24-inch long split spoon samplers.
- Advance the depth of the boring into the anticipated clay soil deposit until field screening indicates no impacts or refusal.
- Visually inspect and log all samples. A standard boring log will be completed by the engineer/geologist, to include sample depths and recovery, soil unit descriptions and any groundwater observations.
- Collect routine observations and notes for all retrieved samples regarding the absence or presence of field indicators of potential contamination, to include:

- Presence of discolored or potentially stained conditions.
- Presence of obvious oily materials or sheens.
- Routine photoionization detection (PID) meter readings, described below.
- Presence of any fugitive odors.

- Field screen all recovered soil samples using a calibrated PID equipped with an 11.7 eV lamp. The data will provide general screening data for contaminants of concern (COCs). The proposed boring shall proceed completely through the unsaturated zone into the water table.

- Collect soil samples in accordance with the following guidelines:
  - If the soil profile did not show any field indication of contamination, a composite sample will be submitted for analysis, consisting of soil from a relatively thin horizon (maximum of 2 feet) immediately above the water table.
  - If field indication of potential contamination is evident in the boring, a grab sample shall be collected for analysis of the potentially contaminated soil.
  - A selected soil sample from the boring for well MW-5 will be submitted for analysis of VOCs and metals.

- Install a 2-inch diameter PVC monitoring well in each boring in accordance with standard operating procedures in the approved ENSR Investigation Work Plan.

- Measure groundwater elevations and determine which well is most directly downgradient of the sump. Collect a round of groundwater samples from the wells (MW-1 through MW-6) and submit to the project laboratory for analysis.

4.2 Surface Soil Sampling

Samples will be collected from 0 to 2 inches below grade from beneath any surface vegetation materials. If any distinct areas of potential surface contamination are encountered at other locations of the site during the investigation activities, a sample will be collected. The grass area west of the buildings will be targeted. A sample (SS-10) from near SS-1 will also be collected.

Samples for analytical work will be submitted to the laboratory for analysis in accordance with *Table 1 – Sample Rationale, Table 2 – Analytical Plan and Table 3 – Analytical Methods*. The work will be performed in accordance with Standard Operating Procedures outlined in the approved ENSR Investigation Work Plan. The project Quality Assurance/Quality Control (QA/QC) Plan will also be as outlined in the approved ENSR Investigation Work Plan.

5.0 PROJECT ORGANIZATION

The following Plumley Engineering and contract personnel are involved with the QA/QC aspects of the project.

Project Manager/Engineer .....Dale R. Vollmer, P.E.

Project Geologist .....Derk Hudson, Geologist

Project Laboratory (Primary) .....Environmental Laboratory Services, Inc.

Quality Assurance Officer .....Judy V. Harry, Data Validation Services

Field Analyst: PID Screening.....Derk Hudson, Geologist

Field Sampling: Soil Borings, Surface Soils and Sediment.....Derk Hudson, Geologist

Field Sampling: Groundwater Sampling.....Matthew Martin, Environmental Scientist

6.0 SAMPLE ANALYSIS

The primary laboratory will be Pace Analytical. The laboratory is approved by the New York State Department of Health (DOH) under the Environmental Laboratory Approved Program (ELAP).

Approximately 10% of the proposed sampling is to be performed using the Category B deliverables. The selection of the Category B samples will be coordinated with the DEC. The remainder of the sampling will done using Category A deliverables. No field screening analyses, other than PID measurements, are proposed. Refer to Tables 1, 2 and 3 for specific test methods and deliverables.

All analytical data will be submitted to an independent data validator for review. The data validator will prepare a Data Usability Report (DUSR) summarizing their findings in accordance with DEC guidelines.

7.0 HEALTH AND SAFETY PLAN

The work will be performed in accordance with HASP outlined in the approved ENSR Investigation Work Plan. A copy is included in Appendix A.

8.0 COMMUNITY AIR MONITORING PROGRAM

A CAMP will be implemented during intrusive investigation activities, including dust and VOC monitoring. A copy of the CAMP is included in Appendix B.

9.0 PROJECT REPORT

At the completion of the scope of work described herein, a data report summarizing the investigation and the IRM will be submitted to the DEC for review. The report will include:

- Soil boring logs and well construction diagrams.

- Summary tables of analytical data (including IRM confirmation sampling).

- Qualitative human health exposure assessment tables.

- Recommendations with regard to items deferred (vapor intrusion evaluation, FWIA and deep groundwater investigation).

- Recommendations regarding the need for additional investigation, monitoring and/or remediation, as appropriate.

This information will be used for discussions with the DEC regarding the need to perform the deferred work. Once all required work is completed, a full Remedial Investigation Report will be prepared summarizing all of the investigation findings.

TABLES

SITE NO. V-00264-7
Town of Salina, Onondaga County, New York

TABLE 1 - SAMPLE RATIONALE

Location	Site Location	Purpose	Rationale	Soil Analyses	Groundwater Analyses
Monitoring Wells	Downgradient Property Line	Groundwater Flow, Quality, Deeper Soil Impacts	DEC Request	VOCs, Metals	*VOCs, SVOCs, Metals, PCBs
Subsurface Soil Samples	Western Edge of Parking Lot	VOC Soil Impacts in 0-2 foot zone	DEC Request	VOCs	---
Surface Soil Samples (4)	Western Grass Area	Human Health Exposure Assessment	VOCs Do Not Persist in Surface Soils Due to Evaporation	SVOCs, Metals, PCBs	---
Sump IRM	Source Area Pre-Excavation	Disposal Characterization	Required for disposal arrangements	Per Landfill Requirements	---
Sump IRM	Soil Pile	IRM Effectiveness	Residual Soil Impacts	VOCs, SVOCs, Metals, PCBs	---
MW-4	Source Area Post-Excavation	IRM Effectiveness	Residual Groundwater Impacts	---	VOCs, SVOCs, Metals, PCBs

* VOCs only, except well downgradient of the sump.

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Town of Salina, Onondaga County, New York

TABLE 2 - ANALYTICAL PLAN

Sample Matrix	Laboratory Analysis	Number of Investigative Samples	Number of IRM Samples	Number of Field QC Samples		MS/MSD Samples (c)	Number of LD Samples (d)	Total Samples
				Dups (a)	Blanks (b)			
Subsurface Soil	VOCs	3	5		1	1		10
	SVOCs	1	5		1	1		8
	Metals (e)	1	5					6
	Cyanide	1	5					6
	PCBs	1	5					6
Surface Soil	VOCs	0	0					0
	SVOCs	5	0					5
	Metals (e)	5	0		1			6
	Cyanide	5	0		1			6
	PCBs	5	0		1			6
Water(f)	VOCs	5	1	1	1	1		9
	SVOCs	1	1	1	1	1		5
	Metals (e)	1	1					2
	Cyanide	1	1					2
	PCBs	1	1					2
	Hexavalent Chromium	1	1					2

(a) Field duplicates 1 per 20 environmental samples.
(b) Field blanks 1 per 10 environmental samples.
(c) MS/MSD - Matrix Spikes and Matrix Spike Duplications will be collected for organic analyses at 1 per 20 environmental samples.
(d) LD - Laboratory duplicates for inorganics at 1 per 20 environmental samples (included in Cat B deliv.)
(e) Metals - Target Analyte List (Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Th, Va, and Zn)
(f) Groundwater sample from MW-4 will be Cat. B Deliverable, remainder Cat. A.

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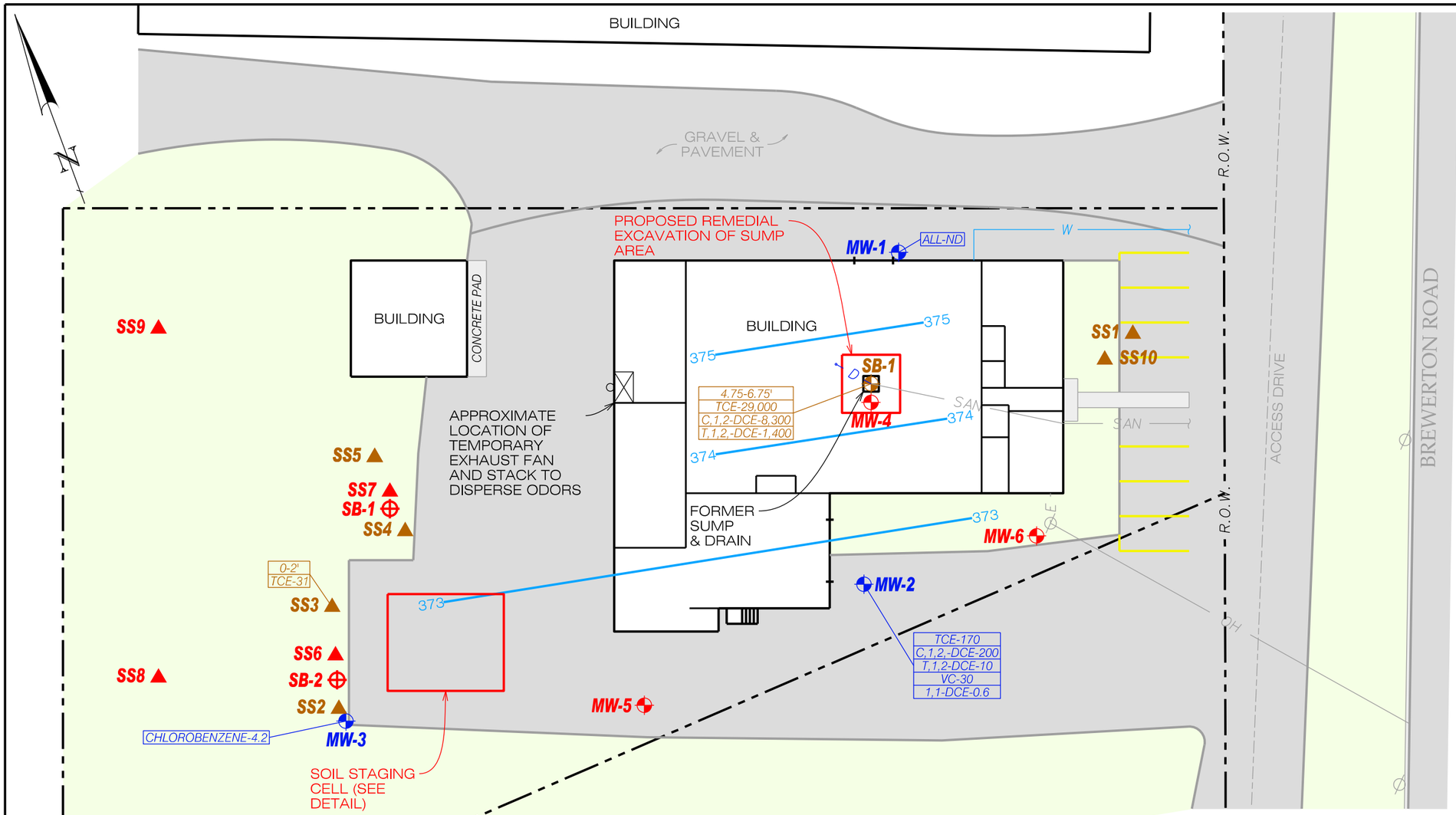
Town of Salina, Onondaga County, New York

TABLE 3 - ANALYTICAL METHODS

Parameter	Analytical Method	
	Solid	**Liquid**
VOCs	8260	8260
SVOCs	8270 B/N	8270 B/N
Metals (e)	6010a/6020	6010a/6020
Hg	7471	7471
Cyanide	9010B	9010B
PCBs	8020	8020
Hexavalent Chromium	NA	3060A

FIGURES



Key

- R.O.W. — Right of Way
- Property Line
- Utility Pole
- E — Underground Electric
- OH — Overhead Utility
- D — Drainage LIne
- SAN — Sanitary Sewer Line
- W — Water Service Line
- MW-1 — Monitoring Well (December 2004)
- SB-1 — Soil Boring (December 2004)
- MW-4 — Proposed Monitoring Well
- SS1 — Surface Soil Sample (December 2004)
- SS8 — Proposed Surface Soil Sample (0-2")
- SB-2 — Proposed Soil Boring (0-2')
- 373 — Groundwater Contour (Based on 12/15/04 Data)
- DEPTH / VOC (ppb) — VOC Soil Analytical Results (12/04)
- VOC (PPB) — VOC Groundwater Analytical Results (12/04)

Basemap References:

1. *"Groundwater Flow Map, Former National Plating Facility, 1501 Brewerton Road, Syracuse, New York" Prepared by: ENSR International; Dated: February 10, 2005; Project No.: 10160-004.*

2. *"National Plating, Inc., 1501 Brewerton Road, Syracuse, New York, Site Layout" Dated: May 20, 1999.*

Plan View

1" = 30' SCALE — 15 0 15 30 FEET

DEC SITE: VCP00265-7

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REVISIONS:	DATE:	BY:
A ADDITIONAL SAMPLING LOCATIONS.	03/04/11	DRV

PROJECT: FORMER NATIONAL PLATING

DWG. TITLE: SITE PLAN

CLIENT: D.H.J. REALTY CORP.

LOCATION: TOWN OF SALINA, ONONDAGA COUNTY, NEW YORK

PROJECT No.:	2010150
FILE NAME.:	EV01P
SCALE:	AS NOTED
DATE:	NOV. 2010
ENG'D BY:	DRV
DRAWN BY:	JMD
CHECKED BY:	DRV

SHEET NO.: FIGURE 1

APPENDIX A

HEALTH AND SAFETY PLAN
(by ENSR Internationl)

HEALTH AND SAFETY PLAN

Focused Site Investigation
Former National Plating Co. Inc. Site
1501 Brewerton Road
Syracuse, New York

Approved by: _____ Date: _____
ENSR Regional Health and Safety Manager

Approved by: _____ Date: _____
ENSR Project Manager

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1.0 INTRODUCTION

1.1 HASP Applicability

This site-specific Health and Safety Plan (HASP) has been developed by ENSR Corporation (ENSR). It establishes the health and safety procedures to minimize any potential risk to ENSR and contractor personnel implementing the focused site investigation at the Former National Plating Co. Inc. facility located in Syracuse, New York. ENSR is performing this work on behalf of Hancock & Estabrook.

The provisions of this plan apply to all ENSR personnel and ENSR subcontractor personnel who may potentially be exposed to safety and/or health hazards related to activities described in Section 3.0 of this document.

This HASP has been written to comply with the requirements of the Occupational Safety and Health Administration (OSHA) Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120). All activities covered by this HASP must be conducted in complete compliance with this HASP and with all applicable federal, state, and local health and safety regulations. Personnel covered by this HASP who cannot or will not comply will be excluded from site activities.

This plan will be distributed to each employee involved with the investigations being conducted at the former manufacturing facility. Each employee must sign a copy of the attached health and safety plan receipt and acceptance form (see Attachment A).

This HASP only pertains to the tasks that are listed in Section 3.0. A task specific HASP or addenda to this HASP will be developed at a later date for any other subsequent investigative/remedial activities at the facility.

1.2 Organization/Responsibilities

The implementation of health and safety at this project location will be the shared responsibility of the ENSR Project Manager (PM), the ENSR Regional Health and Safety Manager (RHSM), the ENSR Project Site Safety Officer (SSO) and all other ENSR and contractor personnel.

1.2.1 ENSR Project Manager

The ENSR PM (Karl Reimer) is the individual who has the primary responsibility for ensuring the overall health and safety of this project. As such, the PM is responsible for ensuring that the requirements of this HASP are implemented. Some of the PM's specific responsibilities include:

- Assuring that all personnel to whom this HASP applies have received a copy of it;
- Providing the RHSM with updated information regarding environmental conditions at the site and the scope of site work;
- Providing adequate authority and resources to the on-site SSO to allow for the successful implementation of all necessary safety procedures;
- Supporting the decisions made by the SSO and RHSM;
- Maintaining regular communications with the SSO and, if necessary, the RHSM; and,
- Coordinating the activities of all subcontractors and ensuring that they are aware of the pertinent health and safety requirements for this project.

1.2.2 ENSR Regional Health and Safety Manager

The ENSR RHSM (Kathleen Harvey) is the individual responsible for the preparation, interpretation and modification of this HASP. Modifications to this HASP which may result in less stringent precautions cannot be undertaken by the PM or the SSO without the approval of the RHSM. Specific duties of the RHSM include:

- Writing, approving and amending the HASP for this project;
- Advising the PM and SSO on matters relating to health and safety for this program;
- Recommending appropriate personal protective equipment (PPE) and air monitoring instrumentation to protect personnel from potential site hazards;
- Conducting accident investigations in conjunction with the SSO; and,
- Maintaining regular contact with the PM and SSO to evaluate site conditions and new information which might require modifications to the HASP.

1.2.3 ENSR Site Safety Officer

All ENSR field technicians are responsible for implementing the safety requirements specified in this HASP. However, one field technician will serve as the SSO. The SSO will be appointed by the PM and will be on-site during all activities covered by this HASP. The SSO is responsible for enforcing the requirements of this HASP once work begins. The SSO has the authority to immediately correct all situations where noncompliance with this HASP is noted and to stop work in cases where an immediate danger is perceived. Some of the SSO's specific responsibilities include:

- Assuring that all personnel to whom this HASP applies have submitted a completed copy of the HASP receipt and acceptance form;
- Assuring that all personnel to whom this HASP applies have attended a pre-entry briefing prior to entering an exclusion zone;
- Maintaining a high level of health and safety consciousness among employees at the work site;
- Procuring and distributing the PPE needed by ENSR employees for this project;
- Verifying that all PPE and health and safety equipment used by ENSR is in good working order;
- Setting up and maintaining the work zones and assuring proper decontamination of all site personnel and equipment;
- Notifying the PM and RHSM of all noncompliance situations and stopping work in the event that an immediate danger situation is perceived;
- Monitoring and controlling the safety performance of all personnel within the established work areas to ensure that required safety and health procedures are being followed;
- Conducting accident/incident investigations and preparing accident/incident investigation reports;
- Conducting the pre-entry briefing as required by Section 10.3 of the HASP; and,
- Initiating emergency response procedures in accordance with Section 11.0 of this HASP.

1.2.4 ENSR Field Personnel and Covered Contractor Personnel

All ENSR field personnel and contractor personnel covered by this HASP are responsible for following the health and safety procedures specified in this HASP and for performing their work in a safe and responsible manner. Some of the specific responsibilities of the field personnel are as follows:

- Reading the HASP in its entirety prior to the start of on-site work;
- Submitting a completed HASP Acceptance Form and documentation of medical surveillance and training to the ENSR PM prior to the start of work;
- Attending the required pre-entry briefing prior to beginning on-site work;
- Bringing forth any questions or concerns regarding the content of the HASP to the PM or the SSO prior to the start of work;
- Reporting all accidents, injuries and illnesses, regardless of their severity, to the ENSR SSO; and,
- Complying with the requirements of this HASP and the requests of the SSO.

1.2.5 Contractors

In addition to other requirements referenced in this HASP, all contractors are required to:

- Provide appropriate PPE for their employees;
- Ensure, via daily inspections, that their equipment is maintained in good working condition;
- Operate their equipment in a safe manner; and
- Appoint an on-site safety coordinator to interface with the ENSR SSO.

1.3 Modification of the HASP

The procedures in this HASP have been developed based on a site visit and a review of historical information regarding site operations and previous investigations. Should additional information become available regarding potential on-site hazards, it may be necessary to modify this HASP. All proposed modifications to this HASP must be reviewed and approved by the ENSR RHSM before such modifications are implemented.

Any significant modifications must be incorporated into the written document as addenda and the HASP must be reissued. The ENSR PM will ensure that all personnel covered by this HASP receive copies of all issued addenda. Sign-off forms will accompany each addendum and must be signed by all personnel covered by the addendum. Sign-off forms will be submitted to the ENSR PM. The HASP addenda should be distributed during the daily safety meeting so that they can be reviewed and discussed. Attendance forms will be collected during the meeting.

2.0 SITE DESCRIPTION AND HISTORY

2.1 Site Description

The Former National Plating Co. Inc. facility is located at 1501 Brewerton Road in Syracuse, New York.

The site was in use from the early 1950s to 2002 as a metal plating facility, which specialized in decorative and industrial metal finishing. Previous sampling performed by O'Brien & Gere (1987) detected elevated levels of cadmium, chromium, cyanide, nickel and zinc in surficial soil samples collected at the site. The concentrations of these inorganic constituents exceed current soil cleanup criteria, and suggest the potential for the plating operations to have impacted the condition of the property.

2.2 Areas to be Investigated

The volunteers have entered into the New York State Voluntary Cleanup Program (VCP). Based on a review of historical information and a site visit, there are two general areas of the site where investigations will be focused, including:

- Concrete Sump Pit
- Western Edge of Pavement

In addition, monitoring wells will be installed at the site, one upgradient and two downgradient of the facility.

2.2.1 Concrete Sump Pit

Process waste waters generated in the operations area were conveyed through six 1½ -inch PVC pipes to a centrally located concrete sump pit which is approximately six feet deep. Process wastewater had been discharged to the sump since at least 1970. Until the late 1980s, the sump was unlined and discharges from the sump were conveyed to the County sanitary sewer without treatment.

A polypropylene liner and wastewater treatment system were installed in 1984. Wastewater treatment consisted of batch treatment (precipitation) and pH adjustment of rinse waters prior to discharge to the municipal sanitary sewer system.

2.2.2 Western Edge of Pavement

There were four potential sources of impacts to soils along the western edge of the pavement.

- There are two floor drains in the building, one in the former storage room and one in the former polishing room. Materials utilized in the plating process and kept in the storage room did not have secondary containment. The floor drains discharged to the western exterior perimeter of the building.
- Baghouse wastes (approximately two 55-gallon drums per year) from the polishing room ventilation system were disposed in the general office trash dumpster located along the western edge of the pavement.
- Used plating tanks were reportedly stored along the western edge of the pavement in an approximately 30-foot by 30-foot area. These tanks were acquired in the late 1970's and were stored in the area for approximately one to two years.
- Blowdown from boiler discharge is assumed to migrate with over land flow to the western edge of the asphalt.

3.0 SCOPE OF WORK

3.1 Project Overview

The purpose of the proposed focused site investigation is to characterize conditions at the site.

3.2 Field Investigations

Specific field tasks being implemented to meet the project objective include the following:

- Advance a soil boring through the sump pit using a direct-push drill rig and collect a soil sample and groundwater sample, if encountered, for subsequent laboratory analyses.
- Install groundwater monitoring wells downgradient and upgradient of the facility, using hollow-stem auger drilling techniques;
- Develop each well prior to sampling;
- Measure static water levels in each well prior to sampling;
- Collect groundwater samples from each well, using low-flow sampling techniques, for subsequent laboratory analyses; and,
- Collect surface and subsurface soil samples (0-2 inches below grade and 2 feet – 3 feet below grade) from the four potential sources of impacts on the western edge of the pavement using either a Geoprobe™ or hollow stem auger and splitspoon method for sampling for subsequent laboratory analyses.

4.0 CHEMICAL HAZARD ASSESSMENT AND CONTROLS

4.1 Chemical Hazards

The site has been used for metal plating operations since approximately 1950. Metal plating processes which historically occurred at the facility are described as decorative and industrial metal finishing, including electroplating, electroless plating, buffing, and polishing of various metals. Detailed information pertaining to the specific processes used at the site is not currently available. However, processes used during metal fabrication can include metal shaping, surface preparation, surface finishing and cleaning. Surface preparation can include solvent degreasing and emulsion, alkaline and acid cleaning. Surface finishing can include anodizing, chemical conversion coating, electroplating, plating and painting.

Limited sampling performed by O'Brien & Gere (1987) detected elevated levels of cadmium, chromium, cyanide, nickel and zinc in surficial soil samples collected at the site. The concentrations of these inorganic constituents exceed current soil cleanup criteria, and suggest the potential for the plating operations to have impacted the condition of the property.

Based on the areas where sampling is proposed, the primary constituents of concern include metals and cyanide. Soils and groundwater may also have altered pH due to the use of both acidic and alkaline solutions during metal preparation and finishing as well as wastewater pre-treatment.

4.1.1 Metals

A variety of metals have been previously detected in surface soils collected by O'Brien & Gere including cadmium, chromium, nickel and zinc.

4.1.1.1 Cadmium

Cadmium can cause local skin and eye irritation. The early symptoms of overexposure, via inhalation of fumes or dusts, may include mild irritation of the upper respiratory tract, a sensation of constriction of the throat, a metallic taste and/or a cough. A period of 1-10 hours may precede the onset of rapidly progressing shortness of breath, chest pain and flu-like symptoms. Repeated overexposure to cadmium may result in kidney dysfunction/damage and an increased risk of cancer of the lung and prostate. The OSHA Permissible Exposure Limit (PEL) for cadmium is 5 ug/m3, as an 8-hour time-weighted average (TWA).

4.1.1.2 Chromium

Hexavalent chromium compounds, upon contact with the skin can cause ulceration and possibly an allergic reaction. Inhalation of hexavalent chromium dusts is irritating and corrosive to the mucous membranes of the upper respiratory tract. Chrome ulcers and chrome dermatitis are common occupational health effects from prolonged and repeated exposure to hexavalent

chromium compounds. Acute exposures to hexavalent chromium dusts may cause coughing or wheezing, pain on deep inspiration, tearing, inflammation of the conjunctiva, nasal itch and soreness or ulceration of the nasal septum. Repeated and chronic overexposures to certain forms of hexavalent chromium have been found to cause increased respiratory cancer among workers. Trivalent chromium compounds (chromic oxide) are generally considered to be of lower toxicity, although dermatitis may occur as a result of direct handling. The OSHA PEL for hexavalent chromium compounds is 0.1 mg/m3, as an 8-hr TWA.

4.1.1.3 Nickel

Skin sensitization is the most frequently seen toxic reaction to nickel and nickel compounds. This often results in chronic eczema known as "nickel itch". Nickel and its compounds are also irritants to the conjunctiva of the eye and mucous membrane of the upper respiratory tract. Studies have shown that chronic overexposures to the dusts of nickel and nickel salts can produce cancers of the lung and nasal passages. The OSHA PEL is 1 mg/m3, as an 8-hr TWA
{PRIVATE }

4.1.1.4 Zinc

Zinc metal is not considered to be hazardous. It is zinc oxide, which is considered hazardous if inhaled but this not a contaminant of concern for this program.

4.1.2 Cyanide

During electroplating, cyanide salts are used. Typical salts include potassium and sodium cyanide. Cyanide salts are granular solids that exhibit a faint almond-like odor. The primary toxic effect associated with overexposure to cyanide salts is their ability to combine in the tissues with enzymes associated with cellular oxidation. It renders oxygen unavailable to the tissues. The presence of cherry-red venous blood in cases of cyanide poisoning is due to the inability of the tissues to remove oxygen from the blood (i.e, cyanosis). The OSHA PEL for cyanide salts is 5 mg/m3, as an 8-hr TWA.

4.1.3 High or Low pH

Soils and/or groundwater may be acidic or alkaline due to the use of both types of materials, typically in liquid baths, during the metal preparation and finishing processes, as well as waste water pre-treatment. pH altered materials can cause irritation of the skin, especially if the skin is moist as well as irritation of the eyes, nose, throat and respiratory tract if the vapors or dusts of such materials are inhaled.

4.1.4 Exhaust Gases during Interior Drilling

The sump is located within the building. As such, the build up of exhaust gases from gasoline-powered internal combustion engines is a concern during the installation of the soil boring in this interior location. Carbon monoxide is the most toxic of the exhaust gases. Carbon monoxide is an asphyxiant in that it prevents hemoglobin from binding with oxygen. Symptoms of acute carbon monoxide poisoning include intense headache, dizziness, nausea, and collapse. Initially the victim is pale; later the skin and mucous membranes may turn cherry-red in color. The OSHA PEL for carbon monoxide is 35 ppm, as an 8-hour TWA with a ceiling value of 200 ppm. The American Conference of Governmental Industrial Hygienists (ACGIH) recommends a threshold limit value (TLV) of 25 ppm, as an 8-hr TWA.

{PRIVATE }

4.2 Chemical Exposure Potential

The contaminants of concern are not volatile in nature. Therefore, it is the potential for inhaling dusts that is a concern. However, the use of direct-push technology to collect subsurface soil samples and the use of hand tools to collect surface soil samples will greatly minimize the potential for the generation of dusts. Dusts may be generated during conventional auger drilling. However, the most likely route of potential exposure to the contaminants of concern will be via direct dermal contact with environmental media during sampling activities. There is also the potential for employees to transport contaminated dusts home on their shoes or clothing if contamination is surficial in nature.

4.2.1 Chemical Exposure Control

The following chemical exposure control measures will be implemented during the proposed investigations:

- To avoid direct dermal contact with potentially contaminated media, as well as the potential for contamination transport, protective clothing, as described in Section 7.1, will be required during the investigative program.
- To determine if sustained dust levels exceed the established action level during well installation, a portable dust monitor will be used, as defined in Section 6.0. To reduce the potential for dust generation during the installation of the monitoring wells, a light mist of water can be applied over the boreholes during drilling.
- If the above mentioned measures are unsuccessful in controlling the dust, work will be suspended until additional controls can be implemented, including the use of respiratory protection.
- If possible, electrical coring devices and an electric-rig will be used to advance the soil boring near the concrete sump. If this piece of equipment is not available and a drilling rig with an internal combustion engine is used, a carbon monoxide meter must be used to

monitor the build up of exhaust gas in the building. The unit will be set to alarm at 25 ppm. If the alarm sounds, work will cease and all employees will leave the building. Even if the building is well-ventilated and the exhaust gas is ducted to the outside, a CO meter is still required.

- Although highly unlikely, exposure to all of the contaminants of concern may occur via ingestion (hand-to-mouth transfer). The decontamination procedures described in Section 9.0 address personal hygiene issues that will limit the potential for contaminant ingestion.
- To prevent deposition of potentially contaminated dust on stored material within the building, plastic sheeting will be used to cover the material. The sheeting will be removed and disposed of as PPE at the completion of the investigation.

5.0 PHYSICAL HAZARDS AND CONTROLS

5.1 Working Inside the Facility

The facility is currently used for the storage of cleaning supplies (mainly soap, hangers, spot remover, etc.). None of these materials are stored in drums. Further, employees only go to the facility as needed; no employees work at the facility on a full time basis. So it is unlikely that the proposed interior drilling will pose a problem to the current site occupants. However, ENSR has arranged to have the current occupant clear an area, if necessary, around the sump so that we have clear and unrestricted access to the sump during the proposed drilling.

5.2 Utility Hazards

5.2.1 Underground Utility Hazards

New York law requires that, at least 48 hours prior to initiation of any subsurface work, a utility clearance be performed at the site. The drilling contractor will contact DIG SAFELY NEW YORK (1-800-962-7962) to request a mark-out of underground utilities in the proposed boring/monitoring well locations. Work will not begin until the required utility clearances have been performed. {PRIVATE }Public utility clearance organizations typically do not mark-out underground utility lines that are located on private property. As such, the contractor must exercise due diligence and try to identify the location of any private utilities on the property being investigated. The contractor can fulfill this requirement in several ways, including:

- obtaining as-built drawings for the areas being investigated from the property owner;
- visually reviewing each proposed drilling location with the property owner or knowledgeable site representative;
- performing a geophysical survey to locate utilities or hiring a private line locating firm to determine the location of utility lines that are present at the property;
- identifying a no- drill zone; or
- hand digging in the proposed drilling locations if insufficient data is available to accurately determine the location of the utility lines.

5.2.2 Overhead Utilities

Be particularly aware of overhead power lines in the work area. Any vehicle or mechanical equipment capable of having parts of its structure elevated (drill rig, crane etc.) near energized overhead lines

shall be operated so that a clearance of at least 10 feet is maintained. If the voltage is higher than 50kV, the clearance shall be increased 4 inches for every 10kV over that voltage.

5.3 Drilling Hazards

5.3.1 Auger Drilling

Use of a drill rig to install monitoring wells will require all personnel in the vicinity of the operating rig to wear steel-toed boots, hardhats, hearing protection and safety eyewear. Personnel shall not remain in the vicinity of operating equipment unless it is required for their work responsibilities. Additionally, the following safety requirements must be adhered to:

- All drill rigs and other machinery with exposed moving parts must be equipped with an operational emergency stop device. Drillers and geologists must be aware of the location of this device. This device must be tested prior to job initiation and periodically thereafter. The driller and helper shall not simultaneously handle augers unless there is a standby person to activate the emergency stop.

- The driller must never leave the controls while the tools are rotating unless all personnel are kept clear of rotating equipment.

- A long-handled shovel or equivalent must be used to clear drill cuttings away from the hole and from rotating tools. Hands and/or feet are not to be used for this purpose.

- A remote sampling device must be used to sample drill cuttings if the tools are rotating or if the tools are readily capable of rotating. Samplers must not reach into or near the rotating equipment. If personnel must work near any tools which could rotate, the driller must shut down the rig prior to initiating such work.

- Drillers, helpers and geologists must secure all loose clothing when in the vicinity of drilling operations.

- Only equipment that has been approved by the manufacturer may be used in conjunction with site equipment and specifically to attach sections of drilling tools together. Pins that protrude excessively from augers shall not be allowed

- No person shall climb the drill mast while tools are rotating.

- No person shall climb the drill mast without the use of ANSI-approved fall protection (approved belts, lanyards and a fall protection slide rail) or portable ladder which meets the requirements of OSHA standards.

5.3.2 Geoprobe Drilling

Use of the Geoprobe System to advance a soil boring near the sump will require all personnel in the vicinity of the operating unit to wear steel-toed boots, hardhats, hearing protection and safety eyewear. Personnel shall not remain in the vicinity of operating equipment unless it is required for their work responsibilities. Additionally, the following safety requirements must be adhered to:

- A remote vehicle ignition is located on the control panel of the Geoprobe unit. This allows the operator to start and stop the vehicle engine from the rear. This device must be tested prior to job initiation and periodically thereafter. All employees should be aware of how to access and operate the rear ignition.

- The driller must never leave the controls while the probe is being driven.

- Drillers, helpers and geologists must secure all loose clothing when in the vicinity of drilling operations.

- The Geoprobe vehicle shall not be moved any distance with the probe in the extended position. Check for clearance at roof or the vehicle before folding the Geoprobe out of the carrier vehicle.

- Be sure the parking brake is set before probing.

- Never allow the derrick foot to be lifted more than 6" off of the ground surface.

- Deactivate hydraulics when adding or removing probe rods, anvils or any tool in the hammer.

- Verify that all threaded parts are completely threaded together before probing.

5.4 Cuts and Lacerations

Employees are at an increased risk of cutting themselves with the knives used to cut tubing that is used for groundwater sampling. Similarly, the acetate soil liners used for geoprobe soil sampling must also be cut open to collect the sample. If a tube cutter is not used for cutting tubing or the acetate sleeve and a knife or blade must be used, follow the safety precautions listed below:{PRIVATE }

- Keep your free hand out of the way and secure your work if cutting through thick material

- Use only sharp blades; dull blades require more force which results in less knife control
- Pull the knife toward you; pulling motions are easier to manage
- Don't put your knife in your pocket
- Use a self-retracting blade or a linoleum knife
- Wear leather or Kevlar™ gloves when using knives or blades.

5.5 Noise Exposure

The use of the drilling rig will generate noise levels that will require the use of hearing protection in the immediate vicinity. Appropriate earmuffs or earplugs (i.e., with an NRR greater than 25 dB) should be worn to prevent overexposure. The general rule of thumb is that if you have to raise your voice to be understood by someone who is standing 3 to 5 feet away from you, the noise levels are likely to be above 85 dB and therefore require the use of hearing protection.

5.6 Back Safety

Using the proper techniques to lift and move heavy pieces of equipment is important to reduce the potential for back injury. The following precautions should be implemented when lifting or moving heavy objects:

- Use mechanical devices to move objects that are too heavy to be moved manually
- If mechanical devices are not available, ask another person to assist you.
- Bend at the knees, not the waist. Let your legs do the lifting.
- Do not twist while lifting
- Bring the load as close to you as possible before lifting
- Be sure the path you are taking while carrying a heavy object is free of obstructions and slip, trip and fall hazards.

5.7 Electrical Safety

If using portable tools that are electrically powered, follow the safety precautions listed below:{PRIVATE }

- Check to see that electrical outlets used to supply power during field operations is of the three wire grounding type.

- Extension cords used for field operations should be of the three wire grounding type and designed for hard or extra-hard usage. This type of cord uses insulated wires within an inner insulated sleeve and will be marked S, ST, STO, SJ, SJO or SJTO.

- NEVER remove the ground plug blade to accommodate ungrounded outlets.

- Do not use extension cords as a substitute for fixed or permanent wiring. Do not run extension cords through openings in walls, ceilings or floors.

- Protect the cord from becoming damaged if the cord is run through doorways, windows or across pinch points.

- Examine extension and equipment cords and plugs prior to each use. Damaged cords with frayed insulation or exposed wiring and damaged plugs with missing ground blades MUST BE REMOVED from service immediately.

- All portable or temporary wiring which is used outdoors or in other potentially wet or damp locations must be connected to a circuit that is protected by a ground fault circuit interrupter (GFCI). GFCI's are available as permanently installed outlets, as plug-in adapters and as extension cord outlet boxes. DO NOT CONTINUE TO USE A PIECE OF EQUIPMENT OR EXTENSION CORD THAT CAUSES A GFCI TO TRIP.

- When working in flammable atmospheres, be sure that the electrical equipment being used is approved for use in Class I, Division I atmospheres.

- Do not touch a victim who is still in contact with current. Separate the victim from the source using a dry, nonmetallic item such as a broomstick or cardboard box. Be sure your hands are dry and you are standing on a dry surface. Turn off the main electrical power switch and then begin rescue efforts.

5.8 Thermal Stress

5.8.1 Heat Stress

Types of Heat Stress

Heat related problems include **heat rash, fainting, heat cramps, heat exhaustion and heat stroke. Heat rash** can occur when sweat isn't allowed to evaporate, leaving the skin wet most of the time and making it subject to irritation. **Fainting** may occur when blood pools to lower parts of the body and as a result, does not return to the heart to be pumped to the brain. Heat related fainting often occurs during activities that require standing erect and immobile in the heat for long periods of time. **Heat cramps** are painful spasms of the muscles due to excessive salt loss associated with profuse sweating. **Heat exhaustion** results from the loss of large amounts of fluid and excessive loss of salt from profuse sweating. The skin will be clammy and moist and the affected individual may exhibit giddiness, nausea and headache.

Heat stroke occurs when the body's temperature regulatory system has failed. The skin is hot, dry, red and spotted. The affected person may be mentally confused and delirious. Convulsions could occur. EARLY RECOGNITION AND TREATMENT OF HEAT STROKE ARE THE ONLY MEANS OF PREVENTING BRAIN DAMAGE OR DEATH. A person exhibiting signs of heat stroke should be removed from the work area to a shaded area. The person should be soaked with water to promote evaporation. Fan the person's body to increase cooling.

Early Symptoms of Heat-Related Health Problems:

- decline in task performance
- incoordination
- decline in alertness
- unsteady walk
- excessive fatigue
- reduced vigilance
- muscle cramps
- dizziness

Susceptibility to Heat Stress Increases due to:

- lack of physical fitness
- lack of acclimation
- increased age
- dehydration
- obesity
- drug or alcohol use
- sunburn
- infection

People unaccustomed to heat are particularly susceptible to heat fatigue. First timers in PPE need to gradually adjust to the heat.

The Effect of Personal Protective Equipment

Sweating normally cools the body as moisture is removed from the skin by evaporation. However, the wearing of certain personal protective equipment (PPE), particularly chemical protective coveralls (e.g., Tyvek), reduces the body's ability to evaporate sweat and thereby regulate heat buildup. The body's efforts to maintain an acceptable temperature can therefore become significantly impaired by the wearing of PPE.

Measures to Avoid Heat Stress:

The following guidelines should be adhered to when working in hot environments:

- Establish work-rest cycles (short and frequent are more beneficial than long and seldom).
- Identify a shaded, cool rest area.
- Rotate personnel, alternative job functions.
- Water intake should be equal to the sweat produced. Most workers exposed to hot conditions drink less fluids than needed because of an insufficient thirst. DO NOT DEPEND ON THIRST TO SIGNAL WHEN AND HOW MUCH TO DRINK. For an 8-hour workday, 50 ounces of fluids should be drunk.
- Eat lightly salted foods or drink salted drinks such as Gatorade to replace lost salt.
- Save most strenuous tasks for non-peak heat hours such as the early morning or at night.
- Avoid alcohol during prolonged periods of heat. Alcohol will cause additional dehydration.
- Avoid double shifts and/or overtime.

The implementation and enforcement of the above mentioned measures will be the joint responsibility of the project manager, on-site field coordinator, and health and safety officer. Potable water and fruit juices should be made available each day for the field team.

Heat Stress Monitoring Techniques

Site personnel should regularly monitor their heart rate as an indicator of heat strain by the following method: Check radial pulse rates by using fore-and middle fingers and applying light pressure to the pulse in the wrist for one minute at the beginning of each rest cycle. If the pulse rate exceeds 110 beat/minute, shorten the next work cycle by one-third and keep the rest period the same. If, after the next rest period, the pulse rate still exceeds 110 beats/minute, shorten the work cycle by one-third.

5.8.2 Cold Stress

Types of Cold Stress

Cold injury is classified as either localized, as in frostbite, frostnip or chilblain; or generalized, as in hypothermia. The main factors contributing to cold injury are exposure to humidity and high winds, contact with wetness and inadequate clothing.

The likelihood of developing frostbite occurs when the face or extremities are exposed to a cold wind in addition to cold temperatures. The freezing point of the skin is about 30° F. The fluids around the cells of the body tissue freeze, causing the skin to turn white. This freezing is due to exposure to extremely low temperatures. As wind velocity increases, heat loss is greater and frostbite will occur more rapidly.

Symptoms of Cold Stress

The first symptom of frostbite is usually an uncomfortable sensation of coldness, followed by numbness. There may be a tingling, stinging or aching feeling in the effected area. The most vulnerable parts of the body are the nose, cheeks, ears, fingers and toes.

Symptoms of hypothermia, a condition of abnormally low body temperature, include uncontrollable shivering and sensations of cold. The heartbeat slows and may become irregular, the pulse weakens and the blood pressure changes. Pain in the extremities and severe shivering can be the first warning of dangerous exposure to cold.

Maximum severe shivering develops when the body temperature has fallen to 95° F. This must be taken as a sign of danger and exposure to cold must be immediately terminated. Productive physical and mental work is limited when severe shivering occurs.

Methods to Prevent Cold Stress

When the ambient temperature, or a wind chill equivalent, falls to below 40° F (American Conference of Governmental Industrial Hygienists recommendation), site personnel who must remain outdoors should wear insulated coveralls, insulated boot liners, hard hat helmet liners and insulated hand protection. Wool mittens are more efficient insulators than gloves. Keeping the head covered is very important, since 40% of body heat can be lost when the head is exposed. If it is not necessary to wear a hard hat, a wool knit cap provides the best head protection. A face mask may also be worn.

Persons should dress in several layers rather than one single heavy outer garment. The outer piece of clothing should ideally be wind and water proof. Clothing made of thin cotton fabric or synthetic fabrics such as polypropylene is ideal since it helps to evaporate sweat. Polypropylene is best at wicking away moisture while still retaining its insulating properties. Loosely fitting clothing also aids in sweat evaporation. Denim is not a good protective fabric. It is loosely woven which allows moisture to penetrate. Socks with a high wool content are best. If two pairs of socks are worn, the inner sock should be smaller and made of cotton, polypropylene or a similiar type of synthetic material that wicks away moisture. If clothing becomes wet, it should be taken off immediately and a dry set of clothing put on.

If wind conditions become severe, it may become necessary to shield the work area temporarily. The SSO and the PM will determine if this type of action is necessary. Heated break trailers or a designated area that is heated should be available if work is performed continuously in the cold at temperatures, or equivalent wind chill temperatures, of 20° F.

Dehydration occurs in the cold environment and may increase the susceptibility of the worker to cold injury due to significant change in blood flow to the extremities. Drink plenty of fluids, but limit the intake of caffeine.

6.0 AIR MONITORING

6.1 Direct Reading Instruments

The contaminants of concern are non-volatile. Therefore, it is the potential for inhaling dusts during the implementation of this field program that is a concern to the field team. However, the use of direct-push technology to collect subsurface soil samples and the use of hand tools to collect surface soil samples will greatly minimize the potential for the generation of dusts. Therefore, monitoring for dusts will be limited to those activities that may generate dust, which for this program involves the installation of monitoring wells using conventional auger drilling.

Instrument 1: Dust Monitor - MIE pDR 2000 or equivalent

A dust monitor, such as a MIE pDR 2000 or equivalent, will be used to measure the total dust concentration generated during the installation of groundwater monitoring wells. The monitor will be used to measure dust concentrations generated in the immediate work areas. The action level* for total dust in the worker's breathing zone is 0.36 mg/m3. This level is based upon the presence of cadmium at concentrations up to 1,400 mg/kg (west edge of pavement), its PEL of 5 μg/m3 and an applied safety factor of 10 due to cadmium's carcinogenicity.

$$\text{Action Level} = \frac{(1E^{+6})(\text{exposure limit mg/m3})}{(\text{concentration mg/kg})(\text{safety factor } 10)}$$

Engineering controls, such as the application of a fine mist of water over the boreholes, will be implemented if total dust concentrations exceed the action level. If engineering controls are unsuccessful in keeping the dust concentration below the action level, respiratory protection will be donned.

Instrument 2 - Carbon Monoxide Meter

If electric sampling equipment is not available and traditional drilling techniques (internal combustion engine) are used to advance the boring within the building, a carbon monoxide meter must be used to monitor the build up of exhaust gas in the building. The unit will be set to alarm at 25 ppm. If the alarm sounds, work will cease and all employees will leave the building until the levels of CO have been removed. If levels continue to exceed 25 ppm, mechanical ventilation will be required to remove the vapors from the work area as the use of air-purifying respiratory protection is not applicable. Even if the building is well-ventilated and the exhaust gas is ducted to the outside, a CO meter is still required.

6.2 Personal Air Sampling

OSHA does not require the collection of personal air sampling during the proposed activities. As such, this type of monitoring will not be conducted by ENSR during any of the proposed tasks.

6.3 Instrument Calibration and Recordkeeping

The dust monitor will be sent for calibration several weeks before the commencement of investigation activities at the site. In accordance with the manufacturer's instructions, a zero value update will be performed every 8 hours if the unit is operated in high particle concentration (>5 mg/m^3) environments. At aerosol concentrations below 1 mg/m^3, this update will be performed on a weekly basis. If at any time the zero value exceeds 2.5 mg/m^3, the sensor will be cleaned. If the zero value still exceeds 1.0 mg/m^3, the unit will be sent out for factory calibration (manufacturers suggested maintenance). A new unit will be made immediately available.

A log of total dust readings will be recorded at least once every 30 minutes and kept in the field notebook. Daily calibration information will also be recorded in the field notebook unless separate equipment calibration logs are maintained on site.

ENSR will request that the rental agency calibrate the carbon monoxide meter the day before the unit is to be used. The calibration record will be kept in the project files.

6.4 Community Air Monitoring Program (CAMP)

As required by the New York State Department of Health, a CAMP has been prepared for the instrusive activities being performed during this investigation and more specifically, for the installation of the groundwater monitoring wells. Due to the limited nature of the dust-producing work being performed, ENSR proposes the following work area perimeter monitoring. As indicated above, the presence of total dust will be monitored at the immediate work area. If sustained readings for total dust are detected in the breathing zone at the NYSDOH action limit of 100 ug/m3, initial perimeter air monitoring will be conducted. This monitoring will be conducted in a "step out" radial pattern of 5-foot intervals up to approximately 10 to 20 feet downwind of the work area. If elevated readings (i.e. total dust readings exceeding 100 ug/m3) are detected at downwind locations, the engineering controls being used to control dust will be increased. Work will not proceed until the increased controls are implemented and total dust levels at the perimeter locations are below the action levels.

A record of all perimeter air monitoring readings, including the time recorded, location, and reading, as well as a description of activities that resulted in elevated readings and response actions taken, will be maintained.

7.0 PERSONAL PROTECTIVE EQUIPMENT

Personal protective equipment (PPE) will be worn during sampling activities to prevent on-site personnel from being injured by the safety hazards posed by the site and/or the activities being performed. The following table describes the PPE and chemical protective clothing to be worn for general site activities and for certain specific tasks.

7.1 Chemical Protective Clothing

To put checkmarks in the any of the table's boxes, highlight one of the checkmark that is already located in the table and select Edit and Copy. Place your cursor in the appropriate box and select Edit and Paste. Additional check marks can be inserted by placing the cursor in the appropriate and simply hitting "Ctrl-V". Don't worry, the blue text that is underlined in dots will not print.

PPE Item	Task 1	Task 2	Task 3	Task 4
Hard Hat		✓	✓	
Steel Toed Safety Shoes	✓	✓	✓	✓
Safety Glasses with Sideshields	✓	✓	✓	✓
Tyvek coveralls	*			
Kevlar or Leather gloves		*		*
Disposable Best N-Dex Nitrile gloves	✓	✓	✓	✓
Hearing Protection		✓	✓	

Task 1 –Surface Soil Sampling
* if employees kneel on impacted surface soils to collect samples

Task 2 - Geoprobe Sampling
* -when cutting acetate soil liners

Task 3 - Well Installation

Task 4 - Water Level Measurements/Groundwater Sampling
* -when cutting tubing for sampling

7.2 Respiratory Protection

A dust monitor will be used to measure the total dust concentration generated during the installation of groundwater monitoring wells. If the action limit of 0.36 mg/m3 is sustained for 15-minutes within employee breathing zones, engineering controls, such as the application of a fine mist of water over

the boreholes, will be implemented. If engineering controls are unsuccessful in keeping the dust concentration below the action level, respiratory protection will be donned.

Level C Respiratory Protection - Half-mask air-purifying respirator with P-100 filters

Employees who are expected to don respiratory protection must have successfully passed a fit-test within the past year for the brand and model respirator they plan to wear for this program.

If electric sampling equipment is not available and traditional drilling techniques (internal combustion engine) are used to advance the boring within the building, a carbon monoxide meter must be used to monitor the build up of exhaust gas in the building. The unit will be set to alarm at 25 ppm. If the alarm sounds, work will cease and all employees will leave the building until the levels of CO have been removed. If levels continue to exceed 25 ppm, mechanical ventilation will be required to remove the vapors from the work area as the use of air-purifying respiratory protection is not applicable.

7.3 Other Protective Equipment

The following additional safety items should be available at the site:

- Portable, hand-held eyewash bottles
- First aid kit
- Type 10A:40B:C fire extinguisher (on drill rig is sufficient)
- Portable phones

8.0 SITE CONTROL

8.1 Work Zones

To prevent both exposure of unprotected personnel and migration of contamination due to tracking by personnel or equipment, work areas and personal protective equipment requirements will be clearly identified. ENSR designates work areas or zones as suggested in the "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities," NIOSH/OSHA/USCG/EPA, November, 1985. They recommend the areas surrounding each of the work areas to be divided into three zones:

- Exclusion or "hot" Zone
- Contamination Reduction Zone (CRZ)
- Support Zone

8.1.1 Exclusion Zone

The facility is essentially non-operational. Therefore, establishing formal exclusion zones during the proposed soil boring/well installation program is not required. However, all personnel entering the active work area must be trained in accordance with the requirements defined in Section 10.2 of this HASP and must wear the prescribed level of personal protective equipment.

8.1.2 Contamination Reduction Zone

The decontamination zone will be established adjacent to the work zone. Personnel will remove contaminated gloves and other disposable items in this area and place them in a plastic bag until they can be properly disposed of.

8.1.3 Support Zone

At this site the support zone will include the area outside of the work area.

8.2 Safety Practices

The following measures are designed to augment the specific health and safety guidelines provided in this plan.

- The "buddy system" will be used at all times by all field personnel. No one is to perform field work alone. Standby team member must be intimately familiar with the procedures for initiating an emergency response.
- Eating, drinking, chewing gum or tobacco, smoking or any practice that increases the probability of hand-to-mouth transfer and ingestion of materials is prohibited in the immediate work area and the decontamination zone.
- Smoking is prohibited in all work areas. Matches and lighters are not allowed in these areas.

- Hands and face must be thoroughly washed upon leaving the work area and before eating, drinking or any other activities.
- Beards or other facial hair that interfere with respirator fit are prohibited.
- The use of alcohol or illicit drugs is prohibited during the conduct of field operations.
- All equipment must be decontaminated or properly discarded before leaving the site in accordance with the project work plan.

9.0 DECONTAMINATION

9.1 Personal Decontamination

Proper decontamination is required of all personnel before leaving the site. Decontamination will occur within the contamination reduction zone. Disposable PPE will be removed in the decontamination zone and placed in garbage bags and disposed of as general refuse.

Regardless of the type of decontamination system required, a container of potable water and liquid soap should be made available so employees can wash their hands before leaving the site for lunch or for the day.

10.0 MEDICAL MONITORING AND TRAINING REQUIREMENTS

10.1 Medical Monitoring

All personnel performing activities covered by this HASP must be active participants in a medical monitoring program that complies with 29 CFR 1910.120(f). Each individual must have completed an annual surveillance examination and/or an initial baseline examination within the last year prior to performing any work on the site covered by this HASP.

10.2 Health and Safety Training

10.2.1 HAZWOPER

All personnel performing activities covered by this HASP must have completed the appropriate training requirements specified in 29 CFR 1910.120(e). Each individual must have completed an annual 8-hour refresher-training course and/or initial 40-hour training course within the last year prior to performing any work on the sites covered by this HASP.

10.2.2 Pre-Entry Briefing

The SSO will conduct a pre-entry briefing before site activities begin. HASP receipt and acceptance sheets will be collected at this meeting. Short safety refresher meetings will be conducted, as needed, throughout the duration of the project. Attendance of the pre-entry meeting is mandatory and will be documented by the ENSR SSO. An attendance form is presented in Attachment B.

11.0 EMERGENCY RESPONSE

OSHA defines emergency response as any "response effort by employees from outside the immediate release area or by other designated responders (i.e., mutual-aid groups, local fire departments, etc.) to an occurrence which results, or is likely to result in an uncontrolled release of a hazardous substance." According to ENSR policy, ENSR personnel shall not participate in any emergency response where there are potential safety or health hazards (i.e., fire, explosion, or chemical exposure). ENSR response actions will be limited to evacuation and medical/first aid as described within this section below. As such this section is written to comply with the requirements of 29 CFR 1910.38 (a).

The basic elements of an emergency evacuation plan include:

- employee training,
- alarm systems,
- escape routes,
- escape procedures,
- critical operations or equipment,
- rescue and medical duty assignments,
- designation of responsible parties,
- emergency reporting procedures and
- methods to account for all employees after evacuation.

11.1 Employee Training

Employees must be instructed in the site-specific aspects of emergency evacuation. This information will be communicated to the field team during the pre-entry briefing. On-site refresher or update training is required anytime escape routes or procedures are modified or personnel assignments are changed.

11.2 Alarm Systems/Emergency Signals

An emergency communication system must be in effect at all sites. The most simple and effective emergency communication system in many situations will be direct verbal communications. Each site must be assessed at the time of initial site activity and periodically as the work progresses. Verbal communications must be supplemented anytime voices can not be clearly perceived above ambient noise levels (i.e., noise from heavy equipment; drilling rigs, backhoes, etc.) and anytime a clear line-of-sight can not be easily maintained amongst all ENSR personnel because of distance, terrain or other obstructions.

Verbal communications will be adequate to warn employees of hazards associated with the immediate work area. The facility is non-operational so ENSR will not have access to telephone

facilities. Therefore, cellular phones will be brought to the site to facilitate contact with local emergency responders.

11.3 Escape Routes and Procedures

The escape routes from the work area will be via internal facility roads to Brewerton Road. The escape routes and assembly areas will be reviewed during the pre-entry briefing. All personnel on site are responsible for knowing the escape route from the site and where to assemble after evacuation.

11.4 Rescue and Medical Duty Assignments

The phone numbers of the police and fire departments, ambulance service, local hospital, and ENSR representatives are provided in the emergency reference sheet. This sheet will be posted in the site vehicle.

In the event an injury or illness requires more than first aid treatment, the SSO will accompany the injured person to the medical facility and will remain with the person until release or admittance is determined. The escort will relay all appropriate medical information to the on-site project manager and the RHSM.

If the injured employee can be moved from the accident area, he or she will be brought to the CRZ where their PPE will be removed. If the person is suffering from a back or neck injury the person will not be moved and the requirements for decontamination do not apply. The SSO must familiarize the responding emergency personnel about the nature of the site and the injury. If the responder feels that the PPE can be cut away from the injured person's body, this will be done on-site. If this not feasible, decontamination will be performed after the injured person has been stabilized.

11.5 Designation of Responsible Parties

The SSO is responsible for initiating emergency response. In the event the SSO can not fulfill this duty, the alternate SSO will take charge.

11.6 Employee Accounting Method

The SSO is responsible for identifying all ENSR personnel on-site at all times. On small, short duration jobs this can be done informally as long as accurate accounting is possible.

11.7 Accident Reporting and Investigation

Any incident (other than minor first aid treatment) resulting in injury, illness or property damage requires an accident investigation and report. The investigation should be conducted as soon as emergency conditions are under control. The purpose of the investigation is not to attribute blame but to determine the pertinent facts so that repeat or similar occurrences can be avoided. An ENSR accident investigation form is presented in Attachment C of this HASP. The injured ENSR employee's supervisor and the RHSM should be notified immediately of the injury.

If a subcontractor employee is injured, they are required to notify the ENSR SSO. Once the incident is under control, the subcontractor will submit a copy of their company's accident investigation report to the ENSR SSO.

EMERGENCY REFERENCES

Ambulance: 9-1-1

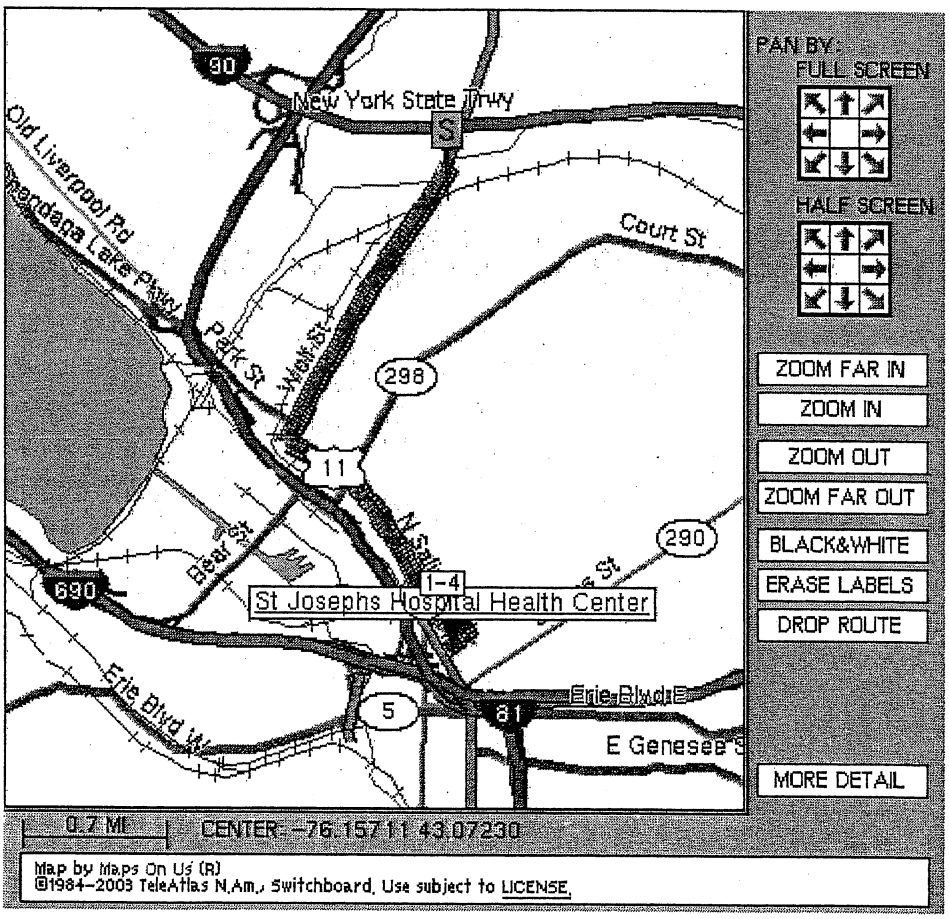
Fire: 9-1-1

Police: 9-1-1

Medical Services: 315-448-5111

St. Josephs Hospital Health Center
301 Prospect Ave
Syracuse, NY

Directions to Hospital: From Brewerton Road, head south on US 11. Go 2.6 miles and continue onto Prospect Ave. Go 0.2 miles and turn left onto E. Laurel St. Go less than 0.1 miles and turn right onto N. Townsend Ave. Go 0.1 mile and turn right onto Union. Go 0.1 mile to hospital.



Dont' forget to add the basic directions to the hospital prior to issuing the HASP. Don't use "To be Determined Upon Arrival at the Site". Don't worry, this won't print.

ENSR Project Representatives:

ENSR/WESTFORD, MA	978-589-3000
-Kathleen Harvey (RHSM)	x 3325
ENSR/SYRACUSE, NY	315-432-0506
-Karl Reimer (PM)	x233

Attachment A

Health and Safety Plan Receipt and Acceptance Form

Health and Safety Plan Receipt and Acceptance Form

Focused Site Investigation
Former National Plating Co. Inc. Site
1501 Brewerton Road
Syracuse, New York

I have received a copy of the Health and Safety Plan prepared for the above-referenced site and activities. I have read and understood its contents and I agree that I will abide by its requirements.

Name (Print) _____

Signature _____ Date: _____

Representing (Print) _____
Company Name

Attachment B

Health and Safety Plan Pre-Entry Briefing Attendance Form

Focused Site Investigation
Former National Plating Co. Inc. Site
1501 Brewerton Road
Syracuse, New York

Briefing Conducted By: _____

Date Performed: _____

Printed Name	Signature	Representing

APPENDIX B

COMMUNITY
AIR MONITORING PROGRAM

COMMUNITY AIR MONITORING PROGRAM

The Community Air Monitoring Program (CAMP) requires real-time monitoring for VOCs and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at the site. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors, including residences and businesses, and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions and/or work shutdown.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. In addition to the building demolition, anticipated ground intrusive activities for this project include test pitting or trenching, installation of soil borings or monitoring wells, remedial excavation, contaminated soil staging and contaminated soil loading.

Periodic monitoring for VOCs will be required during non-intrusive activities, such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. "Periodic" monitoring during sample collection will consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well baling/purging and taking a reading prior to leaving a sample location.

VOC Monitoring, Response Levels and Actions

VOCs must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work should be performed using equipment appropriate to measure

the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions and monitoring continued. After these steps, work activities can resume, provided the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less, but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shut down.

All 15-minute readings must be recorded and be available for State (DEC and DOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels and Actions

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring

particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

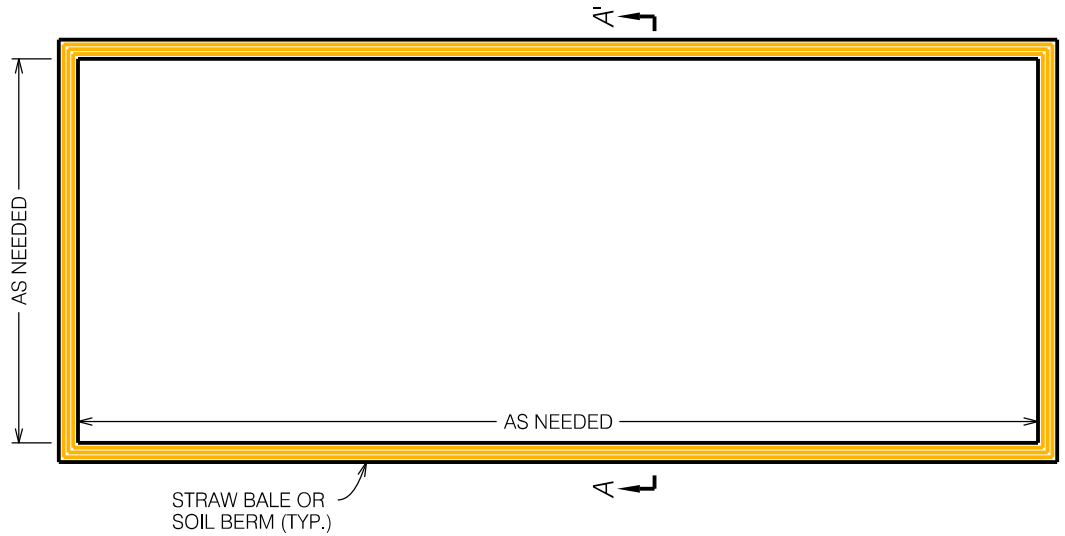
- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, dust suppression techniques must be employed. Work may continue with dust suppression techniques, provided downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided no visible dust is migrating from the work area.

- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

All readings will be recorded and be available for DEC and DOH personnel to review.

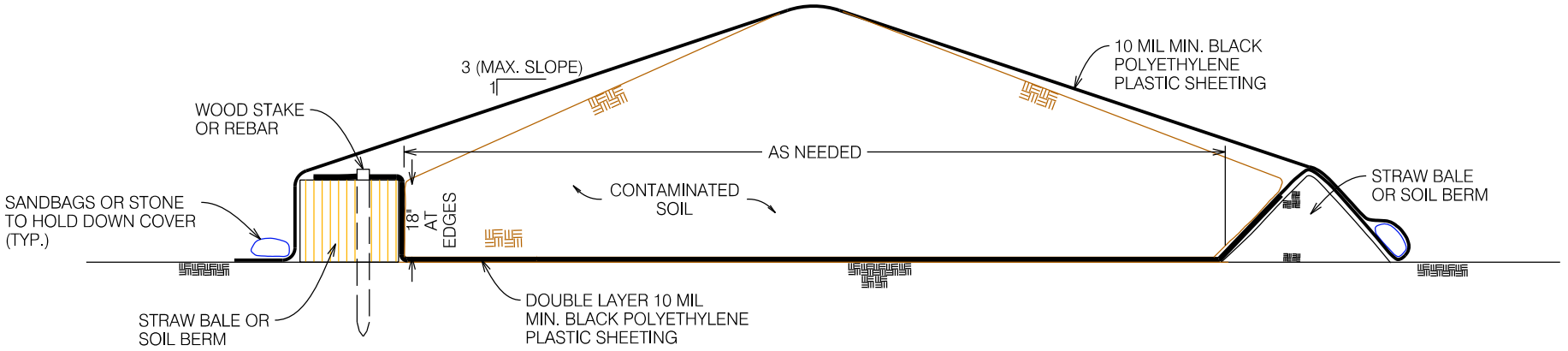
APPENDIX C

TYPICAL SOIL STAGING CELL



Typical Soil Staging Cell - Plan View

Scale: 1"=10'



Typical Soil Staging Cell - Section A-A'

Scale: 1"=2'

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