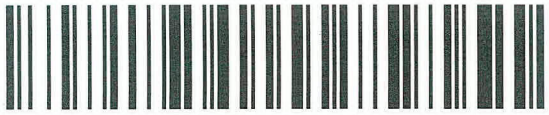


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City of Amsterdam
Amsterdam, NY

SVOC Soil Sampling

Work Plan for the

Mohasco Mills Complex

ENSR Corporation
January 2005
Document Number 10472-001

City of Amsterdam
Amsterdam, NY

SVOC Soil Sampling

Work Plan for the

Mohasco Mills Complex

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1.0 INTRODUCTION

The City of Amsterdam wishes to address the exceedances of risk based criteria caused by residual contamination present within the former Mohasco Mills Complex located in Amsterdam, New York. The property is located at the intersection of Forest Avenue and Lyon Street in the City of Amsterdam, Montgomery Country, New York (the City).

This Work Plan has been developed to meet the goal of further delineating the extent and nature of impacts to the site for the removal and/or capping in the area of concern.

The sampling activities described within this Work Plan will serve to characterize conditions at the site.

1.1 Site Background

The site was in use from the late 1880s through 1984 as a carpet manufacturing facility, specializing in milling and weaving of raw materials and dye operations. It is believed that chemicals shipped to, used, and stored at the site included, but may not have been limited to, sulfuric acid, acetic acid, hydrogen peroxide, hydrosulfites, PCBs, and some metalized dyes. Carpet manufacturing at the site ceased in 1984, after which it was leased until 1992 for use as storage and office space. Fires destroyed most of the buildings on site between 1992 and 1994, the debris being used to backfill building foundations.

In 1994 the City of Amsterdam acquired the site and it is currently unoccupied.

1.2 Site Setting

The site is approximately 23.5 acres and is located at the southwest corner of the intersection of Forest Avenue and Lyon Street within the City of Amsterdam, Montgomery Country, New York. The North Chuctanunda Creek bisects the site from the northeast to the southwest. The Mohawk River is located approximately 1.25 miles southwest of the site. The remains of large buildings, building foundations, demolition debris, and a parking lot cover most of the central and northern section of the property. An abandoned railroad and the former steam plant building are on the western and southern portion of the property. See Figures 1 and 2 for more detail.

Elevation at the site is approximately 550 feet above mean sea level. The site slopes steeply to the southwest towards downtown Amsterdam and the Mohawk River.

Surrounding sites include industrial buildings (Esquire Novelty Corporation and The Noteworthy Company), commercial properties (restaurants and a gas station), and residential housing. Much of the surrounding area is covered by asphalt, concrete, and buildings.

Geology

Bedrock in the Amsterdam area is classified as the Amsterdam Limestone of the Middle Ordovician Black River Group. This is predominated by limestone, with some areas of carbonate-cemeted sandstone. Limestone bedrock is exposed at the surface along the Chuctanunda Creek and at various locations throughout the site. Surficial deposits in the vicinity of the site are classified as absent or less than 3 feet think. The bedrock beneath the site consists mainly of massive gray limestone, with lenses of yellow-brown, medium grained, sandstone.

Hydrogeology

Groundwater elevations vary significantly across the site moving from east to west. The elevations average about 51 feet in the former Steam Plant Area. In the eastern portion of the site, groundwater flow is away from the Chuctanunda Creek. As you move westward towards the former steam plant, the groundwater begins to locally discharge to the Creek.

No groundwater supply wells are located on the site. The site is serviced by public water.

2.0 SITE ENVIRONMENTAL HISTORY

2.1 1995 Phase I Environmental Site Assessment

Alpha Earth, Inc. conducted an environmental site assessment of the site in 1995. Asbestos containing materials (ACM) in the buildings, lead-based paints, electrical transformers containing PCB oil, and several drums of corrosive chemicals were found on-site. Discharge of spent chemicals into the Chuctanunda Creek was documented from interviews with former Mohasco employees.

2.2 2000 Site Investigation

A site investigation was implemented by Malcolm Pirnie, Inc. to define the nature and extent of the contamination that resulted from the previous activities at the site. The site investigation included soil boring and monitoring well installation for soil and groundwater analysis as well as physical properties of soil and hydrogeologic conditions. Surface soil samples were collected and analyzed to determine the extent of surficial contamination. To determine the extent of subsurface contamination, a series of test pits were dug to investigate possible buried transformers. The North Chuctanunda Creek was sampled for water and sediment analysis before merging with the Mohawk River. Finally, asbestos and lead paint surveys were conducted in all remaining buildings located on site.

The analytical data for the samples collected was compared to environmental Site Cleanup Goals (SCG). Certain areas and media located on the site were found to require remediation. All contamination levels of concern are based on guidance taken from NYSDEC Ambient Water Quality Standards and Guidance Values, Part V of NYS Sanitary Code, NYSDEC TAGM 4046, and NYSDEC Technical Guidance for Screening Contaminated Sediments guidelines.

3.0 FIELD ACTIVITIES PLAN

The former steam plant area has been identified for investigation. This section summarizes the rationale for investigating the steam plant area and identifies the sampling techniques and analytical requirements for the investigation. All field activities will be completed in accordance with the site-specific health and safety plan (Appendix B).

3.1 Investigation Area

Based on historical information, site visits, and a previous site investigation, the investigation will be focused in the former steam plant area and in the soils along the Chuctanunda Creek. Because this area was not fully delineated during the previous site investigation the Record of Decision states that additional surface soil samples must be collected. This sampling event will more accurately identify the lateral extent of PAH surface soil contamination so that the amount of soils to be consolidated and capped can be minimized.

Figure 3-1 shows the proposed locations of the surface soil sampling to complete the investigation of these areas. Final sampling locations may be adjusted in the field based on access and utility clearance. Based on a review of the chemicals that were historically used at the facility, samples will be analyzed using 8720 for Semi-Volatile Organic Compounds (SVOCs).

3.1.1 Former Steam Plant Area

metals, pest./PCBs also?

PAH compounds and metals were detected in surface soil samples at concentrations above guidance values in the vicinity of the former steam plant, with the highest concentrations detected at the sample collected immediately southeast of the steam plant.

The SVOC contamination at the site is in the form of compounds referred to as polycyclic aromatic hydrocarbons (PAHs), which are a byproduct of combustion. The sources of the PAHs include power plants, automobile emissions and industrial processes. The relatively high concentrations of PAHs and certain metals found at this site are likely the result of the fires that occurred at the site, as well as the ash and soot from the former coal burning steam power plant. A summary of the compounds detected in the former steam plant area can be found in Appendix A. The former sampling locations can be found in Figure 3-1.

Missing pp. 3, 4?

To investigate potential impacts from the former steam plant, ten surface soil samples will be collected from the surface to a depth of six inches below ground surface and analyzed for SVOCs

3.2 Field Sampling Techniques

The following media will be sampled and analyzed as part of the site investigation:

- Surface soil

The media will be sampled and analyzed to allow delineation of any additional impacts to the soils on the former steam plant area of the subject property. The estimated number of samples to be collected at each of the areas is identified in Table 3-1.

Quality Assurance/Quality Control (QA/QC) samples will be collected to ensure the data are accurate and meet the data quality objectives. Equipment rinsate blank, field blank, trip blank, method blank, and matrix spike samples will be collected and analyzed to assess the accuracy of the data resulting from the field sampling and analytical programs. The number and type of QA/QC samples to be collected for each media of interest are summarized in Table 3-1. ENSR's Standard Operating Procedures for various sampling methods and decontamination have been included as Appendix B.

Not in Table

3.2.1 Soil Investigation

Surface soil samples will be collected by hand using pre-cleaned soil sampling equipment (shovels or trowels) and placed into pre-cleaned sample collection jars supplied by a New York State ELAP-certified analytical laboratory.

3.2.1.1 Soil Sampling Procedures

At each location, discrete soil samples will be collected from a depth of 0- to 6-inches below grade, with vegetation removed. Several discrete samples may be required to obtain the sample volume necessary; these samples will be collected from within a one-square foot area. The discrete samples will be composited prior to filling the sample jars. Surface soil samples will not be collected from areas covered by impermeable surfaces (e.g., building, pavement, etc.). Each of the samples collected will be submitted to the laboratory for analysis.

ENSR standard operating procedure (SOP) 7110 - Surface Soil Sampling (Appendix B-1) details the methods for obtaining surface soil samples for chemical and physical analyses. Surface soil samples will be collected using shovels or trowels. Shovels or trowels will be constructed of stainless steel as this material is abrasion resistant, can be easily decontaminated, and can be used to manually extract low to moderate density soil samples directly from the ground surface.

Cuttings from the surface soil sampling program will be inspected for signs of contamination and field screened using a PID meter. Samples will be classified using the ASTM-D2488-84 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure). Field observations will be recorded in a field logbook.

3.3 Quality Assurance Procedures

3.3.1 Field Logbooks / Documentation

Bound field logbooks will be used to record field activities. Entries will be described in as much detail as practical so that activities can be reconstructed for a particular situation. The following information should be recorded in the field logbook:

- Weather observations
- All field measurements and samples collected
- Equipment used to take measurements along with the date of calibration
- Date and time of sample collection
- Sample description, volume, type of preservative, and number of containers
- Equipment decontamination procedures
- Time of arrival at the Site and the time of departure from the Site

3.3.2 Chain-of-Custody Procedures

Properly completed chain-of-custody (COC) forms will accompany the samples. When transferring the possession of samples, the individuals relinquishing and receiving the samples will sign, date, and note the time on the COC form.

Samples will be packaged properly for shipment and dispatched to the laboratory for analysis with a separate signed COC record enclosed in each shipping container. Shipping containers will be secured with packaging tape and sealed with signed custody seals.

Samples will be shipped from the field to the laboratory using a reputable courier or will be driven to the laboratory. To ensure that holding time requirements are met, the selected courier will provide dependable overnight delivery. Samples not shipped overnight, but otherwise properly preserved, will be valid for the maximum holding time period.

All shipments will be accompanied by the COC record identifying the contents. The back copy will be detached and kept as part of the field records. The original COC record and remaining copies will accompany the shipment.

3.3.3 Equipment Decontamination

Procedures for equipment decontamination are described in ENSR SOP 7600 (Decontamination of Equipment) (Appendix C-2). Equipment decontamination will be completed following standard procedures at each sampling location and following sample collection. In addition, general equipment conditions will be checked at the end of the day. Decontaminated equipment will be stored when not in use within a secure area.

3.3.4 Field Equipment Calibration

Instruments used to gather, generate, or measure environmental data will be calibrated with sufficient frequency and in such a manner that accuracy and reproducibility of results are consistent with the manufacturer's specifications. Each instrument used in the field will be examined daily by the Field Team Leader or his/her designee to verify that it is operating properly.

The frequency of calibration for all instruments will be daily before initial use. Calibration procedures will be documented in the field records. Documentation will include the date and time of calibration, the identity of the person performing the calibration, the reference standard used, the readings taken, and any corrective action taken.

3.4 Laboratory Analysis

Soil samples will be analyzed for SVOCs only. This parameter was chosen due to the large concentrations of PAHs found during the previous site investigations. These additional samples are required to further define the capping limits at the site. The analytical methods for the various media sampled and the holding time requirements are shown in Table 3-1.

Laboratory analysis will be conducted by a NYSDOH ELAP-certified laboratory. Results will be reported in a NYSDEC ASP Category B deliverable package. Data will be evaluated according to the Division of Environmental Remediation (DER) Data Usability Summary Report (DUSR) guidelines.

4.0 FINAL REPORT

After completion of field investigation activities, a final investigation report will be prepared and submitted to NYSDEC. This report will provide a description of the site and present a summary of the work done, the analytical results, interpretations of the data, and overall conclusions regarding the nature and extent of contamination at the site.

The results of the health exposure assessment will be summarized in a letter report. The complete set of data and final assessment will be incorporated into the Final Design documents.

Tables

Table 3-1
Sample Container, Preservation and Holding Time Requirements
Former Mohasco Mill Complex
Amsterdam, NY

Location ID	Purpose	Soil Analyses	Container	Analytical Method[1]	Preservative	Maximum Holding Time[2]
SS-1	Soil Quality	SVOCs	(1) 8 ounce glass jar	SW-846 Method 8270	Cool to 4°C	7 Days
SS-2	Soil Quality	SVOCs	(1) 8 ounce glass jar	SW-846 Method 8270	Cool to 4°C	7 Days
SS-3	Soil Quality	SVOCs	(1) 8 ounce glass jar	SW-846 Method 8270	Cool to 4°C	7 Days
SS-4	Soil Quality	SVOCs	(1) 8 ounce glass jar	SW-846 Method 8270	Cool to 4°C	7 Days
SS-5	Soil Quality	SVOCs	(1) 8 ounce glass jar	SW-846 Method 8270	Cool to 4°C	7 Days
SS-6	Soil Quality	SVOCs	(1) 8 ounce glass jar	SW-846 Method 8270	Cool to 4°C	7 Days
SS-7	Soil Quality	SVOCs	(1) 8 ounce glass jar	SW-846 Method 8270	Cool to 4°C	7 Days
SS-8	Soil Quality	SVOCs	(1) 8 ounce glass jar	SW-846 Method 8270	Cool to 4°C	7 Days
SS-9	Soil Quality	SVOCs	(1) 8 ounce glass jar	SW-846 Method 8270	Cool to 4°C	7 Days
SS-10	Soil Quality	SVOCs	(1) 8 ounce glass jar	SW-846 Method 8270	Cool to 4°C	7 Days

1 - The detection limits for the analytical methods shall be less than the Soil Cleanup Objective Levels for the Protection of Groundwater, as provided in the fuel oil contaminated soil table of the December 20, 2000 NYSDEC Memorandum entitled "Determination of Soil Cleanup Levels."

2 - All holding times listed are from Verified Time of Sample Receipt at the laboratory, unless otherwise noted.

Figures



Figure 1-1

Site Location Map

Lyon Street and Forest Avenue
Amsterdam, NY

Former Mohasco Mill Complex
Work Plan

ENSR® INTERNATIONAL
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POWER HOUSE

CHUCTANUNDA CREEK

FLOW

PROJECT SITE BOUNDARY

PROJECT SITE BOUNDARY

PROJECT SITE BOUNDARY

ENSR SS-1

ENSR SS-2

ENSR SS-3

ENSR SS-4

ENSR SS-5

ENSR SS-6

ENSR SS-7

ENSR SS-8

ENSR SS-9

ENSR SS-10

LEGEND

● ENSR SS-8 PROPOSED SURFACE SOIL SAMPLE LOCATION

30 15 0 30

Scale in Feet

1"=30'

CAP AREAS

CITY OF AMSTERDAM, NEW YORK
MOHASCO MILL COMPLEX
PROPOSED SURFACE SOIL SAMPLE LOCATIONS

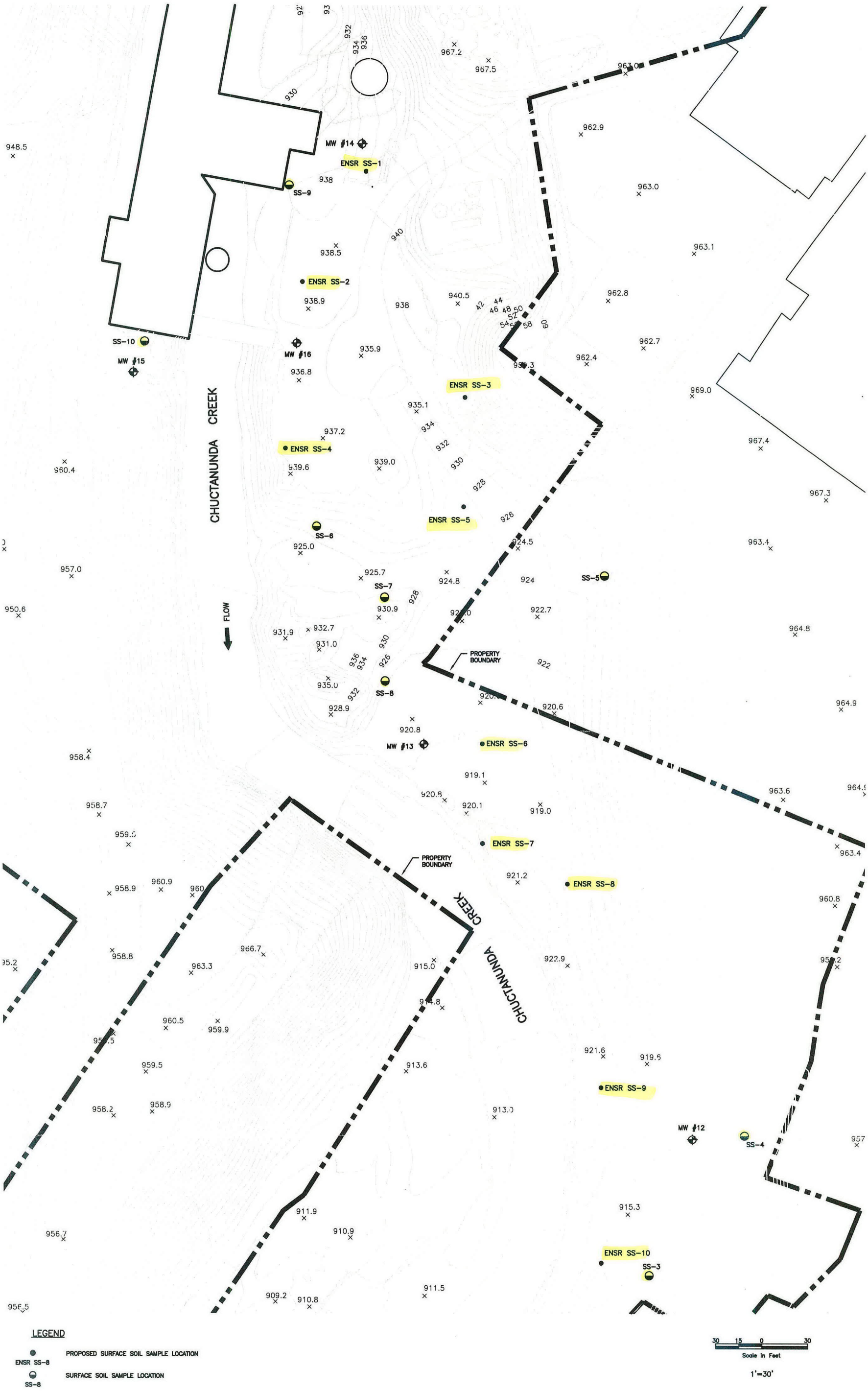
SCALE:	DATE:	PROJECT NUMBER:
AS NOTED	12/30/04	10472-001

SHEET NUMBER: 1 OF 1

DRAWING NUMBER: 2

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JPS	NO.:	DESCRIPTION:	DATE:	BY:
DRAWN BY:				
LLM				
CHECKED BY:				
JPS				
APPROVED BY:				
CG				



SAMPLE LOCATION MAP

CITY OF AMSTERDAM, NEW YORK
MOHASCO MILL COMPLEX
PROPOSED SURFACE SOIL SAMPLE LOCATIONS

SCALE:	DATE:	PROJECT NUMBER:
AS NOTED	12/30/04	10472-001

DRAWING NUMBER: 3-1
SHEET NUMBER: 1 OF 1

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LLM				
CHECKED BY:				
JPS				
APPROVED BY:				
CG				

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Appendix A

SUMMARY OF DETECTED COMPOUNDS IN FORMER STEAMPLANT AREA

Table 4-4
Summary of Detected Compounds in Former Steam Plant Area Surface Soil Samples
Former Mohasco Mill Complex SI/RAR
Amsterdam, New York

Analyte	NYSEDC TAGM 4046 Soil Cleanup Objectives* (ug/kg)	SS-1 RE 08/01/2000	SS-2 RE 08/01/2000	SS-3 RE 08/01/2000	SS-4 RE 08/01/2000	SS-5 08/01/2000
Volatile Organic Compounds (ug/kg)						
Methylene Chloride	100	7.9 J	7.8 J	6.9 J	8.2 J	5.3 J

Analyte	NYSDEC TAGM 4046 Soil Cleanup Objectives* (ug/kg)	SS-1 08/01/2000	SS-2 08/01/2000	SS-3 08/01/2000	SS-4 08/01/2000	SS-5 08/01/2000
Semi-Volatile Organic Compounds (ug/kg)						
Naphthalene	81,510	530 U	520 U	460 U	530 U	4,900 JD
Phenol	1,881	530 U	520 U	460 U	530 U	230 J
2-Methylphenol	627	530 U	520 U	460 U	530 U	54 J
2-Methylnaphthalene	228,228	530 U	520 U	460 U	530 U	2,100
Acenaphthylene	257,070	530 U	520 U	460 U	530 U	590
Acenaphthene	313,500	530 U	520 U	460 U	530 U	2,400 JD
Dibenzofuran	38,874	530 U	520 U	460 U	530 U	2,500 JD
Diethylphthalate	No Standard	530 U	520 U	460 U	81 J	380 U
Fluorene	313,500	530 U	520 U	460 U	530 U	2,500 JD
Phenanthrene	313,500	130 J	170 J	120 J	530 U	27,000 D
Anthracene	313,500	530 U	520 U	460 U	530 U	3,700 JD
Carbazole	No Standard	530 U	520 U	460 U	530 U	3,700 JD
Di-n-butylphthalate	81,000	210 J	110 J	320 J	67 J	130 J
Fluoranthene	50,000	290 J	320 J	210 J	530 U	24,000 D
Pyrene	313,500	210 J	220 J	140 J	530 U	13,000 JD
Benzo(a)anthracene	224	130 J	140 J	86 J	530 U	7,500 JD
Chrysene	2,508	140 J	140 J	100 J	530 U	8,900 JD
Bis(2-Ethylhexyl)phthalate	313,500	530 U	520 U	460 U	530 U	47 J
Di-n-octyl phthalate	313,500	410 J	520 U	460 U	530 U	19,000 UD
Benzo(b)fluoranthene	6,897	200 J	150 J	130 J	530 U	7,800 JD
Benzo(k)fluoranthene	6,897	110 J	120 J	89 J	530 U	8,900 JD
Benzo(a)pyrene	61	150 J	160 J	110 J	530 U	10,000 JD
Indeno(1,2,3-cd)pyrene	20,064	530 J	71 J	53 J	530 U	4,600 JD
Dibenzo(a,h)anthracene	87.78	530 J	520 U	460 U	530 U	19,000 UD
Benzo(g,h,i)perylene	313,500	89 J	110 J	84 J	530 U	7,100 UD
Total VOCs	1,000	ND	ND	ND	ND	5.3 J

Table 4-4
Summary of Detected Compounds in Former Steam Plant Area Surface Soil Samples
Former Mohasco Mill Complex SI/RAR
Amsterdam, New York

Analyte	NYSEDC TAGM 4046 Soil Cleanup Objectives* (ug/kg)	SS-6 RE 08/01/2000	SS-7 RE 08/01/2000	SS-8 RE 08/01/2000	SS-9 RE 08/01/2000	SS-10 RE 08/01/2000
Volatile Organic Compounds (ug/kg)						
Methylene Chloride	100	6.2 J	6.9 J	8.2 J	5.6 J	6.2 J

Analyte	NYSDEC TAGM 4046 Soil Cleanup Objectives* (ug/kg)	SS-6 08/01/2000	SS-7 08/01/2000	SS-8 DL 08/01/2000	SS-9 DL 08/01/2000	SS-10 08/01/2000
Semi-Volatile Organic Compounds (ug/kg)						
Naphthalene	81,510	410 U	460 U	1,100 U	660 JD	150 J
Phenol	1,881	440 U	460 U	1,100 U	1,900 UD	410 U
2-Methylphenol	627	410 U	460 U	1,100 U	1,900 UD	410 U
2-Methylnaphthalene	228,228	410 U	460 U	1,100 U	190 JD	200 J
Acenaphthylene	257,070	410 U	460 U	170 JD	1,900 U	410 U
Acenaphthene	313,500	410 U	460 U	1,100 U	480 JD	410 U
Dibenzofuran	38,874	410 U	460 U	1,100 U	540 JD	85 J
Diethylphthalate	No Standard	410 U	460 U	1,100 U	1,900 U	410 U
Fluorene	313,500	410 U	460 U	1,100 U	680 JD	410 U
Phenanthrene	313,500	44 J	270 J	830 JD	7,500 D	330 J
Anthracene	313,500	410 U	57 J	180 JD	1,500 JD	49 J
Carbazole	No Standard	410 U	460 U	280 JD	860 JD	410 U
Di-n-butylphthalate	81,000	49 J	99 J	430 JD	220 JD	410 U
Fluoranthene	50,000	98 J	600	4,100 D	8,700 D	410
Pyrene	313,500	58 J	420 J	2,100 D	5,300 D	240 J
Benzo(a)anthracene	224	410 U	240 J	960 JD	3,100 D	200 J
Chrysene	2,508	48 J	260 J	1,600 D	2,900 D	230 J
Bis(2-Ethylhexyl)phthalate	313,500	410 U	460 U	1,100 U	1,900 UD	410 U
Di-n-octyl phthalate	313,500	410 U	460 U	1,100 U	1,900 UD	410 U
Benzo(b)fluoranthene	6,897	51 J	330 J	2,400 D	4,600 D	270 J
Benzo(k)fluoranthene	6,897	49 J	150 J	500 JD	1,700 JD	150 J
Benzo(a)pyrene	61	48 J	280 J	1,000 JD	3,300 D	170 J
Indeno(1,2,3-cd)pyrene	20,064	410 U	130 J	380 JD	860 JD	75 J
Dibenzo(a,h)anthracene	87.78	410 U	460 U	1,100 U	1,900 U	410 U
Benzo(g,h,i)perylene	313,500	410 U	190 J	480 JD	1,300 JD	110 J
Total VOCs	1,000	ND	ND	ND	ND	ND

Table 4-4

Summary of Detected Compounds in Former Steam Plant Area Surface Soil Samples

Former Mohasco Mill Complex SI/RAR

Amsterdam, New York

Analyte	NYSDEC TAGM 4046 Soil Cleanup Objectives* (ug/kg)	SS-1 08/01/2000	SS-2 08/01/2000	SS-3 08/01/2000	SS-4 08/01/2000	SS-5 08/01/2000
PCB/Pesticides (ug/kg)						
Aroclor 1260	1,000	26 U	26 U	23 U	26 U	19 U
4,4'-DDE	2,100	1.1 U	1 U	0.9 U	1.1 U	2.9
4,4'-DDT	2,100	1.1 U	1 U	0.9 U	1.1 U	3.5

Notes:

U - Not detected at listed quantitation limit.

Table 4-4
Summary of Detected Compounds in Former Steam Plant Area Surface Soil Samples
Former Mohasco Mill Complex SI/RAR
Amsterdam, New York

Analyte	NYSDEC TAGM 4046 Soil Cleanup Objectives* (ug/kg)	SS-6 08/01/2000	SS-7 08/01/2000	SS-8 08/01/2000	SS-9 08/01/2000	SS-10 08/01/2000
PCB/Pesticides (ug/kg)						
Aroclor 1260	1,000	21 U	23 U	27 U	51	21 U
4,4'-DDE	2,100	0.8 U	0.9 U	1.1 U	0.7 U	1.6
4,4'-DDT	2,100	0.8 U	4.2	6.4	8.1	12

Table 4-4
Summary of Detected Compounds in Former Steam Plant Area Surface Soil Samples
Former Mohasco Mill Complex SI/RAR
Amsterdam, New York

Analyte	NYSDEC TAGM 4046 Soil Cleanup Objectives* (mg/kg)	SS-1 08/01/2000	SS-2 08/01/2000	SS-3 08/01/2000	SS-4 08/01/2000	SS-5 08/01/2000	SS-6 08/01/2000	SS-7 08/01/2000
TAL Metals (mg/kg)								
Aluminum	6,170 (b)	5,300	8,120	7,490	10,800	4,570	1,700	5,220
Antimony	No Standard	0.78 U	0.76 U	0.67 U	0.75 U	0.54 U	0.58 U	1.9 B
Arsenic	7.5	6.2	36.2	43.7	59	5.7	110	164
Barium	300	58.8	213	153	363	58.9	111	227
Beryllium	0.43 (b)	0.38 B	1.5	1.1	2.4	0.32 B	0.45 B	1.7
Cadmium	1	0.23 B	0.10 B	1.3	0.05 U	0.19 B	0.05 U	0.05 U
Calcium	42,500 (b)	45,000 J	14,600 J	12,200 J	2,360 J	39,100 J	1,190 J	1,770 J
Chromium	10	8.8	15.2	13.6	27.7	8.2	9.4	553
Cobalt	30	6.1 B	7.6 B	6.7 B	13	5 B	3 B	3.3 B
Copper	25	21.3	63.2	31.7	42.3	28.3	21.1	38.7
Iron	17,100 (b)	17,500	27,200	21,800	64,200	12,300	20,300	16,700
Lead	6.6 (b)	66.7	56.5	66.6	15.2	59.9	27	22.9
Magnesium	10,100 (b)	14,600	3,220	1,900	652 B	15,500	180 B	216 B
Manganese	253 (b)	409	280	268	108	284	31.2	43.9
Mercury	0.1	0.09	0.25	0.24	0.53	0.06	0.05	0.15
Nickel	13	13.5	17.9	16.9	41.4	11.1	5.3	6.8
Potassium	1,410 (b)	1,070 J	1,290 E	1,080 E	1,430 E	759 E	610 E	977 E
Selenium	2	0.37 B	1.6	1.5	4.9	0.24 U	1.5	4.3
Silver	ND (b)	0.56 B	0.48 B	0.52 B	1.4 B	0.31 B	0.51 B	0.33 B
Sodium	342 (b)	299 B	407 B	683 B	46.8 U	285 B	223 B	296 B
Thallium	ND (b)	0.54 B	2.4	1.7	6.1	0.36 B	1.9	2.2
Vanadium	150	19	37.6	30.5	79	14.8	18.8	34
Zinc	48.1 (b)	210	116	1,590	119	227	49.6	107

Table 4-4
Summary of Detected Compounds in Former Steam Plant Area Surface Soil Samples
Former Mohasco Mill Complex SI/RAR
Amsterdam, New York

Analyte	NYSDEC TAGM 4046 Soil Cleanup Objectives* (mg/kg)	SS-8 08/01/2000	SS-9 08/01/2000	SS-10 08/01/2000
TAL Metals (mg/kg)				
Aluminum	6,170 (b)	4,560	1,430	1,300
Antimony	No Standard	0.77 U	0.53 U	0.57 U
Arsenic	7.5	**102**	**58.4**	**130**
Barium	300	197	161	101
Beryllium	0.43 (b)	**0.84**	0.33 B	**0.48 B**
Cadmium	1	0.09 B	0.82	0.05 U
Calcium	42,500 (b)	5,520 J	11,400 J	1,450 J
Chromium	10	**12.3**	9.2	3
Cobalt	30	5 B	4.5 B	3 B
Copper	25	**38.5**	**106**	22.7
Iron	17,100 (b)	**19,400**	**23,500**	**33,900**
Lead	6.6 (b)	**53.3**	**272**	**42.5**
Magnesium	10,100 (b)	708 B	5,710	163 B
Manganese	253 (b)	139	111	30.6
Mercury	0.1	**0.46**	**25.9**	**0.57**
Nickel	13	12	**14.7**	4.1 B
Potassium	1,410 (b)	566 BE	269 BE	1,320 E
Selenium	2	**3.6**	1.1	**9.5**
Silver	ND (b)	**0.44 B**	**0.64 B**	**0.73 B**
Sodium	342 (b)	334 B	**396 B**	**823**
Thallium	ND (b)	**0.39 B**	**2.3**	**7.3**
Vanadium	150	30.5	18.2	20.8
Zinc	48.1 (b)	**115**	**515**	**132**

Appendix B

SITE SPECIFIC HEALTH AND SAFETY PLAN

HEALTH AND SAFETY PLAN

Surface Soil Sampling
Former Steam Plant Area of the Former Mohasco Mills Complex
City of Amsterdam, New York

Prepared by: Kathleen Harvey

Date: January 2005

Approved by: _____
ENSR Project Manager

Date:

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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 required to minimize potential risk to ENSR personnel implementing the surface soil sampling program at the Former Steam Plant Area of the Former Mohasco Mills Complex located in the City of Amsterdam, New York.

The provisions of this plan apply to ENSR 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 OSHA's 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 proposed investigative activities at the site. Each employee must sign a copy of the attached health and safety plan sign-off sheet (see Attachment A).

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

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 other ENSR personnel implementing the proposed scope of work.

1.2.1 ENSR Project Manager

The ENSR PM (Chris Gaule) 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 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; and,
- Maintaining regular communications with the SSO and, if necessary, the RHSM.

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 on this site;
- Recommending appropriate personal protective equipment (PPE) and respiratory equipment to protect personnel from potential site hazards;
- Conducting accident investigations; 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. The SSO 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 immediately 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 and any subsequent safety meetings that are conducted during the implementation of the program;
- Maintaining a high level of health and safety consciousness among employees at the work site;
- Procuring the air monitoring instrumentation required and performing air monitoring for investigative activities;
- Procuring and distributing the PPE and safety equipment needed for this project for ENSR employees;
- Verifying that all PPE and health and safety equipment used by ENSR is in good working order;
- Notifying the PM 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 restricted 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 10.0 of the HASP; and,
- Initiating emergency response procedures in accordance with Section 11.0 of this HASP.

1.2.4 ENSR Field Personnel

All ENSR field 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 to the ENSR SSO prior to the start of work;
- Attending the required pre-entry briefing prior to beginning on-site work and any subsequent safety meetings that are conducted during the implementation of the program;
- 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.

1.3 Management of Change/ Modification of the HASP

1.3.1 Management of Change

The procedures in this HASP have been developed based on ENSR's understanding of the potential environmental issues at the property and the proposed scope of work. Every effort has been made to address the chemical hazards that may be encountered during the implementation of the proposed investigation. Similarly, this document also discusses the physical hazards associated with the proposed activities. However, unanticipated site-specific conditions or situations may occur during the implementation of this project. Also, ENSR may elect to perform certain tasks in a manner that is different from what was originally intended due to a change in field conditions. As such, this HASP must be considered a *working document* that is subject to change to meet the needs of this dynamic project.

ENSR will complete a Job Hazard Analysis (JHA) when new tasks or different investigative techniques not addressed in the HASP are proposed. The use of new techniques will be reviewed and if new hazards are associated with the proposed changes, they will be documented on the JHA. An effective control measure must also be identified for each new hazard. JHAs will be reviewed by the SSO prior to being implemented. Once approved, the JHAs will be reviewed with all field staff during the daily safety meeting. A blank JHA is presented as Attachment B.

1.3.2 HASP Modifications

Should significant 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 Location

The former Mohasco Mills Complex is located at the intersection of Forest Avenue ad Lyon Street in the City of Amsterdam, New York. The North Chuctanunda Creek bisects the site from the northeast to the southwest. The Mohawk River is located approximately 1.25 miles southwest of the site.

2.2 Site History

The site is approximately 23.5 acres in size and was used from the late 1880s through 1984 as a carpet manufacturing facility, specializing in milling and weaving of raw materials and dye operations. In 1984, carpet manufacturing ceased at the site. The site was then leased until 1992 for use as storage and office space. Fires destroyed most of the buildings on site between 1992 and 1994, the debris being used to backfill building foundations.

The remains of large buildings, building foundations, demolition debris and a parking lot cover most of the central and northern section of the property. An abandoned railroad and the former steam plant building are on the western and southern portion of the property.

2.3 Previous Investigations

In 2000, Malcolm Pirnie implemented a site investigation to define the nature and extent of the contamination that resulted from the previous activities at the site. The investigation included soil boring and monitoring well installation for soil and groundwater analysis as well as physical properties of soil and hydrogeologic conditions. Surficial soil samples were collected and analyzed to determine the extent of contamination. To determine the extent of subsurface contamination, a series of test pits were dug. The North Chuctanunda Creek was sampled for water and sediment analysis before merging with the Mohawk River. Finally, asbestos and lead paint surveys were conducted in all remaining buildings located on site.

The analytical data for the samples collected was compared to environmental state clean-up guidelines. Certain areas and media located on the site were found to require remediation.

2.4 Former Steam Plant Area

Polycyclic aromatic hydrocarbons (PAHs) and metals were detected in surface soil samples at concentrations above guidance values in the vicinity of the former steam plant , with the highest concentrations detected at the sample collected immediately southeast of the steam plant. The relatively high concentrations of PAHs and certain metals detected are likely the result of the fires that occurred at the site, as well as the ash and soot from the former coal burning steam power plant.

3.0 SCOPE OF WORK

3.1 Purpose of Investigation

Based on historical information, site visits and a previous site investigation, ENSR's investigations will be focused in the former steam plant area and in the soils along the Chuctanuda Creek. This sampling event will more accurately identify the lateral extent of PAH surface soil contamination so that the amount of soils to be consolidated and capped can be minimized.

3.2 Field Tasks

To investigate potential impacts from the former steam plant area, the following field tasks are being conducted:

- Collect ten surface soil samples, from the surface to a depth of six inches below ground surface, using hand tools such as trowels, for subsequent laboratory analysis

4.0 CHEMICAL HAZARD ASSESSMENT AND CONTROLS

4.1 Chemical Contaminants of Concern

Previous soil sampling data indicates that surface soil samples in the former steam plant area are impacted with PAHs.

4.1.1 Polycyclic Aromatic Hydrocarbons

The semi-volatile organic compounds identified in the soils are referred to as polycyclic aromatic hydrocarbon (PAH) compounds. PAH compounds are a family of multiple ring aromatic compounds commonly found in fossil fuels and formed from the incomplete combustion of organic materials. Repeated contact with PAH compounds may cause photosensitization of the skin, producing skin burns after subsequent exposure to ultra-violet light. Certain PAHs, as a group, are considered potential human carcinogens (CaPAH).

4.1.2 Hazardous Substances Brought On-Site by ENSR

A material safety data sheet (MSDS) must be available for each hazardous substance that ENSR brings on the property. This includes solutions/chemicals that will be used to decontaminate sampling equipment. All containers of hazardous materials must be properly labeled in accordance with OSHA's Hazard Communication Standard.

4.2 Chemical Exposure and Control

4.2.1 Chemical Exposure Potential

Surface soils in the former steam plant area are impacted with PAHs. Due to low vapor pressures, PAH compounds are not volatile. Therefore, the primary potential route of exposure during the proposed work includes inhalation of PAH dusts. However, the use of hand tools to collect the samples will significantly minimize the potential for dust generation. Therefore, direct dermal contact with potentially impacted soils during sampling is the primary potential route of exposure to the contaminants of concern. Another potential route of exposure would be the transfer of impacted surface soils to employee's shoes and/or clothing and then further transfer to off-site areas including cars, homes, etc.

4.2.2 Chemical Hazard Control

The chemical hazards associated with the investigative and sampling activities can be controlled in several ways, including:

- Inhalation of dusts is not expected to be a concern due to the types of sampling methods being employed. However, if dusts are generated, a light mist of water can be applied over each sampling location.
- To avoid direct dermal contact with contaminated media, protective clothing, as described in Section 7.1, will be required when collecting samples and decontaminating sampling equipment. PPE may also be required to prevent the transfer of metal dusts from the soil to employee's shoes and clothing. In lieu of PPE, employees can place polyethylene sheeting beneath themselves so that they are kneeling on the plastic and not the soils during the collection of samples.

- 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.

5.0 PHYSICAL HAZARDS AND CONTROLS

5.1 Underground Utility Hazards

Regardless of depth, New York requires that a utility clearance be performed at least two (2) days prior to initiation of any subsurface work. ENSR will contact Dig Safely New York (1-800-962-7962) to request a mark-out of natural gas, electric, telephone, cable television, water and sewer lines in the proposed sampling locations. Work will not begin until the required utility clearances have been performed.

Public utility clearance organizations typically do not mark-out underground utility lines that are located on private property. As such, ENSR must exercise due diligence and try to identify the location of any private utilities on the property being investigated. ENSR 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 sampling locations 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-dig zone; or
- hand digging in the proposed locations if insufficient data is available to accurately determine the location of the utility lines.

5.2 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. When fluids around the cells of the body tissue freeze, skin turns 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. Productive physical and mental work is limited when severe shivering occurs. Shivering is a serious sign of danger. Immediately remove any person who is shivering from the cold.

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 facemask 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 waterproof. 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 similar types of synthetic material that wick 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.

5.3 Slip, Trip and Fall Hazards

5.3.1 Uneven Terrain

On any work area, it is expected that the ground may be uneven. The ground surface may be unreliable due to settling. Surface debris may be present and wet or swampy areas may exist. Employees should always follow an unobstructed path when accessing outdoor work locations due to the potential for irregular terrain and/or the presence of heavy vegetation.

Employees should walk around, not over or on top of debris or trash piles. When carrying equipment, identify a path that is clear of any obstructions. It may be necessary to remove obstacles to create a smooth, unobstructed access point to the work areas on site.

5.3.2 Winter Weather Conditions

During the winter months, snow shovels and salt crystals should be available to keep paths and work areas free of accumulated snow and ice.

6.0 AIR MONITORING

Surface soils in the former steam plant area are impacted with PAHs. Due to low vapor pressures, PAH compounds are not volatile. Therefore, the primary potential route of exposure during the proposed work includes inhalation of PAH dusts. However, the use of hand tools to collect the samples will significantly minimize the potential for dust generation. Therefore, direct dermal contact with potentially impacted soils during sampling is the primary potential route of exposure to the contaminants of concern. Therefore, the use of direct reading dust monitors during this proposed sampling event is not necessary.

7.0 PERSONAL PROTECTIVE EQUIPMENT

Personal protective equipment (PPE) will be worn during these activities to prevent on-site personnel from being injured by the safety hazards posed by the site and/or the activities being performed. In addition, chemical protective clothing will be worn to prevent direct dermal contact with the site's chemical contaminants.

7.1 Chemical Protective Clothing

PPE Item	Surface Soil Sampling
Steel Toed Safety Shoes	✓
Safety Glasses with Sideshields	✓
Disposable Nitrile Gloves	✓
Tyvek Coveralls	If employees kneel directly onto surface soils and do not use to plastic as a barrier between clothes and potentially impacted surface soils

7.2 Respiratory Protection

Surface soils in the former steam plant area are impacted with PAHs. Due to low vapor pressures, PAH compounds are not volatile. Therefore, the primary potential route of exposure during the proposed work includes inhalation of PAH dusts. However, the use of hand tools to collect the samples will significantly minimize the potential for dust generation. Therefore, direct dermal contact with potentially impacted soils during sampling is the primary potential route of exposure to the contaminants of concern. Therefore, the use of respiratory protection is not anticipated for this sampling program.

7.3 Other Safety Equipment

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

- Plastic sheeting to use as a barrier between employee's clothing/shoes and potentially impacted surface soils
- Portable, hand-held eyewash bottles
- First aid kit

- Portable phones

8.0 SITE CONTROL/DECONTAMINATION

To prevent both exposure of unprotected personnel and migration of contamination due to tracking by personnel or equipment, hazardous work areas will be clearly identified and decontamination procedures will be required for personnel and equipment leaving those areas.

8.1 Designation of Zones

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 that 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 site is a vacant, former industrial property and the work being conducted does not involve the use of heavy equipment and/or machinery. Therefore, establishing formal exclusion zones is not necessary. However, all personnel entering an active work area must wear the prescribed level of personal protective equipment.

8.1.2 Contamination Reduction Zone

The decontamination zone will be established adjacent to each work area. 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 exclusion zone.

8.2 General Site Safety Practices

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

- ENSR personnel are not expected to work alone on remote sites. On most sites, client, subcontractor, or public personnel are generally nearby in case of an emergency or accident. ENSR personnel, through coordination, can rely upon these personnel for assistance in an emergency. If no one else is nearby, the use of the buddy system should be encouraged. However, if only one person is slated to collect the samples, scheduled call-in's to the PM on a cell phone may be used to assure personal safety.

- 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 exclusion zone. Decontamination will occur within the contamination reduction zone.

Disposable PPE, such as gloves, will be removed in the decontamination reduction zone and placed in garbage bags for disposal as general refuse.

Regardless of the type of decontamination system required, as a minimum, a container of potable water and liquid soap should be made available so employees can wash their hands and face before leaving the site for lunch or for the day. Employees should always wash their face and hands with soap and water before eating, smoking or drinking.

9.2 Transfer

Plastic sheeting should be used as a barrier between employee's clothing/shoes and potentially impacted surface soils. This will prevent the transfer of contaminants to off-site locations such as employees' cars or homes.

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

Prior to the commencement of on-site activities, a pre-entry briefing will be conducted by the SSO to review the specific requirements of this HASP. Attendance of the pre-entry meeting is mandatory for all personnel covered by this HASP and must be documented on the attendance form provided in Attachment C. HASP sign-off sheets should also be collected at the time of the pre-entry briefing. All documentation should be maintained in the project file.

The pre-entry briefing must be completed for each new employee before they begin work at the site. Short safety refresher meetings will be conducted, as needed, throughout the duration of the project.

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. 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 property is a vacant, former industrial facility. Therefore, ENSR will bring a portable phone to the site to ensure that communications with local emergency responders is maintained, when necessary.

11.3 Escape Routes and Procedures

The escape route from the property will be via Forest Avenue or Lyon Street. 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 D 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.

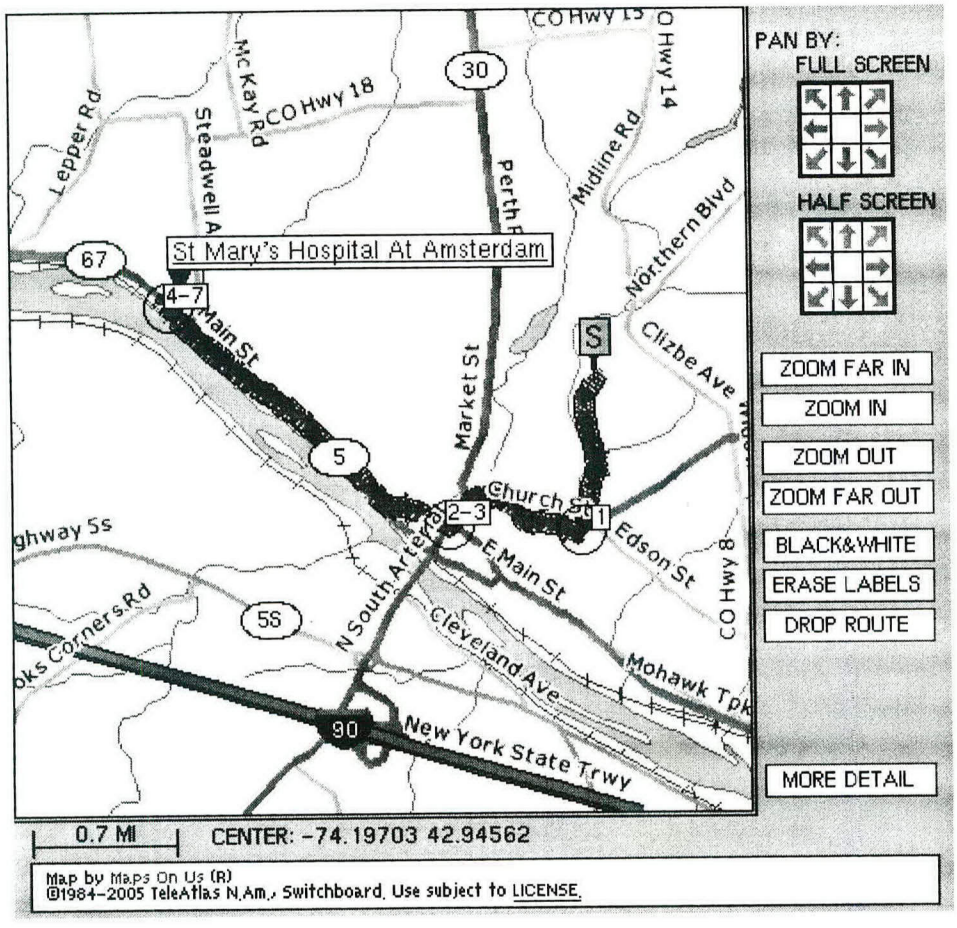
EMERGENCY REFERENCES

Ambulance:	911
Fire:	911
Police:	911
Medical Services:	518-842-0109 St. Mary's Hospital at Amsterdam 427 Guy Park Ave - Amsterdam
Directions to Hospital:	Head southwest on Forest Avenue for 0.8 miles and then go straight on Church Street. Go 0.7 miles and turn right onto Grove Street. Go 0.2 miles and go straight on W. Main Street. Go 1.5 miles and turn right ontoHerrick Street. Go less than 0.1 miles and turn left onto Division St. Go less than 0.1 miles and turn right onto Swart Lane. Go less than 0.1 miles and turn right onto Guy Park Ave and follow to hospital.
On Site Telephone:	Property is unoccupied. Bring portable communications.
Underground Utility Location Service:	(800)-962-7962

ENSR Project Representatives:

ENSR/Westford, MA	(978) 589-3000
-Kathy Harvey (RHSM)	x 3325
ENSR/Albany, NY	518-453-5444
-Christopher Gaule (PM)	

Map from Property to St. Mary's Hospital at Amsterdam
Guy Park Avenue - Amsterdam



Attachment A

Health and Safety Plan Receipt and Acceptance Form

Health and Safety Plan Receipt and Acceptance Form

Surface Soil Sampling
Former Steam Plant Area of the Former Mohasco Mills Complex
City of Amsterdam, 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:

Signature:

Date:

Representing:

Attachment B

Job Hazard Analysis Form

Job Analysis Form

PRINCIPAL STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
SAFETY EQUIPMENT	**INSPECTION REQUIREMENT**	**TRAINING REQUIREMENTS**

Attachment C

Health and Safety Plan Pre-Entry Briefing Attendance Form

ENSR INTERNATIONAL

Health and Safety Plan Pre-Entry Briefing Attendance Form

Surface Soil Sampling
Former Steam Plant Area of the Former Mohasco Mills Complex
City of Amsterdam, New York

Briefing Conducted By: _____

Date Performed: _____

Printed Name	Signature	Representing

Appendix C

C-1: SOP 7110 - Surface Soil Sampling

C-2: SOP 7600 - Decontamination of Equipment

ENSR

SOP NUMBER: 7110

Surface Soil Sampling

Date:	2nd Qtr. 1994
Revision Number:	1
Author:	Charlie Martin
Discipline:	Geosciences

1.0 PURPOSE AND APPLICABILITY

1.1 Purpose and Applicability

This standard operating procedure (SOP) describes the methods used for obtaining surface soil samples for physical and/or chemical analysis. For purposes of this SOP, surface soil (including shallow subsurface soil) is loosely defined as soil that is present within 5 feet of the ground surface and can be sampled with the use of readily available and easy-to-operate sampling equipment. Various types of sampling equipment are used in the collection of surface soil samples and include spoons or scoops, trowels, shovels, and hand or bucket augers.

The purpose of this SOP is to provide a specific method and/or procedure to be used in the collection of surface soil samples which, if followed properly, will promote consistency in sampling and provide a basis for sample representativeness.

This SOP is generally applicable to surface and shallow depth soils which are unconsolidated and are of low to moderate density. Higher density or compacted soils may require use of drill rigs or other powered equipment to effectively obtain representative samples.

It should be noted that other specific state and/or federal agency standard operating procedures may be in existence in certain areas which may require deviation from this sampling procedure. The applicability of other agency operating procedures, which may differ from ENSR's SOP, needs to be determined prior to start of the sampling program. Deviations from this SOP to accommodate other regulatory requirements should be reviewed in advance of the field program, should be explained in the project work plan, and must be documented in the field project notebook when they occur.

1.2 General Principles

Surface soil sampling generally involves use of hand-operated equipment to obtain representative soil samples from the ground surface and to shallow depths below the ground surface. If soil conditions are appropriate, surface soil sampling, following the

procedures described in this SOP, can provide representative soil samples in an efficient manner.

1.3 Quality Assurance Planning Considerations

Project personnel should follow specific quality assurance guidelines for sampling as outlined in the site-specific QAPP and/or Sampling Plan. Proper quality assurance requirements should be provided which will allow for collection of representative samples from representative sampling points. Quality assurance requirements typically suggest the collection of a sufficient quantity of field duplicate, field blank, and equipment blank samples.

1.4 Health and Safety Considerations

Surface soil sampling may involve chemical exposure hazards associated with the type of contaminants present in surface soil. When surface soil sampling is performed, adequate Health and Safety measures must be taken to protect sampling personnel. These measures must be addressed in the project Health and Safety Plan (HASP). This plan must be approved by the project Health and Safety Officer before work commences, must be distributed to all personnel performing sampling, and must be adhered to as field activities are performed.

2.0 RESPONSIBILITIES

2.1 Sampling Personnel

It will be the responsibility of the sampling personnel to conduct surface soil sampling in a manner consistent with this SOP. The above individual will be responsible for the proper use and maintenance of all types of equipment used for obtaining surface soil samples, and the collection, labeling, handling and storage of all samples until further chain-of-custody procedures are undertaken.

2.2 Sampling Coordinator

Large sampling programs may require additional support personnel such as a sampling coordinator. The sampling coordinator is responsible for providing management support such as maintaining an orderly sampling process, providing instructions to sampling personnel regarding sampling locations, and fulfilling sample documentation requirements, thereby allowing sampling personnel to collect samples in an efficient manner.

2.3 Project Manager

It is the responsibility of the project manager to ensure that the sampling activity is properly staffed, planned, and executed.

3.0 REQUIRED MATERIALS

3.1 Spoons or Scoops

Spoons or scoops should preferably be constructed of stainless steel as this material is abrasion resistant, can be easily decontaminated, and can be used to manually extract low to moderate density soil samples directly from the ground surface. Other spoon/scoop construction materials such as high-density polyethylene and teflon may be suitable in some applications but are difficult to use in higher density soils.

3.2 Trowel

Stainless steel construction is preferred. The blade of a trowel is generally flat or slightly curved and is 5 to 6 inches in length. Some trowels are available with depth calibrations marked on the blade.

3.3 Shovel

Shovels may be long or short-handled and are most often used for preparation of the sample collection area, i.e., for removal of surface debris or penetration of a high density/compacted surface prior to collection of the sample with another more appropriate device. Shovels may be used for the collection of samples that require large volumes of material for analysis (i.e., for bench-scale treatability studies). Shovels can also be used for scraping of test pit sidewalls in preparation for sidewall sampling using another device.

3.4 Hand Auger

This tool, commonly referred to as a soil auger, consists of a short spiral-bladed metal rod (solid-stem auger) attached to a handle. Clockwise rotation of the handle provides the cutting motion for the auger. Most of the loose soil is discharged upwards as the auger moves downwards. However, if the soil is cohesive some of it will stick to the auger flight providing a collectable sample at a measurable depth. Samples of surface soil can also be collected using a tube sampler which is attached to the end of the auger rods and advanced into the soil to extract a sample.

3.5 Bucket Auger

This device consists of a short length of hollow tube with cutting teeth at the bottom. As the handle is rotated, the sample is brought into and retained within the tube. When the auger is removed from the ground surface, the sample is retrieved from the tube with a spoon, or, if loosely consolidated, is poured directly into a collection pan or into the sample containers. Typically constructed of stainless steel, bucket augers are commonly available in diameters varying from two to four inches.

3.6 Collection Pan

A soil collection pan is often used as an intermediate sample container between removal of the sample from the ground and final bottling of the sample. Soil collection pans should preferably be constructed of stainless steel, although common household steel cooking pans may be used if the pan is lined with aluminum foil during sample collection.

3.7 Supporting Materials

- Teaspoon or spatula
- Aluminum foil
- Sample kit (i.e., bottles, labels, custody records, cooler, etc.)
- Sample logs/boring logs
- Decontamination materials
- Six-foot folding rule or tape measure for depth measurement
- Personal protective equipment (as required by the HASP)
- Field project notebook/pen

4.0 METHOD

4.1 General Procedures

Site-specific soil characteristics such as soil density and moisture will generally dictate the preferred type of sampling equipment for use at a particular site. Similarly, other project-specific requirements such as sampling depth and requested type of analysis such as physical testing (e.g., grain-size distribution) and/or chemical analysis will dictate the use of a preferred type of sampling equipment. Analytical testing requirements will indicate sample volume requirements that also will influence the selection of the appropriate type of sampling tool. The project sampling plan should define the specific requirements for collection of surface soil samples at a particular site. Should site-specific characteristics remain unidentified prior to start of the sampling

program, sampling personnel should be equipped with a variety of sampling equipment to address the most likely sampling situations to be encountered.

As indicated, sample volume and sampling depth requirements should be defined in the sampling plan. This information should define the size of the hole which will be created during collection of the sample. For instance, if only a 500-ml sample will be required for analysis from a depth interval of 0 to 6 inches, an approximate 2 to 3-inch diameter hole will be needed. The indicated types of sampling equipment will generally make a minimum diameter hole of approximately 3 inches, therefore, an excess volume of soil may be generated during collection of a small volume soil sample. For samples requiring a large volume of soil, multiple holes and soil compositing may be necessary. Collection of the requisite volume of soil to meet sample volume requirements without underestimating the sample volume is the overall objective and is a technique which improves with experience.

It should be noted that some sampling programs may require the use of a sampling grid for the purpose of obtaining a statistically representative number of soil samples. This SOP does not provide information relative to construction of a sampling grid. This information may be found in other documents.

4.2 Equipment Decontamination

Regardless of the specific type of equipment used, each piece of equipment needs to be decontaminated prior to its initial use and following collection of each individual soil sample. Site-specific requirements for equipment decontamination should be outlined within the project sampling plan. Equipment decontamination procedures are specified within ENSR SOP 7600 - Decontamination of Equipment.

4.3 Collection of Samples for Volatile Organics Analysis

Collection of surface soil samples for volatile organics analysis (VOA) is different than collection of soil samples for other routine physical or chemical testing primarily because of the concern for potential loss of volatiles during the normal sample collection procedure. To limit the potential for loss of volatiles, the soil sample must be obtained as quickly and as directly as possible. This generally means that if a VOA sample is to be collected as part of a multiple analyte sample, the VOA sample portion should be obtained first. The VOA sample should also be obtained from a discrete portion of the entire collected sample and not from a sample which has been composited or homogenized from the entire sample interval. In general, it is best to collect the VOA sample by transferring the sample directly from the sampling tool into the sample bottles. Intermediate sample containers such as collection pans should not be used during collection of VOA samples.

4.4 Standard Procedures

4.4.1 Surface Preparation

At some sampling locations, the ground surface may require preparation in advance of sampling. Surface preparation can include removal of surface debris which blocks access to the actual soil surface or loosening of dense surface soils such as those encountered in heavy traffic areas, or frozen soils. If sampling equipment is used for both removal of surface debris and for collection of the soil sample, the equipment should be decontaminated prior to sample collection to reduce the potential for sample interferences between the surface debris and the underlying soil.

4.4.2 Shovel Sampling Procedure

A detailed operating procedure for proper use of a shovel for soil sampling is unnecessary. Specific requirements for sample quantity and sampling depth should be outlined within the project sampling plan.

Decontaminate the shovel in accordance with established procedures prior to use.

Once the soil sample is obtained and placed into the appropriate sample container(s) the hole from which the sample was retrieved should be filled with surrounding soils to eliminate a potential surface hazard.

4.4.3 Spoon, Scoop, and Trowel Sampling Procedure

Spoons, scoops, and trowels are of similarly designed construction and can therefore be operated in accordance with the following procedure.

Select the sampling location and prepare the surface by removal of surface debris if present. If the sample depth interval is at some depth below the ground surface, the surface soil material should also be removed as part of the surface preparation step. Surface preparation should be completed using other appropriately decontaminated sampling equipment.

Decontaminate the sampling tool in accordance with established procedures prior to use.

The soil sample should be obtained by inserting the sampling tool into the ground and rotating the tool so that a representative "column" of soil is removed from the ground.

The immediate objective is to collect the VOA sample fraction first if this is required. If the VOA sample is to be collected from the upper sampling interval, then the first scoop of soil should be used to directly fill the sample containers. If a specific depth below the ground surface has been targeted for the VOA sample, the overlying soils should be removed and discarded or placed into a soil collection pan as part of the remaining composite sample.

Regardless of whether or not a VOA sample is required, one or more cores or scoops of soil may be needed until the desired sampling depth is achieved. Removal of a representative column of soil in cohesionless soils may be difficult to achieve, however. If more soil is needed to meet sample volume requirements, additional soil cores may be collected from an immediately adjacent location.

Except for VOA samples, as each portion of the sample is removed from the ground, it should be placed into an intermediate sample container (collection pan) until the entire sample interval of soil is removed.

Once the sample interval has been collected, the soil sample should be thoroughly homogenized within the collection pan prior to bottling. Sample homogenizing is accomplished by manually mixing the entire soil sample in the collection pan with the sampling tool or with a clean teaspoon or spatula until a uniform mixture is achieved.

The appropriate sample containers should be filled with soil from the collection pan. The sampling tool may be used to fill the sample bottles. If packing of the samples into the bottles is necessary, a clean stainless steel teaspoon or spatula may be used. Use of fingers/hands to fill or pack sample containers should be avoided (this also includes VOA samples).

Once each sample container is filled, the rim and threads of the sample container will be cleaned of gross soil by wiping with a paper towel, then capped and labeled. Do not submerge the sample containers in water to clean them. Once labeled the sample containers should be placed into a cooler for protection. Sample chain-of-custody and other documentation requirements should be completed at this time.

The sampling tool and other sampling equipment should be decontaminated prior to reuse. All investigation-derived waste should be properly contained before leaving the area.

The sample hole should be backfilled to eliminate any surface hazard. The project sampling plan may indicate the requirements for backfilling of the sample hole.

4.4.4 Hand Auger Sampling

Select the sampling location and prepare the surface by removal of surface debris if present.

Decontaminate the sampling tool in accordance with established procedures prior to use.

A hand auger, or soil auger, can be used to extract shallow soil samples up to three (3) feet below the surface. Representative samples can be collected directly from the auger flight as it is withdrawn from the ground, or from the tube sampler attachment which can be advanced into the soil after augering to the desired depth.

When using the hand auger, the hole should be augered to the required depth by manually pushing and turning the auger. As the auger is turned, soils will be discharged to the ground surface, although some soil will be retained on the auger flight. Augering should be continued until the desired depth is achieved. If a composite or homogenized soil sample is the objective, those soils which have been discharged to the ground surface as well as those soils which cling to the auger flight should be homogenized within a soil collection pan prior to bottling. If a VOA sample is required, this fraction of the soil sample should be collected as soon as possible without compositing. It should be noted that soil augers cause considerable disturbance of the soil, therefore, some consideration should be given toward collection of VOA sample fractions using some other method (spoons, trowels, bucket augers may cause less disturbance).

Except for VOA sample fractions, the remainder of the soil sample should be thoroughly homogenized in the soil collection pan prior to bottling.

The appropriate sample containers should be filled with soil from the collection pan. A clean spoon or spatula may be needed to fill the sample bottles as necessary.

Once each sample container is filled, the rim and threads of the sample container will be cleaned of gross soil by wiping with a paper towel, then capped and labeled. Do not submerge the sample containers in water to clean them. Once labeled the sample containers should be placed into a cooler for protection. Sample chain-of-custody and other documentation requirements should be completed at this time.

All used sampling equipment should be decontaminated prior to reuse and investigation-derived waste should be properly contained before leaving the area.

The sample hole should be backfilled to eliminate any surface hazard. The project sampling plan may indicate the requirements for backfilling of the sample hole.

4.4.5 Bucket Auger Sampling

A bucket auger may be used to collect soil samples from depths ranging from one (1) to approximately five (5) feet. In some instances, soil samples may be collected from greater depths, but often with considerable more difficulty. Bucket augers allow for discrete depth interval sampling as the soil is retained within the hollow tube of the auger when it is extracted from the ground. It should be noted that if depth-discrete sampling is the objective, more than one auger may be necessary, with one auger used to provide access to the required sampling depth and the other (clean) auger used for sample collection.

Select the sampling location and prepare the surface by removal of surface debris, if present.

Decontaminate the sampling tool in accordance with established procedures prior to use.

When using the bucket auger, the auger should be pushed downward and rotated until the bucket becomes filled with soil. Usually a 6 to 12-inch core of soil is obtained each time the auger is inserted. Once filled, the auger should be removed from the ground and emptied into the soil collection pan. If a VOA sample is required, the sample should be taken directly from the auger using a teaspoon or spatula and/or directly filling the sample container from the auger. The augering process should be repeated until the desired sample interval has been augered and placed into the collection pan.

If the desired sample interval is located at a specific depth below the ground surface, the unwanted interval can be removed with one auger and the soil

discarded. Sample collection can then proceed in normal fashion using a clean auger or following decontamination of the original auger.

Except for VOA sample fractions, the remainder of the soil sample should be thoroughly homogenized in the soil collection pan prior to bottling.

The appropriate sample containers should be filled with soil from the collection pan. Once each sample container is filled, the rim and threads of the sample container will be cleaned of gross soil by wiping with a paper towel, then capped and labeled. Do not submerge the sample containers in water to clean them. Once labeled the sample containers should be placed into a cooler for protection. Sample chain-of-custody and other documentation requirements should be completed at this time.

All used sampling equipment should be decontaminated prior to reuse and investigation-derived waste should be properly contained before leaving the area.

The sample hole should be backfilled to eliminate any surface hazard. The project sampling plan may indicate the requirements for backfilling of the sample hole.

5.0 QUALITY CONTROL

Quality control requirements for sample collection are dependent on project-specific sampling objectives. The Quality Assurance Project Plan (QAPP) will provide requirements for sample preservation and holding times, container types, sample packaging and shipment, as well as requirements for the collection of various quality assurance samples such as trip blanks, field blanks, equipment blanks, and field duplicate samples.

6.0 DOCUMENTATION

Various forms are required to ensure that adequate documentation is made of the sample collection activities. These forms include:

- Field log books
- Sample collection records
- Chain-of-custody forms
- Shipping labels

The field book will be maintained as an overall log of all samples collected throughout the study. Sample collection records are generated for each sample collected and include specific

information about the sample (Figure 1). Chain-of-custody forms are transmitted with the samples to the laboratory for sample tracking purposes. Shipping labels are required if sample coolers are to be transported to the laboratory by a third party (courier service). Original and/or copies of these documents will be retained in the appropriate project files.

7.0 TRAINING/QUALIFICATIONS

Surface soil sampling is a relatively simple procedure requiring minimal training and a relatively small amount of equipment. It is, however, recommended that initial attempts be supervised by more experienced personnel. Sampling personnel should be health and safety certified as specified by OSHA (29 CFR 1910.120(e)(3)(i)) to work on sites where hazardous materials may be present.

8.0 REFERENCES

Not applicable.

FIGURE 1 Surface Soil Sample Log

ENSR

SURFACE SOIL SAMPLE LOG

Project Number: _____ Project Location: _____

Sample Point No.: _____

Date: _____ Time:

Sample Point Description/Designation: _____

_____

_____

_____

SAMPLE COLLECTION

Equipment Used: _____

No. of Samples Collected: Container Size: _____

Sample Number	Depth	Type of Material	Analyses Requested

Comments:

Lab Designation _____

Shipping ID Number: _____

Collector's Name _____

SOP NUMBER: 7600

Decontamination of Field Equipment

Date:	4th Qtr. 1994
Revision Number:	4
Author:	Charles Martin
Discipline:	Geosciences

1.0 PURPOSE AND APPLICABILITY

1.1 Purpose and Applicability

This SOP describes the methods to be used for the decontamination of field equipment used in the collection of environmental samples. The list of field equipment may include a variety of items used in the collection of soil and/or water samples, such as split-spoon samplers, trowels, scoops, spoons, bailers and pumps. Heavy equipment such as drill rigs and backhoes also require decontamination, usually in a specially constructed temporary decontamination area.

Decontamination is performed as a quality assurance measure and a safety precaution. Improperly decontaminated sampling equipment can lead to misinterpretation of environmental data due to interference caused by cross-contamination. Decontamination protects field personnel from potential exposure to hazardous materials. Decontamination also protects the community by preventing transportation of contaminants from a site.

This SOP emphasizes decontamination procedures to be used for decontamination of reusable field equipment. Occasionally, dedicated field equipment such as well construction materials (well screen and riser pipe) or disposable field equipment (bailers or other general sampling implements) may also require decontamination prior to use. The project-specific work plan should indicate the specific decontamination requirements for a particular project.

Respective state or federal agency (regional offices) regulations may require specific types of equipment or procedures for use in decontamination of field equipment. The project manager should review the applicable regulatory requirements, if any, prior to the start of the field investigation program.

1.2 General Principles

Decontamination is accomplished by manually scrubbing, washing, or spraying equipment with detergent solutions, tap water, distilled/deionized water, steam and/or high pressure water, or solvents. The decontamination method and agents

are generally determined on a project-specific basis and must be stated in the Quality Assurance Project Plan (QAPP).

Generally, decontamination of equipment is accomplished at each sampling site between collection points. Waste decontamination materials such as spent liquids and solids will be collected and managed as investigation-derived waste for later disposal. All decontamination materials, including wastes, should be stored in a central location so as to maintain control over the quantity of materials used or produced throughout the investigation program.

1.3 Quality Assurance Planning Considerations

1.3.1 General Considerations

Sampling personnel should follow specific quality assurance guidelines as outlined in the site-specific QAPP. The QAPP guidelines typically require collection of equipment blank samples in order to determine the effectiveness of the decontamination procedure.

The decontamination method, solvent, frequency, location on site and the method of containment and disposal of decontamination wash solids and solutions are dependent on site logistics, site-specific chemistry, and nature of the contaminated media to be studied and the objectives of the study. Each topic must be considered and addressed during development of a decontamination strategy and should be outlined in the Quality Assurance Project Plan (QAPP).

1.3.2 Solvent Selection

There are several factors which need to be considered when deciding upon a decontamination solvent. The solvent should not be an analyte of interest. The sampling equipment must be resistant to the solvent. The solvent must be evaporative or water soluble or preferably both. The applicable regulatory agency may have specific requirements regarding decontamination solvents. The QAPP should specify the type of solvent to be used for a particular project.

The analytical objectives of the study must also be considered when deciding upon a decontamination solvent. Pesticide-grade methanol is the solvent of choice for general organic analyses. It is relatively safe and effective. Hexane, acetone, and isopropanol are sometimes used as well. A 10% nitric acid in deionized water solution is the solvent of choice for general metals

analyses. Nitric acid can be used only on Teflon, plastics and glass. If used on metal equipment, nitric acid will eventually corrode the metal and lead to the introduction of metals to the collected samples. Dilute hydrochloric acid is usually preferred over nitric acid when cleaning metal sampling equipment.

Equipment decontamination should be performed a safe distance away from the sampling area so as not to interfere with sampling activities but close enough to the sampling area to maintain an efficient working environment. If heavy equipment such as drill rigs or backhoes are to be decontaminated, then a central decontamination station should be constructed with access to a power source and water supply.

1.4 Health and Safety Considerations

Decontamination procedures may involve chemical exposure hazards associated with the type of contaminants encountered or solvents employed and may involve physical hazards associated with decontamination equipment. When decontamination is performed on equipment which has been in contact with hazardous materials or when the quality assurance objectives of the project require decontamination with chemical solvents, the measures necessary to protect personnel must be addressed in the project Health and Safety Plan (HASP). This plan must be approved by the project Health and Safety Officer before work commences, must be distributed to all personnel performing equipment decontamination, and must be adhered to as field activities are performed.

2.0 RESPONSIBILITIES

2.1 Sampling Technician

It is the responsibility of the sampling technician to be familiar with the decontamination procedures outlined within this SOP and with specific quality assurance, and health and safety requirements outlined within project-specific work plans (HASP, QAPP). The sampling technician is responsible for decontamination of field equipment and for proper documentation of decontamination activities. The sampling technician is also responsible for ensuring that decontamination procedures are followed by subcontractors when heavy equipment requires decontamination.

2.2 Field Project Manager

The field project manager is responsible for ensuring that the required decontamination procedures are followed at all times. The project manager is also responsible for ensuring that subcontractors construct and operate their decontamination facilities according to project specifications. The project manager is responsible for collection and control of IDW in accordance with project specifications.

3.0 REQUIRED MATERIALS

- Decontamination agents (per work plan requirements):
  - LIQUI-NOX, ALCONOX, or other phosphate-free biodegradable detergent,
  - Tap water,
  - Distilled/deionized water,
  - Nitric acid and/or hydrochloric acid,
  - Methanol and/or hexane, acetone, isopropanol.
- Health and Safety equipment
- Chemical-free paper towels
- Waste storage containers: drums, 5-gallon pails w/covers, plastic bags
- Cleaning containers: plastic buckets or tubs, galvanized steel pans, pump cleaning cylinder
- Cleaning brushes
- Pressure sprayers
- Squeeze bottles
- Plastic sheeting
- Aluminum foil
- Field project notebook/pen

4.0 METHODS

4.1 General Preparation

4.1.1 It should be assumed that all sampling equipment, even new items, are contaminated until the proper decontamination procedures have been performed on them or unless a certificate of analysis is available which demonstrates the items cleanliness.

Field equipment that is not frequently used should be wrapped in aluminum foil, shiny side out, and stored in a designated "clean" area. Small field equipment can also be stored in plastic bags to eliminate the potential for contamination. Field equipment should be inspected and decontaminated prior to use if the equipment appears contaminated and/or has been stored for long periods of time. Unless customized procedures are stated in the QAPP for decontamination of equipment, the standard procedures specified in this SOP shall be followed.

4.1.2 Establish the decontamination station within an area that is convenient to the sampling location. If single samples will be collected from multiple locations, then a centralized decontamination station, or a portable decontamination station should be established.

4.1.3 An investigation-derived waste (IDW) containment station should be established at this time also. The project-specific work plan should specify the requirements for IDW containment. In general, decontamination solutions are discarded as IDW between sampling locations. Solid waste is disposed of as it is generated.

4.2 Decontamination for Organic Analyses

4.2.1 This procedure applies to soil sampling and groundwater sampling equipment used in the collection of environmental samples submitted for organic constituents analysis. Examples of relevant items of equipment include split-spoons, trowels, scoops/spoons, bailers, and other small items. Submersible pump decontamination procedures are outlined in Section 4.4.

4.2.2 Decontamination is to be performed before sampling events and between sampling points.

4.2.3 After a sample has been collected, remove all gross contamination from the equipment or material by brushing and then rinsing with available tap water.

This initial step may be completed using a 5-gallon pail filled with tap water. Steam or a high-pressure water rinse may also be conducted to remove solids and/or other contamination.

4.2.4 Wash the equipment with a phosphate-free detergent and tap water solution. This solution should be kept in a 5-gallon pail with its own brush.

4.2.5 Rinse with tap water or distilled/deionized water until all detergent and other residue is washed away. This step can be performed over an empty bucket using a squeeze bottle or pressure sprayer.

4.2.6 Rinse with methanol or other appropriate solvent using a squeeze bottle or pressure sprayer. Rinsate should be collected in a waste bucket.

4.2.7 Rerinse with deionized water to remove any residual solvent. Rinsate should be collected in the solvent waste bucket.

4.2.8 Allow the equipment to air-dry in a clean area or blot with chemical-free paper towels before reuse. Wrap the equipment in tin foil and/or seal it in a plastic bag if it will not be reused for a while.

4.2.9 Dispose of soiled materials and spent solutions in the designated IDW disposal containers.

4.3 Decontamination for Inorganic (Metals) Analyses

4.3.1 This procedure applies to soil sampling equipment used primarily in the collection of environmental samples submitted for inorganic constituents analysis. Examples of relevant items of equipment include split-spoons, trowels, scoops/spoons, bailers, and other small items.

4.3.2 For plastic and glass sampling equipment, follow the steps outlined in 4.2 above, however, use a 10% nitric acid solution (acid in water) in place of the solvent rinse in Section 4.2.6.

4.3.3 For metal sampling equipment, follow the steps outlined in 4.2 above, however, use a 10% hydrochloric acid solution (acid in water) in place of the solvent rinse in Section 4.2.6.

4.4 Decontamination of Submersible Pumps

4.4.1 This procedure will be used to decontaminate submersible pumps before and between ground-water sample collection points. This procedure applies to both electric submersible and bladder pumps. This procedure also applies to discharge tubing if it will be reused between sampling points.

4.4.2 Prepare the decontamination area if pump decontamination will be conducted next to the sampling point. If decontamination will occur at another location, the pump and tubing may be removed from the well and placed into a clean trash bag for transport to the decontamination area. Pump decontamination is easier with the use of 3-foot tall pump cleaning cylinders (i.e., Nalgene cylinder) for the various cleaning solutions, although the standard bucket rinse equipment may be used.

4.4.3 Once the decontamination station is established, the pump should be removed from the well and the discharge tubing and power cord coiled by hand as the equipment is removed. If any of the equipment needs to be put down temporarily, place it on a plastic sheet (around well) or in a clean trash bag. If a disposable discharge line is used it should be removed and discarded at this time.

4.4.4 As a first step in the decontamination procedure, use a pressure sprayer with tap water to rinse the exterior of the pump, discharge line, and power cord as necessary. Collect the rinsate and handle as IDW.

4.4.5 Place the pump into a pump cleaning cylinder or bucket containing a detergent solution (detergent in tap water). Holding the tubing/power cord, pump solution through the pump system. A minimum of one gallon of detergent solution should be pumped through the system. Collect the rinsate and handle as IDW.

4.4.6 Place the pump into another cylinder/bucket containing a 10% solution of solvent (methanol, or other designated solvent) in distilled/deionized water. Pump until the detergent solution is removed. Collect the rinsate and handle as IDW.

4.4.7 Place the pump into another cylinder/bucket containing distilled/deionized water. Pump a minimum of 3 to 5 pump system volumes (pump and tubing) of water through the system. Collect the rinsate and handle as IDW.

4.4.8 Remove the pump from the cylinder/bucket and if the pump is reversible, place the pump in the reverse mode to discharge all removable water from the system. If the pump is not reversible the pump and discharge line should be drained by hand as much as possible. Collect the rinsate and handle as IDW.

4.4.9 Using a pressure sprayer with distilled/deionized water, rinse the exterior of the pump, discharge line, and power cord thoroughly, shake all excess water, then place the pump system into a clean trash bag for storage. If the pump system will not be used again right away, the pump itself should also be wrapped with aluminum foil before placing it into the bag.

4.5 Decontamination of Large Equipment

4.5.1 Consult the QAPP for instruction on the location of the decontamination station and the method of containment of the wash solutions. On large projects usually a temporary decontamination facility (decontamination pad) is required which may include a membrane-lined and bermed area large enough to drive heavy equipment (drill rig, backhoe) onto with enough space to spread other equipment and to contain overspray. Usually a small sump with pump is necessary to collect and contain rinsate. A water supply and power source is also necessary to run steam cleaning and/or pressure washing equipment.

4.5.2 Upon arrival and prior to leaving a sampling site, all heavy equipment such as drill rigs, trucks, and backhoes should be thoroughly cleaned and then the parts of the equipment which come in contact or in close proximity to sampling activity should be decontaminated. This can be accomplished in two ways, steam cleaning or high pressure water wash and manual scrubbing. Following this initial cleaning, only those parts of the equipment which come in close proximity to the sampling activities (i.e., auger stems, rods, backhoe bucket) must be decontaminated in between sampling events.

Occasionally, well construction materials such as well screen and riser pipe may require decontamination before the well materials are used. These materials may be washed in the decontamination pad, preferably on a raised surface above the pad (i.e., on sawhorses), with clean plastic draped over the work surfaces. Well materials usually do not require a multistep cleaning process as they generally arrive clean from the manufacturer. Usually, a thorough steam-cleaning of the interior/exterior of the well materials will be sufficient. The QAPP should provide specific guidance regarding decontamination of well materials.

5.0 QUALITY CONTROL

5.1 Field Blank Sample Collection

General guidelines for quality control check of field equipment decontamination usually require the collection of one field blank from the decontaminated equipment per day. The QAPP should specify the type and frequency of collection of each type of quality assurance sample.

Field blanks are generally made by pouring laboratory-supplied deionized water into, over, or through the freshly decontaminated sampling equipment and then transferring this water into a sample container. Field blanks should then be labeled as a sample and submitted to the laboratory to be analyzed for the same parameters as the associated sample. Field blank sample numbers, as well as collection method, time and location should be recorded in the field notebook.

6.0 DOCUMENTATION

Specific information regarding decontamination procedures should be documented in the project-specific field notebook. Documentation within the notebook should thoroughly describe the construction of each decontamination facility and the decontamination steps implemented in order to show compliance with the project work plan. Decontamination events should be logged when they occur with the following information documented:

- Date, time and location of each decontamination event
- Equipment decontaminated
- Method
- Solvents
- Noteable circumstances
- Identification of field blanks and decontamination rinsates
- Method of blank and rinsate collection
- Date, time and location of blank and rinsate collection
- Disposition of IDW

Repetitive decontamination of small items of equipment does not need to be logged each time the item is cleaned.

7.0 TRAINING/QUALIFICATIONS

All sampling technicians performing decontamination must be properly trained in the decontamination procedures employed, the project data quality objectives, health and safety

procedures and the project QA procedures. Specific training or orientation will be provided for each project to ensure that personnel understand the special circumstances and requirements of that project. Field personnel should be health and safety certified as specified by OSHA (29 CFR 1910.120(e)(3)(i)) to work on sites where hazardous materials may be present.

8.0 REFERENCES

Not applicable.

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