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15 May 2012
File No. 36795-027/029

New York State Department of Environmental Conservation
Division of Environmental Remediation, Region 9
270 Michigan Avenue
Buffalo, New York 14203

Attention: Mr. Glenn May
Environmental Geologist II

Subject: Pre-Design Investigation – Sub-Slab Depressurization Systems
Buildings 7 and 8 BCP Sites #C932138 / C932139
200 Upper Mountain Road
Lockport, New York

Dear Mr. May:

On behalf of GM Components Holdings, LLC, (GMCH) Haley & Aldrich of New York (Haley & Aldrich) has prepared this Work Plan to conduct Pre-Design Investigation (PDI) activities at the GMCH Lockport facility located at 200 Upper Mountain Road, Lockport, New York. The Remedial Investigation Reports (RIR; Haley & Aldrich/GZA, 2011) for the Building 7 Brownfield Cleanup Program (BCP) Site and Building 8 BCP Site were approved by the New York State Department of Environmental Conservation (Department) on 29 December 2011 and a DRAFT Remedial Work Plan (H&A/GZA, 2011) was submitted to the Department for review on 29 December 2011.

The goals of the PDI will be to evaluate the design parameters for the installation and operation of a sub-slab depressurization system (SSDS) as part of the proposed remedy for Building 7 (BCP Site #C932138) and Building 8 (BCP Site #C932139). The Work Plan includes the methods to collect specific information related to the SSDS installation and assist in the design of the SSDS as a component of future remedial actions for each Site.

To confirm design assumptions presented in the DRAFT Remedial Work Plan, on-site PDI will be conducted within Building 7 and Building 8. Two (2) pilot test locations within Building 7 and one (1) pilot test location within Building 8 were selected based on current plant operations and the results of sub-slab vapor samples collected during the RI. Figure 1 and 2 present the locations for PDI activities in Buildings 7 and 8, respectively. The PDI will provide data and information for the following system specifications:

- Determine the number of suction points to maintain sub-slab depressurization (vacuum) for the area of impacts identified during the RI. Applied vacuum measurements will be obtained through the installation of small diameter vacuum measurement points, and measuring sub-slab pressure using a handheld micro-manometer;

- Measurement of extracted sub-slab vapor contaminant concentrations. Samples of the vacuum blower effluent will be obtained during the pilot test and analyzed using a gas chromatograph to determine chemical specific discharge rates;

- Measurement of extracted vapor air flow rates to determine the annual Potential To Emit (PTE) for each suction point;

BLOWER SYSTEM / SUB-SLAB VACUUM MEASUREMENTS

A three (3) horsepower (hp) explosion proof regenerative blower will be used to conduct the PDI. The blower is capable of producing a process air flow of 100 cubic feet per minute (CFM) at 70-inches of water column (”WC) vacuum, 150 CFM at 40”WC of water column and 215 CFM maximum flow. The blower system and piping will be equipped with dampening valves, vacuum gauges and flow meters so adjustments can be made during the PDI to achieve variable air flow and vacuum levels. Figure 3 presents the anticipated configuration of the vacuum blower system, suction pit and associated piping to be installed for the PDI.

Sub-slab vacuum measurement (VM) points will be installed through the concrete floor to a depth of approximately 0.5 inches below the slab. Each VM point will be manually emplaced and connected to high density polyethylene (HDPE) tubing extended through the floor surface. The borehole around the tubing will be sealed using non-shrink grout. Sub-slab vacuum measurements will be collected from each VM point prior to start up (to determine background conditions), at startup of the vacuum blower system, and at least once daily thereafter during the testing period using a micromanometer with a minimum resolution of 0.001 inches of water column (” W.C.). Figure 4 presents the installation detail for the sub-slab vacuum monitoring point.

EFFLUENT VAPOR SAMPLING AND ANALYSIS

Representative samples of the vacuum blower system effluent will be collected from the discharge piping during the PDI. Effluent samples will be collected using Tedlar® sampling bags and analyzed using a gas chromatograph equipped with a flame ionization detector (FID) calibrated for tetrachloroethene (PCE), trichloroethene (TCE), cis 1,2-dichloroethene (cis 1,2 DCE) and vinyl chloride (VC). Samples will be collected upon start-up of the vacuum blower system and at least once daily during the operation of the blower system to determine the concentration of PCE and TCE.

Concurrent with sample collection, the effluent discharge flow rate will be determined in units of feet per minute (FPM) using a handheld anemometer. The concentration of contaminants detected and the flow rate measured will be used to establish the emission rate in pounds per hour (lb/hr) for the suction point location. Attachment 1 provides the procedure for sample collection and analysis.

AMBIENT AIR MONITORING

Real-time ambient air monitoring will be completed during the PDI activities and during data collection for total volatile organic compounds (VOC) and combustible gases. Monitoring will be conducted prior to starting construction activities to establish background levels within the work areas.

An organic vapor meter (OVM) equipped with a photoionization detector (PID) equipped with a 10.6 eV lamp will be used to monitor the breathing zone of workers performing excavation activities and assess the potential presence of total organic vapors in the work zone. Monitoring with the OVM will be conducted at a frequency necessary to adequately characterize airborne contamination levels in the breathing zone and work area. Initial monitoring will be most frequent and will be continuous during activities which involve removing the concrete floor and exposing the sub-slab air and sub-base. Readings will be collected from the top of the floor opening, breathing zone and work area.

Additional monitoring using a combustible gas indicator (CGI) will be conducted during operation of gasoline or propane powered equipment. If combustible gas levels equal 10% or greater of the lower explosive limit (LEL) or if oxygen levels are less than 19.5% or greater than 23.5%, operation of the powered equipment will be shut down, the work area evacuated.

Equipment calibration will be performed in accordance with the manufacturer's instructions. Field checks using the appropriate reference standards will be made on-Site at the minimum frequency of twice per shift (start of day and mid-day). A daily log of instrument readings, as well as all field reference checks, calibration information, and corrective actions will be maintained in the project field book. The project field book will be reviewed by the Project Site Safety Officer and Project Manager and provided to the GMCH Health & Safety personnel.

HEALTH AND SAFETY

A task-specific health and safety plan (HASP) prepared to address health and safety issues related to the work scope is provided as Attachment 2. The HASP describes the procedures for maintaining a safe work area at the site and precautions that will be employed by site workers to protect against potential exposure to chemical and physical hazards.

Prior to commencing work, all field personnel will be required to review and sign the site-specific health and safety requirements. If site conditions change, the HASP will be updated as necessary to protect site worker. A copy of the signed HASP will be available on site for reference by field personnel and site visitors during execution of the pilot testing/sampling program.

WASTE DISPOSAL

All sub-surface soil and concrete will be placed into solid waste containers provided by the facility. The containers will be sealed and appropriately labeled and placed within a temporary containment area. At the end of the pilot testing program, the solid waste materials will be removed from the work area for off-site disposal by facility personnel in accordance with approved facility procedures.

SCHEDULE

With the approval of the Work Plan by the Department, we anticipate completion of the scope of work within 30 days. Below is our anticipated schedule to complete the PDI.

- Week 1 - Installation of Suction Pit and discharge piping.
- Week 2 – Day 1-3 - Pilot Test operation - Building 8

- Week 2 – Day 4-6 – Pilot Test operation - Building 7 Location 1
- Week 3 - Day 1-3 - Pilot Test operation – Building 7 Location 2

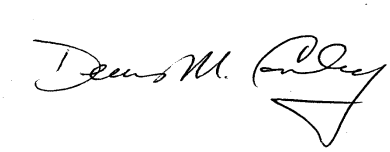
REPORTING

The results of the PDI will be provided in the next monthly report to be submitted to the Department as part of the BCA requirements. The information to be provided in the monthly report will include:

- A description of the activities conducted
- Summary tables of the field measurements taken and the analytical testing results
- A summary of any observations that may impact the design of the proposed SSDS for the impacted area and explanation of the changes (if any) in the assumptions used to develop the Opinion of Probable Cost for the Indoor Air Remedy presented in the DRAFT RWP for each Site, and;
- Considerations for additional testing if necessary.

If there are questions or any additional information needs, please do not hesitate to call us 585.321.4245.

Sincerely yours,
HALEY & ALDRICH OF NEW YORK



Denis Conley
Senior Scientist

David Hagen
Sr. Vice President

Figures
Attachments

REFERENCES

1. Final Remedial Investigation Report, Building 7 BCP Site #c932138, GMCH Lockport Facility, 200 Upper Mountain Road, Lockport, New York, Haley & Aldrich/GZA Environmental, 2011.

2. Final Remedial Investigation Report, Building 8 BCP Site #c932139, GMCH Lockport Facility, 200 Upper Mountain Road, Lockport, New York, Haley & Aldrich/GZA Environmental, 2011.

3. DRAFT Remedial Work Plan, Building 7 BCP Site #c932138, GMCH Lockport Facility, 200 Upper Mountain Road, Lockport, New York, Haley & Aldrich/GZA Environmental, 2011.

4. DRAFT Remedial Work Plan, Building 8 BCP Site #c932139, GMCH Lockport Facility, 200 Upper Mountain Road, Lockport, New York, Haley & Aldrich/GZA Environmental, 2011.

5. "Technical Guidance for Site Investigation and Remediation", NYSDEC Division of Environmental Remediation DER-10, dated May 2010.

6. "Final Guidance for Evaluating Soil Vapor Intrusion in the State New York", New York State Department of Health (NYSDOH), dated October 2006.

7-VI-6	7-VI-6IA 1/18/2011	7-VI-6IA 1/20/2011	7-VI-6SS 1/20/2011
1,1,1-Trichloroethane	2.2 U/1.1 U	0.87 U	0.87 U
1,1-Dichloroethene	0.79 U/1.6 U	0.63 U	0.63 U
Carbon tetrachloride	1.3 U/0.64	0.51	0.50 U
cis-1,2-Dichloroethene	0.79 U/1.6 U	1.2	2.0
Tetrachloroethene	9.6/11	4.7	12
Trichloroethene	7.2/5.6	3.5	160
Vinyl chloride	1.0 U/0.51 U	0.41 U	0.41 U

7-VI-7	7-VI-7IA 1/18/2011	7-VI-7SS 1/18/2011
1,1,1-Trichloroethane	1.1 U	10000 U
1,1-Dichloroethene	0.79 U	7900
Carbon tetrachloride	0.63 U	6000 U
cis-1,2-Dichloroethene	1.3	2400000
Tetrachloroethene	16	7600000
Trichloroethene	10	1800000
Vinyl chloride	0.51 U	24000

7-VI-8	7-VI-8IA 1/18/2011	7-VI-8SS 1/18/2011
1,1,1-Trichloroethane	2.3 U	220 U
1,1-Dichloroethene	1.7 U	160 U
Carbon tetrachloride	1.4 U	130 U
cis-1,2-Dichloroethene	34	2000
Tetrachloroethene	230	70000
Trichloroethene	53	16000
Vinyl chloride	1.1 U	100 U

7-VI-9	7-VI-9IA 1/18/2011	7-VI-9SS 1/18/2011
1,1,1-Trichloroethane	0.44 U	20 U
1,1-Dichloroethene	0.32 U	130
Carbon tetrachloride	0.51	11 U
cis-1,2-Dichloroethene	1.9	1000
Tetrachloroethene	5.4	11000
Trichloroethene	5.8	1300
Vinyl chloride	0.24	16

7-VI-3	7-VI-3IA 1/18/2011	7-VI-3SS 1/18/2011
1,1,1-Trichloroethane	1.1 U	1.1 U
1,1-Dichloroethene	0.79 U	0.79 U
Carbon tetrachloride	0.63 U	1.7
cis-1,2-Dichloroethene	1.2	0.79 U
Tetrachloroethene	7.3	290
Trichloroethene	6.9	63
Vinyl chloride	0.51 U	0.51 U

7-VI-10	7-VI-10IA 1/18/2011	7-VI-10SS 1/18/2011
1,1,1-Trichloroethane	4.4 U	2.2 U
1,1-Dichloroethene	3.2 U	1.6 U
Carbon tetrachloride	2.5 U	1.3 U
cis-1,2-Dichloroethene	3.2 U	1.6 U
Tetrachloroethene	13	110
Trichloroethene	7.9	17
Vinyl chloride	2.0 U	1.0 U

7-VI-5	7-VI-5IA 1/18/2011	7-VI-5SS 1/18/2011
1,1,1-Trichloroethane	1.1 U	230 U
1,1-Dichloroethene	0.79 U	170 U
Carbon tetrachloride	0.63 U	130 U
cis-1,2-Dichloroethene	0.86	310
Tetrachloroethene	6.5	760
Trichloroethene	4.8	480
Vinyl chloride	0.51 U	310

7-VI-4	7-VI-4IA 1/18/2011	7-VI-4SS 1/18/2011
1,1,1-Trichloroethane	0.87 U	8.7 U
1,1-Dichloroethene	0.63 U	6.3 U
Carbon tetrachloride	0.61	5.0 U
cis-1,2-Dichloroethene	2.3	1700
Tetrachloroethene	6.7	280
Trichloroethene	7.3	2300
Vinyl chloride	0.41 U	46

7-VI-2	7-VI-2IA 1/18/2011	7-VI-2SS 1/18/2011
1,1,1-Trichloroethane	2.2 U	53 U
1,1-Dichloroethene	1.6 U	41
Carbon tetrachloride	1.3 U	31 U
cis-1,2-Dichloroethene	1.6 U	410
Tetrachloroethene	5.0	2200
Trichloroethene	2.7	10000
Vinyl chloride	1.0 U	25 U

7-VI-1	7-VI-1IA 1/18/2011	7-VI-1SS 1/18/2011
1,1,1-Trichloroethane	4.4 U/2.2 U	4.4 U
1,1-Dichloroethene	3.2 U/1.6 U	3.2 U
Carbon tetrachloride	2.5 U/1.3 U	2.5 U
cis-1,2-Dichloroethene	3.2 U/1.6 U	15
Tetrachloroethene	5.4 U/4.0	39
Trichloroethene	2.7/3.0	9.9
Vinyl chloride	2.0 U/1.0 U	2.0 U

7-VI-11	7-VI-11IA 1/18/2011	7-VI-11SS 1/18/2011
1,1,1-Trichloroethane	0.87 U	1.1 U
1,1-Dichloroethene	0.63 U	0.79 U
Carbon tetrachloride	0.59	0.70
cis-1,2-Dichloroethene	0.63 U	6.4
Tetrachloroethene	8.2	200
Trichloroethene	6.5	15
Vinyl chloride	0.41 U	0.51 U

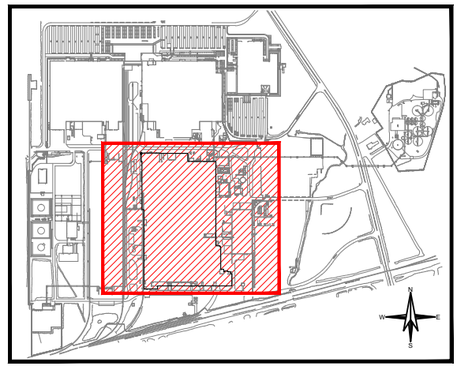
Pilot Test Locations

LEGEND:

- VAPOR INTRUSION SAMPLING POINT
- APPROXIMATE LOCATION OF SOIL BORING
- ERM BORING LOCATION
- APPROXIMATE LOCATION OF MONITORING WELL

NOTES:

1. THIS FIGURE IS BASED ON THE DRAWING PROVIDED BY DELPHI THERMAL AND INTERIOR SYSTEMS, DATED SEPTEMBER 2007.
2. THE LOCATIONS OF THE MONITORING WELLS WERE DETERMINED BY GEOENVIRONMENTAL OF NEW YORK. THE LOCATIONS OF MONITORING WELLS SHOULD BE CONSIDERED APPROXIMATE.
3. DATABOXES SHOWN IN UG/M3.
4. ONLY CHEMICALS WITH CRITERIA SHOWN IN BOXES.
5. RESULTS IN RED EXCEED CRITERIA.
6. DATA QUALIFIERS:
   U - RESULT WAS NOT DETECTED ABOVE REPORTING LIMIT.
   J - ESTIMATED RESULT



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HALEY & ALDRICH

GM COMPONENTS HOLDINGS, LLC.
LOCKPORT FACILITY
200 UPPER MOUNTAIN ROAD
LOCKPORT, NEW YORK

BUILDING 7 SSDS TEST LOCATIONS

SCALE: AS SHOWN

MAY 2012

FIGURE 1

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8-VI-2	8-VI-2IA 1/18/2011	8-VI-2SS 1/18/2011
1,1,1-Trichloroethane	0.87 U	2.2 U
1,1-Dichloroethene	0.63 U	1.6 U
Carbon tetrachloride	0.54	1.3 U
cis-1,2-Dichloroethene	1.5	190
Tetrachloroethene	5.0	35
Trichloroethene	7.0	190
Vinyl chloride	0.41 U	1.9

8-VI-1	8-VI-1IA 1/18/2011	8-VI-1SS 1/18/2011
1,1,1-Trichloroethane	2.2 U/1.5	0.87 U
1,1-Dichloroethene	1.6 U/0.63 U	0.63 U
Carbon tetrachloride	0.60/1.3 UJ	0.50 U
cis-1,2-Dichloroethene	2.2/2.1	0.63 U
Tetrachloroethene	9.6/8.9	13
Trichloroethene	11/11	5.7
Vinyl chloride	1.0 U/0.41 U	0.41 U

8-VI-4	8-VI-4IA 1/18/2011	8-VI-4SS 1/18/2011
1,1,1-Trichloroethane	0.87 U	2.2 U
1,1-Dichloroethene	0.63 U	1.6 U
Carbon tetrachloride	0.63	1.3 U
cis-1,2-Dichloroethene	3.7	6.7
Tetrachloroethene	8.7	11
Trichloroethene	16	45
Vinyl chloride	0.41 U	1.0 U

8-VI-3	8-VI-3IA 1/18/2011	8-VI-3SS 1/18/2011
1,1,1-Trichloroethane	0.87 U	0.44 U
1,1-Dichloroethene	0.63 U	0.32 U
Carbon tetrachloride	0.63	0.57
cis-1,2-Dichloroethene	2.6	3.3
Tetrachloroethene	7.2	1.2
Trichloroethene	13	19
Vinyl chloride	0.41 U	0.20 U

8-VI-5	8-VI-5IA 1/18/2011	8-VI-5SS 1/18/2011
1,1,1-Trichloroethane	4.4 U	16000 U
1,1-Dichloroethene	3.2 U	12000 U
Carbon tetrachloride	2.5 U	9400 U
cis-1,2-Dichloroethene	3.3	830000
Tetrachloroethene	11	20000 U
Trichloroethene	11	4200000
Vinyl chloride	2.0 U	7700 U

8-VI-1
8-VI-2
8-VI-3
8-VI-4
8-VI-5
8-002-B
8-002-C
8-002-A
8-001-F
8-001-B
8-001-G
8-001-C
8-001-E
8-001-I
8-001-H
8-001-A
8-001-J
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8-005-2-A
8-005-2-C
8-005-3B
8-005-3A
8-005-3C
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8-006-C
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8-SB-4
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8-SB-6
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8-SB-8
8-SB-9
8-SB-10
8-SB-11
8-SB-12
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MW-8-2
MW-8-3
MW-8-4
MW-8-003-B
MW-6-F-7
MW-6-F-9
MW-4
MW-7
MW-3S
7-FF-1
7-M-2
7-SB-10
GS-C
BUILDING 8
BUILDI
PILOT TEST LOCATION

LEGEND:

- VAPOR INTRUSION SAMPLING POINT
- TCE AREA MONITORING WELL WITHIN THE ENVIRONMENTAL EASEMENT AREA, PREVIOUSLY LOCATED. (APPROXIMATE LOCATION)
- APPROXIMATE LOCATION OF SOIL BORING
- ERM BORING LOCATION
- APPROXIMATE LOCATION OF MONITORING WELL

NOTES:

1. THIS FIGURE IS BASED ON THE DRAWING PROVIDED BY DELPHI THERMAL AND INTERIOR SYSTEMS, DATED SEPTEMBER 2007.
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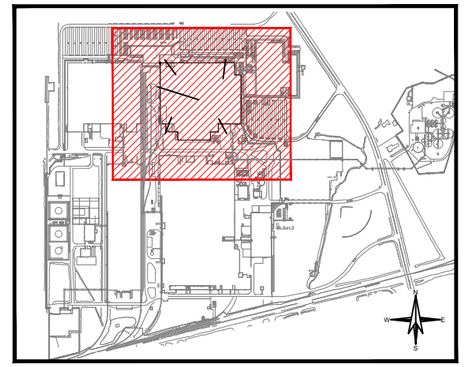
4. ONLY CHEMICALS WITH CRITERIA SHOWN IN BOXES.
5. RESULTS IN RED EXCEED CRITERIA.
6. DATA QUALIFIERS:
   U - RESULT WAS NOT DETECTED ABOVE REPORTING LIMIT.
   J - ESTIMATED RESULT



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GM COMPONENTS HOLDINGS, LLC.
LOCKPORT FACILITY
200 UPPER MOUNTAIN ROAD
LOCKPORT, NEW YORK

BUILDING 8
SSDS TEST LOCATION

SCALE: AS SHOWN

MAY 2012

FIGURE 2

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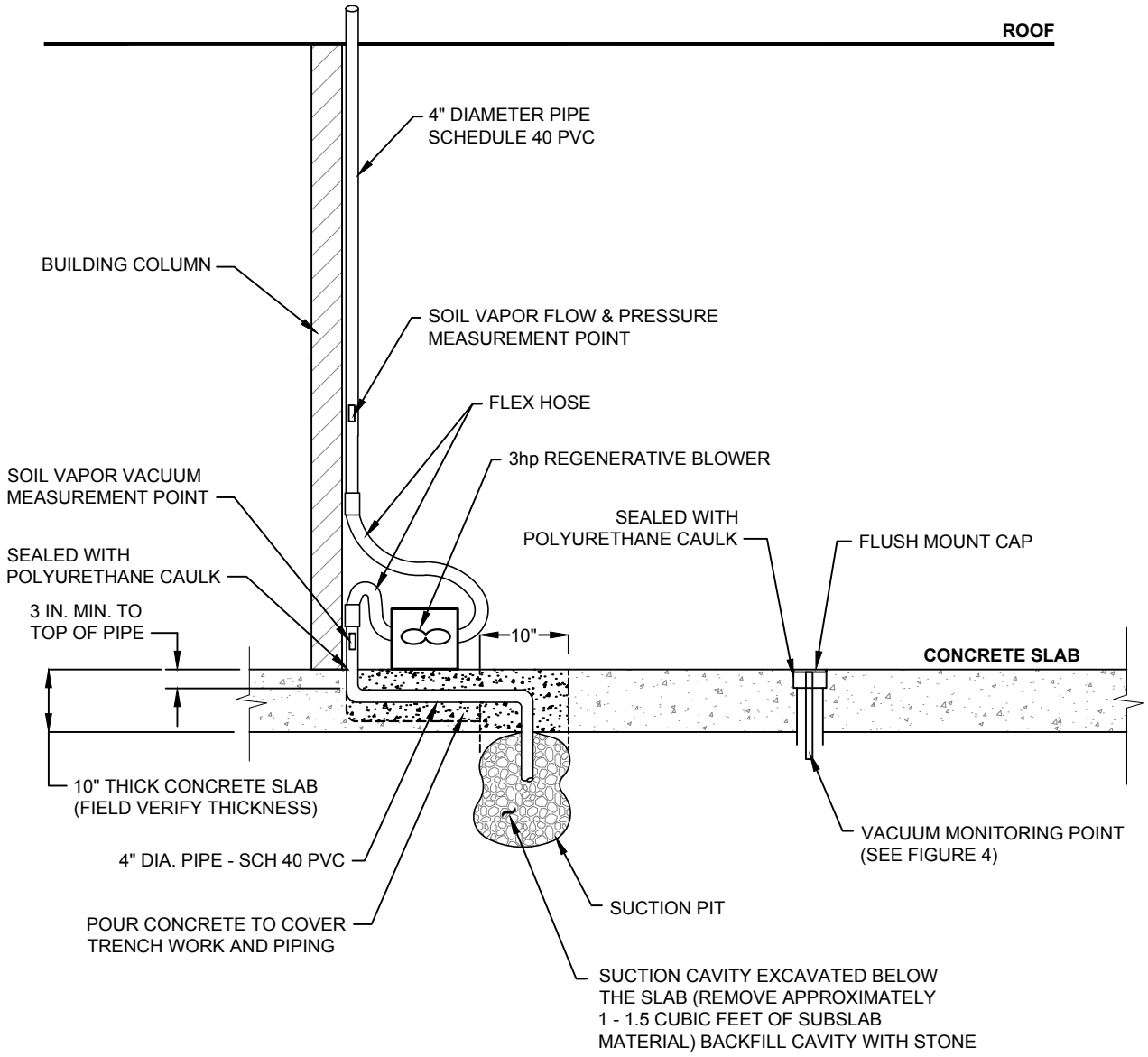

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SUB-SLAB DEPRESSURIZATION SYSTEM PILOT TEST
GMCH LOCKPORT FACILITY
200 UPPER MOUNTAIN ROAD
LOCKPORT, NEW YORK

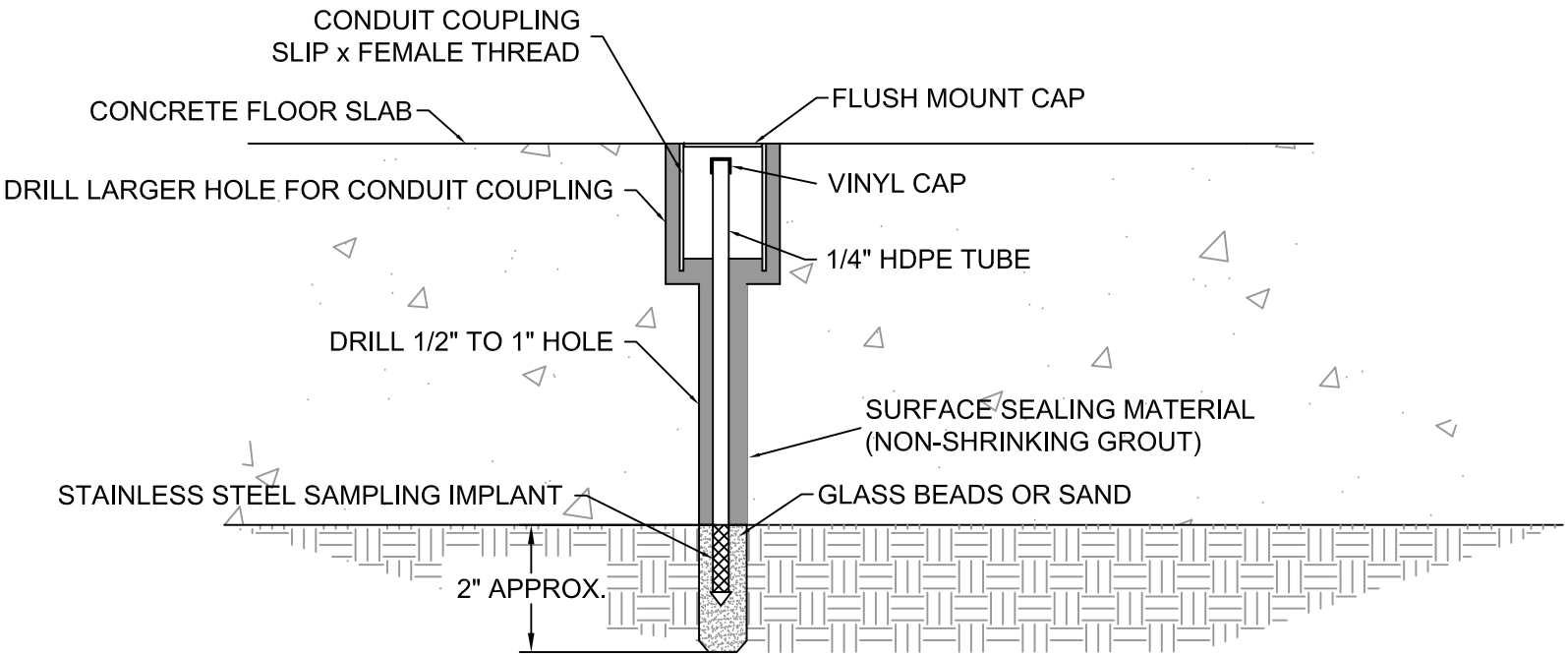
SUB SLAB DEPRESSURIZATION TYPICAL DETAILS

SCALE: NOT TO SCALE
MAY 2012

FIGURE 3

Drawing Name: G:\36795_GM Lockport\027\CAD\36795-000_01.dwg Layout: Sub Slab Detail
Operator Name: LUCIDO, SAM Plot Date: May 11, 2012

G:\PROJECTS\36795_GM LOCKPORT\CAD\36795-027-SS VACUUM MONITORING POINT DETAIL.DWG



HALEY & ALDRICH

SUB-SLAB DEPRESSURIZATION SYSTEM PILOT TEST
GMCH LOCKPORT FACILITY
200 UPPER MOUNTAIN ROAD
LOCKPORT, NEW YORK

SCHEMATIC FOR TYPICAL SUB-SLAB VACUUM MONITORING POINT

SCALE: NOT TO SCALE
MAY 2012

FIGURE 4

Attachment 1

Tedlar Bag Sampling Procedure

TEDLAR BAG SAMPLING

SOP#: 2102
DATE: 10/21/94
REV. #: 0.0

1.0 SCOPE AND APPLICATION

The purpose of this standard operating procedure (SOP) is to define the use of Tedlar bags in collecting gaseous grab samples. Tedlar bags are used to collect both volatile and semi-volatile organic compounds, including halogenated and non-halogenated species. The sensitivity of the method is primarily dependent on the analytical instrument and the compounds being investigated.

These are standard (i.e., typically applicable) operating procedures which may be varied or changed as required, dependent upon site conditions, equipment limitations or limitations imposed by the procedure. In all instances, the ultimate procedures employed should be documented and associated with the final report.

Mention of trade names or commercial products does not constitute U.S. Environmental Protection Agency (U.S. EPA) endorsement or recommendation for use.

2.0 METHOD SUMMARY

When collecting gaseous samples for analysis it is often necessary to obtain a representative grab sample of the media in question. The Tedlar bag collection system allows for this and consists of the following items:

- the Tedlar bag complete with necessary fittings
- a box in which the vacuum is created
- a sampling pump to create the necessary vacuum
- an appropriate Teflon and Tygon tubing

The Tedlar bag is placed into the vacuum box and the fitting is inserted into Teflon tubing. The Teflon tubing is the path through which the gaseous media will travel. The pump is attached to the Tygon tubing, which is part of the vacuum fitting on the vacuum box. The pump evacuates the air in the vacuum box, creating a pressure differential causing the sample to be drawn into the bag. The sample introduced into the Tedlar bag never passes through the pump. The flow rate for the pump must be defined prior to sampling (usually 3 liters/minute [L/min] for bag sampling).

3.0 SAMPLE PRESERVATION, CONTAINERS, HANDLING, AND STORAGE

The Tedlar bags most commonly used for sampling have a 1-liter volume. When the sampling procedure is concluded, the Tedlar bags are stored in either a clean cooler or a trash bag to prevent photodegradation. It is essential that sample analysis be undertaken within 48 hours, as after that time compounds may escape or become altered.

4.0 INTERFERENCES AND POTENTIAL PROBLEMS

Contamination is a major concern since many of the compounds in question will be present in the parts per billion range. In order to minimize the risk of cross contamination, the following factors should be considered:

1. Proximity of the bags to sources of potential contamination during transportation and storage. The further away from the source(s) the bags are, the less likely the chances of external contamination.

2. Bags must be attached only to clean Teflon tubing.

3. Once the bag has been collected, affix the sample label to the edge of the bag. Adhesives found in the label may permeate the bag if placed on the body of the bag. Fill out labels with a ballpoint pen as permanent

markers contain volatile compounds that may contaminate the sample.

4. Due to the chemical structure of Tedlar, highly polar compounds will adhere to the inner surface of the bag. Also, low molecular weight compounds may permeate the bag. Real-time monitors such as the organic vapor analyzer (OVA), photoionization detector (HNU), and combustible gas indicator (CGI) are used as screening devices prior to sampling. The information gathered is written on the sample label to inform the individuals performing the sample analysis.

The Tedlar bag sampling system is straightforward and easy to use. However, there are several things to be aware of when sampling.

1. The seal between the top half and the bottom half of the vacuum box must be air tight in order to allow the system to work.

2. Check the O-ring gasket to see if it is in place with the proper fit. O-rings that have been stretched out will not remain in place, thus requiring constant realignment.

3. Check that all the fittings associated with the vacuum joints are securely in place. The fittings can be pushed loose when inserting the valve stem into the Teflon tubing.

4. Occasionally, a corner of the Tedlar bag will jut out between the two halves of the vacuum box, thus impairing the seal. Since the bags will hold only a given volume, over-inflation will cause the bags to burst.

5.0 EQUIPMENT/APPARATUS

The following items must be operational to perform Tedlar bag sampling:

- Vacuum box - must be clean, Teflon tubing replaced, and equipped with extra O-rings
- Pump(s) - must be charged, in good working order, and set with the appropriate flow rate of 3 L/min
- Tedlar bags - must be free of visible contamination and preferably new
- Chain of Custody records, custody seals
- Sample labels
- Air Sampling Worksheets
- Opaque trash bags

6.0 REAGENTS

This section is not applicable to this SOP.

7.0 PROCEDURES

7.1 Preparation

1. Determine the extent of the sampling effort, the sampling methods to be employed, and the types and amounts of equipment and supplies needed.

2. Obtain necessary sampling and monitoring equipment.

3. Decontaminate or pre-clean equipment, and ensure that it is in working order.

4. Prepare scheduling and coordinate with staff, clients, and regulatory agency, if appropriate.

5. Perform a general site survey prior to site entry in accordance with the site specific Health and Safety Plan.

6. Use stakes or flagging to identify and mark all sampling locations. If required, the proposed locations may be adjusted based on site access, property boundaries, and surface obstructions.

7.2 Field Operation

Tedlar bags are stored in boxes of ten. The valve is in the open position when stored. Occasionally, a piece of debris will clog the valve, necessitating the closing of the valve stem to clear. The valve stem is closed by pulling the stem out. If the valve stem is difficult to pull, it helps to spin the valve stem simultaneously.

1. Remove the Tedlar bag from the carton.

2. Insert the valve stem into the Teflon tube which runs through the vacuum box (Figure 1, Appendix A).

3. Place the Tedlar bag in the vacuum box. Seal the vacuum box by applying pressure to the top and bottom (ensure that the O-ring is in place and unobstructed).

4. Connect the sampling pump to the evacuation tube.

5. Connect the intake tube to the desired source or place the intake tube into the media of concern.

6. Turn on the sampling pump.

7. Allow the bag to fill (visual observation and sound of laboring pump).

8. Turn off the sampling pump and remove the evacuation tube from the pump.

9. Remove bag and pull the valve stem out.

10. Lock the valve stem.

11. Label the bag using either a tag or a sticker placed on the edge of the bag. Do not write on the bag itself.

12. Place Tedlar bag in a clean cooler or opaque trash bag to prevent photodegradation.

7.3 Post-Operation

1. Once the samples are collected, transfer bags to the laboratory for analysis.

2. When transferring the Tedlar bags, a chain of custody form must accompany the samples. Personnel should be aware that some of the compounds of concern will degrade within a few hours of sampling.

3. For the time prior to analysis, samples may be stored in a clean cooler or opaque trash bag with a trip blank (a Tedlar bag filled with "zero air") and the chain of custody form.

8.0 CALCULATIONS

This section is not applicable to this SOP.

9.0 QUALITY ASSURANCE/ QUALITY CONTROL

The following general QA procedures apply:

1. All data must be documented on field data sheets or within site logbooks.

2. All instrumentation must be operated in accordance with operating instruction as supplied by the manufacturer, unless otherwise specified in the work plan. Equipment checkout and calibration activities must occur prior to sampling/operation and they must be documented.

Depending upon the Quality Assurance Work Plan (QAWP) requirements, a background sample consisting of upgradient/downgradient, beginning/ending of day or combination, may be collected. It may also be desirable to change sample train tubing between sample locations.

Tedlar bag standards must be filled on site to identify the contaminants' degradation from the time the sample is collected until analysis. Trip blanks, Tedlar bags filled with "zero air", must accompany sample bags at a minimum rate of one per day to identify possible contamination during handling. For each lot of Tedlar bags, a minimum of one bag must be filled with "zero air" and then analyzed for the parameter(s) of interest to detect contamination due to the Tedlar bag itself which may produce false positive results. Duplicate Tedlar bags should be collected at a minimum rate of five percent of the total number of samples or one per sampling event.

10.0 DATA VALIDATION

Results of the quality control samples (trip and lot blanks) will be evaluated for contamination. This information will be utilized to qualify the environmental sample results according to the project's data quality objectives.

11.0 HEALTH AND SAFETY

When working with potentially hazardous materials, follow U.S. EPA, OSHA, and corporate health and safety procedures.

12.0 REFERENCES

Gilian Instrument Corp., Instruction Manual for Hi Flow Sampler: HFS113, HFS113T, HFS113U, HFS113UT, 1983.

NJDEP, Field Sampling Procedures Manual, Hazardous Waste Programs, February, 1988.

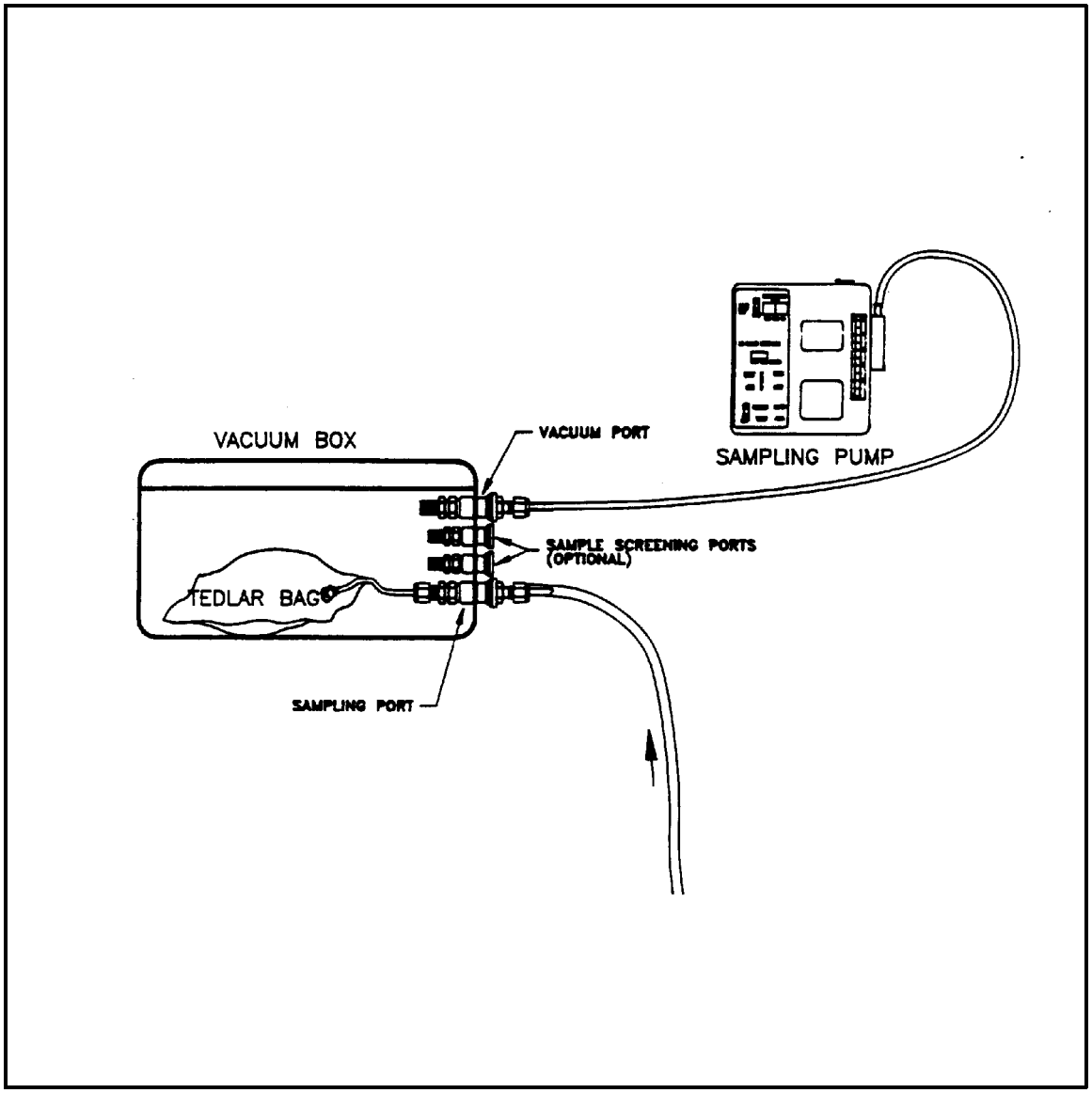
Roy F. Weston, Inc., Weston Instrumentation Manual, Volume I, 1987.

U.S. EPA, Characterization of Hazardous Waste Sites - A Methods Manual: Volume II, Available Sampling Methods, 2nd Edition, EPA-600/ 4-84-076, December, 1984.

APPENDIX A

Figure

FIGURE 1 - Tedlar Bag Sampling Apparatus



Attachment 2

Haley & Aldrich of New York

Site Specific Health and Safety Plan

HALEY & ALDRICH, INC.
SITE-SPECIFIC HEALTH & SAFETY PLAN

For

GM Components Holdings, LLC
200 Upper Mountain Road
City of Lockport, NY

Project/File No. 36795-002

Prepared by: Claire L. Mondello Date: 12/8/2010

Revised by: Denis Conley Date: 5/4/2012

APPROVALS: The following signatures constitute approval of this Health & Safety Plan

Margaret Holt - Local H&S Coordinator — 12/20/10 Date

Denis Conley - Site Project Manager — Date

Date printed: 5/4/2012 at 2:45 PM

Note: This HASP has been developed for Haley & Aldrich purposes only and is not for use by others.

TABLE OF CONTENTS

1. PROJECT INFORMATION AND EMERGENCY RESOURCES

Project Name: GM Components Holdings, LLC RI Work Plan	**H&A File No.: 36795-002**
Location: 200 Upper Mountain Road, City of Lockport, New York	
Client/Site Contact: Phone Number: Emergency Phone Number:	Jim Hartnett 315 463-2391 315 856-0211 (cell)
H&A Project Manager: Phone Number: Emergency Phone Number:	Denis M. Conley (585) 321-4245 (585) 429-0002 (Cell
Local Health & Safety Coordinator: Phone Number: Emergency Phone Number:	Margaret Holt (585) 321-4214 (585) 721-2426
Nearest Hospital: Address: (see map on next page) Phone Number:	Lockport Memorial Hospital 521 East Avenue Lockport, New York (716) 434-9111
Healthcare Clinic to be accessed in non emergency incidents:	1-888-449-7787 (call and Workcare will make appointment at local clinic)
Emergency Response Number:	**911** Site Security (Emergency) – (716) 439-3333
Other Local Emergency Response Number:	Site Security (Non-Emergency) – (716) 439-2237
Other Ambulance, Fire, Police, or Environmental Emergency Resources:	**911**

Work Scope:

This Site-Specific Health and Safety Plan addresses the health and safety practices and procedures that will be employed by all Haley & Aldrich employees participating in the site characterization of the Project Site. This plan is based on an assessment of the site-specific health and safety risks available to Haley & Aldrich and Haley & Aldrich's experience with other project sites. Remedial Investigations consisting of soil probes, groundwater well installation and sampling, and soil vapor intrusion analysis/indoor air sampling will be occurring within three buildings at the Site – Building 7, 8, and 10. The work scope below is broken up by type of work and then further broken down by building number.

Task #1: Soil Probes

Soil Probes will be advanced into overburden soils utilizing direct push technology via a hydraulic hammer mounted on truck or track mounted rig equipped with a 2-inch outer diameter

by 48-inch long macrocore sampler. Soil probes will be advanced to refusal. A field technician will observe the soil probes and log each probe.

Soil samples will be collected at two foot intervals to the bottom of the probe and screened using an OVM. Select samples will be submitted for laboratory analysis per screening results as described in the Work Plans.

- Building 7: A total of 12 soil probes will be advanced within and around Building 7. Seven (7) will be completed on the northeastern exterior portion of the building, and five (5) will be completed in the eastern interior portion of the building.

- Building 8: A total of 13 soil probes will be advanced within Building 8. Six (6) will be completed in the southeastern portion of the building, four (4) will be completed in the northern central part of the building, and three (3) will be completed in the western interior part of the building.

- Building 10: A total of 20 soil probes will be advanced within and west of Building 10. Ten (10) will be completed in the southern portion of the building, four (4) will be completed to the west of the building, and six (6) will be completed to assess the current SVE system.

Task #2: Test Boring, Monitoring Well Installation

Test borings for monitoring well installation will be advanced in the overburden soils using a track or truck mounted rotary drill rig using hollow stem augers. Overburden soil samples will be obtained by driving a 1 3/8 inch inside diameter by 24-inch long split spoon sampler 24 inches ahead of the lead cutting shoe of the auger. The augers will be advanced until refusal is encountered. Once bedrock is encountered, the upper 2 feet of bedrock will be drilled. Once desired depth is reached per the Work Plan, the completed test borings will be converted into groundwater monitoring wells.

Soil samples and rock core collected from the test borings will be classified in the field by visual examination in accordance with the Work Plan. Soil samples will be collected at two foot intervals to the bottom of the probe and screened using an OVM. Select samples will be submitted for laboratory analysis per screening results as described in the Work Plans.

- Building 7: Four (4) test borings/permanent monitoring wells will be installed. Two (2) will be installed upgradient of the building, and two (2) will be installed downgradient of the building.

- Building 8: Four (4) test borings/permanent monitoring wells will be installed. Three (3) will be installed inside of the building and one (1) downgradient of the building.

- Building 10: Two (2) test boring/permanent monitoring wells will be installed downgradient of the building.

Task #3: Groundwater Sampling

Groundwater samples will be collected from newly installed wells and previously existing wells utilizing low-flow sampling techniques as outlined in the Work Plans. Groundwater sampling will include the collection of static water level readings.

Task #4: Vapor Intrusion Investigation/Indoor Air Sampling

A vapor intrusion assessment will be conducted in Buildings 7 and 8. Indoor/outdoor air sampling only will be conducted in Building 10. Three types of air samples (sub-slab, ambient indoor and ambient outdoor) will be collected as part of the vapor intrusion assessment. Prior to sampling, a building inventory will be collected. Sub-slab vapor sampling points will be installed using a drill in a competent portion of the concrete floor slab.

- Building 7: A total of 11 indoor air and 11 sub-slab vapor samples are planned for Building 7 and associated Building 7a. Nine (9) indoor air and nine (9) sub-slab samples are proposed within building 7, and two (2) indoor air and two (2) sub-slab samples are proposed in Building 7a. One (1) ambient outdoor air sample will be collected from an upwind location near Building 7.

- Building 8: A total of five (5) indoor air and five (5) sub-slab vapor samples are planned for Building 8. One (1) ambient outdoor air sample will be collected from an upwind location near Building 8.

- Building 10: A total of two (2) indoor air samples will be collected within Building 10. One (1) ambient outdoor air sample will be collected from an upwind location near Building 10.

Task #5: Sub Slab Depressurization System Monitoring

A three (3) horsepower (hp) explosion proof regenerative vacuum blower will be used to conduct the pilot test program. Sub-slab vacuum measurement (VM) points will be installed through the concrete floor to a depth of approximately 2 inches into the soils. Vacuum measurements will be collected from each VM point using a micromanometer with a minimum resolution of 0.001 inches of water column (in W.C.).

Representative samples of the vacuum blower system effluent will also be collected from the discharge piping using Tedlar® sampling bags. Concurrent with sample collection, the effluent discharge flow rate will be determined in units of feet per minute (FPM) using a handheld anemometer.

Subcontractor(s) to be involved in on-site activities:

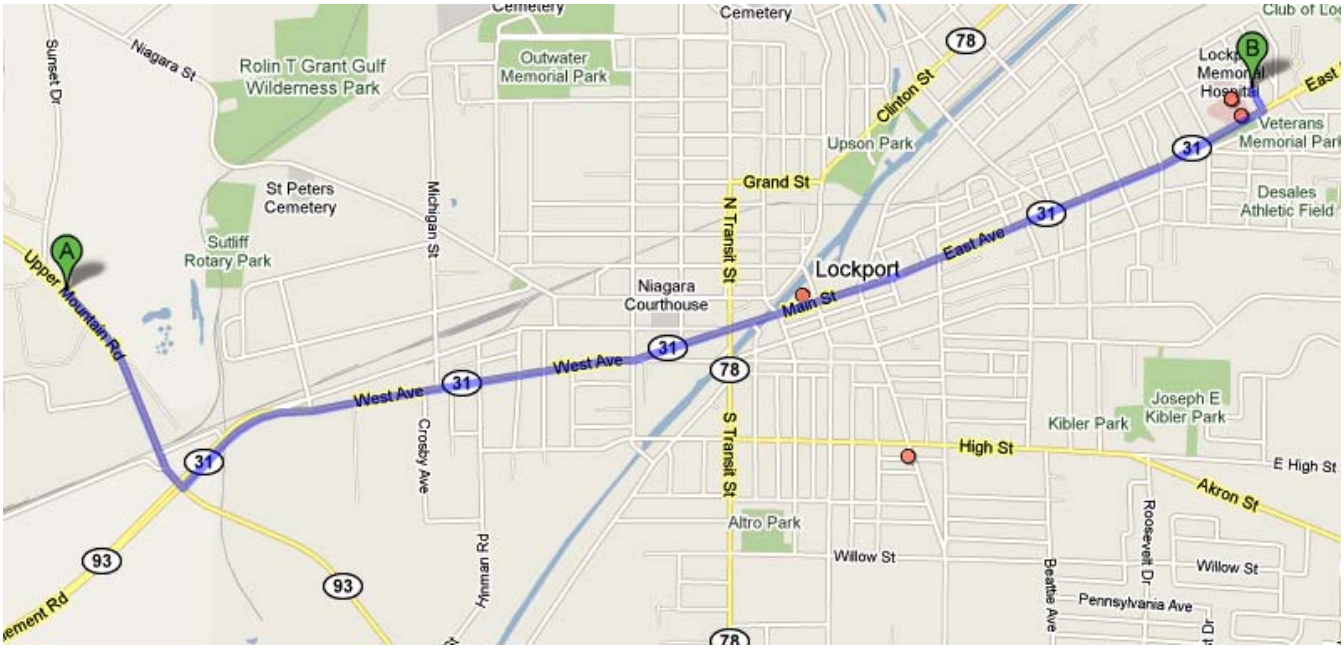
Firm Name	Work Activity
Earth Dimensions	Installation of test borings/monitoring wells.
Matrix Environmental Technologies, Inc.	Installation of soil probes (Direct Push) Installation of SSDS Suction Pits Operation of SSDS Pilot Test Blower

Projected Start Date: 20 May 2012

Projected Completion Date: 20 June 2012

Estimated Number of Days to Complete Field Work: 1 Month

Directions to the Nearest Hospital:



A **200 Upper Mountain Rd**
Lockport, NY 14094

1. Head **southeast** on **Upper Mountain Rd** toward **Old Upper Mt Rd**
0.6 mi

2. Take the 3rd left onto **NY-31 E/Saunders Settlement Rd**
3.0 mi

3. Turn left at **Beverly Ave**
341 ft

B **Eastern Niagara Hospital- Lockport**
521 East Avenue
Lockport, NY 14094

2. SITE DESCRIPTION

Site Classification:

☑ Industrial	☐ Commercial	☐ Other Specify

General Description:

GM Components Holdings, LLC (GMHC) owns and operates an automotive component manufacturing complex located at 200 Upper Mountain Road in both the City and Town of Lockport, which is located in Niagara County, New York. Within the complex, Building 7, Building 8, and Building 9 are dedicated to manufacturing and engineering. Building 6 has been leased to Delphi Properties Management, LLC for vehicle component engineering and testing. Building 10 has been converted to house new manufacturing operations staffed by non-GMCH personnel in the northern portion with the southern portion being used by GMCH as a warehouse.

GMCH is approximately 342 acres in size and located in an area of mixed residential, agricultural, commercial, and industrial settings along Upper Mountain Road. Across Upper Mountain Road, the Niagara Escarpment is located approximately one-half mile to the northeast. A stone quarry and former steel facility are located approximately one-half mile to the northeast. A stone quarry and former steel facility are located approximately 1 mile south of GMCH. Residential properties are generally present along the east and north sides of Upper Mountain Road and to the west.

Background and Historical Site Usage:

The bullets below summarize the historical use and background for the three buildings associated with the Remedial Investigation:

- **Building 7:** Building 7 and the surrounding area constitutes approximately 31 of the 342 acre Site. It is located in the south central portion of the complex and has been used for manufacturing since 1937. Previous investigations at Building 7 have identified elevated levels of chlorinated solvents in soils beneath several former degreaser areas within the building as well as chlorinated solvents and semi-volatile organic compounds (SVOCs) in the groundwater immediately upgradient of the buiding. In addition, chlorinated solvents were identified in groundwater upgradient of Building 7.

- **Building 8:** Building 8 constitutes approximately 13 of the 342 acre Site. It is located in the north central portion of the Site and has been used for manufacturing since 1960. Three areas of interest (AOIs) have been identified at Building 8, which includes the former chromium sump area, former degreasing locations, and historical press operations area. Per previous investigations, elevated detections of arsenic, trichloroethene (TCE), and benzo(a)pyrene were encountered in soils in the three AOIs, respectively. In addition chlorinated solvents were detected in groundwater samples collected from monitoring wells south of Building 8.

- **Building 10:** Building 10 constitutes approximately 11 of the 342 acre Site. Building 10 was constructed in two sections: the north end in 1960, and the south end in 1969. It was used for warehousing until 1989 when manufacturing equipment installation began in the north end. From 1990 to 2002, the north end of the building was used for manufacturing. In 2007, Building 10 was converted to house new manufacturing operations staffed by non-GMCH personnel in the northern portion with the southern portion continuing to be used by GMCH as a warehouse. Two AOIs were identified within Building 10, which include a former painting operation and an area where soil contamination was encountered during construction of a sump in 1999. Tetrachloroethene (PCE) was detected at elevated concentrations in the painting operation area during previous investigations. A Focused Environmental Assessment was subsequently conducted at Building 10. As part of that assessment, chlorinated solvent contamination was identified in soil in the vicinity of the former sump (PCE) and volatile organic compounds (VOCs) were identified in groundwater. As a result of the identified contamination, a soil vapor extraction (SVE) system and sub-slab depressurization (SSD) system were installed within the building. They have generally been running continuously since March 2009.

Overview of Hazards:

Hazards anticipated during Site Work include:

- Heavy Equipment
- Utilities
- Hoisting & Heavy Lifting
- Chemical Hazards from Onsite Contamination (Inhalation, Ingestion, Adsorption)
- Weather Conditions
- Fumes/Dust
- Noise
- Drilling
- Traffic

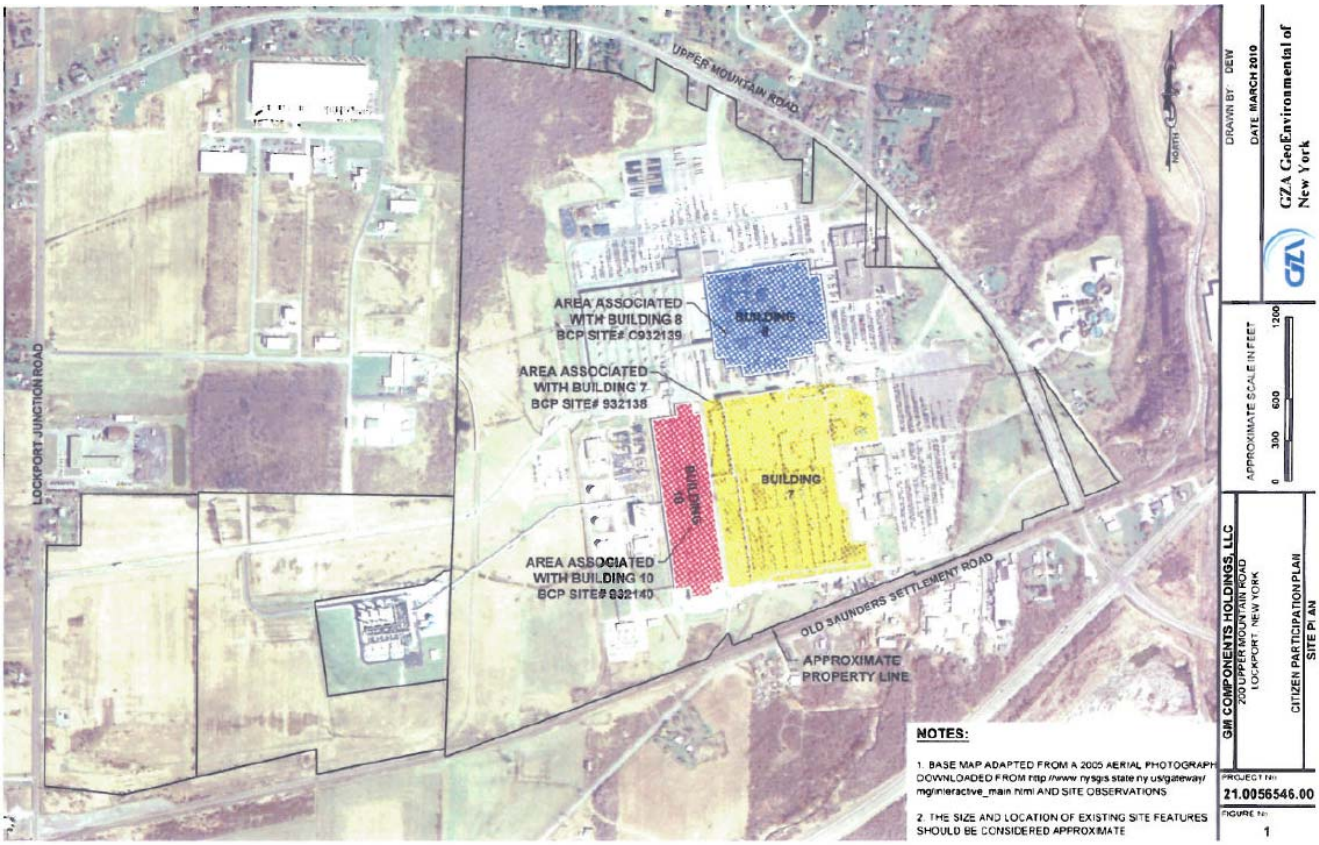
Site Status: Indicate current activity status and describe operations at the site.

☑ Active	☐ Inactive
☐ Partially active	☐ Other

The facility is currently used for manufacturing of automotive parts and warehousing.

Site Plan:

Is a site plan or sketch available? ☑ Y ☐ N



Work Areas:

List/identify each specific work area(s) on the job site and indicate its location(s) on the site plan:

1. Building 7 and surrounding area: Located on the southeast side of the Site
2. Building 8: Located on the southwest side of the Site
3. Building 10: Located on the northeast side of the Site

3. PROJECT TASK BREAKDOWN

List and describe each distinct work task below.

Task No.	Detailed Task Description	Employee(s)	Work Date(s) or Duration
1	Soil Probe Installation	Corey Barnett	4-6 Weeks
2	Test Boring/Monitoring Well Installation	Corey Barnett	4-6 Weeks
3	Groundwater Sampling	Corey Barnett	1 to 2 Weeks
4	Vapor Intrusion/Indoor Air Assessment	Corey Barnett	1 to 2 Days
5	SSDS Pilot Test Program Monitoring	Ben Drayn	2 Weeks

4. HAZARD ASSESSMENT

Material Safety Data Sheets (MSDS) of hazardous materials used during the execution of work shall be available on site. MSDSs are required for chemicals used to prepare samples, calibration gases, etc. MSDSs are not required for waste materials.

Chemical Hazards:

Does chemical analysis data indicate that the site is contaminated? ☑ Y ☐ N

Indicate the potential physical state of the hazardous materials at the site.

☑ Gas/Vapor	☐ Sludge
☑ Liquid	☑ Solid/Particulate

Indicate the anticipated or actual class of compounds at the project specific site locations.

☐ Asbestos	☐ Inorganics
☑ BTEX	☐ Pesticides
☑ Chlorinated Solvents	☐ Petroleum products
☑ Heavy Metals	☑ Other PAHs

Impacted Environments:

Indicate media in which contamination is expected.

☑ Air	☑ Groundwater
☑ Soil	☐ Sediment
☐ Surface water	☐ Other Specify

Estimated concentrations:

Indicate medium of major chemicals expected to be encountered by onsite personnel.

Work Activity	Media	Chemical	Anticipated Concentration
Soil Probe Installation	SO, GW	**Soil:** PAHs, Arsenic, Chlorinated VOCs, BTEX **GW:** Chlorinated VOCs, BTEX	**Soil:** Arsenic (ND-70 ppm); PAHs (ND – 2 ppm); Chlorinated VOCs (ND – 200 ppm); BTEX (ND – 100 ppm) **GW:** Chlorinated VOCs (ND-7000 ppm); BTEX (ND-4000 ppm)
Test Boring/Monitoring Well Installation	SO, GW	**Soil:** PAHs, Arsenic, Chlorinated VOCs, BTEX **GW:** Chlorinated VOCs, BTEX	**Soil:** Arsenic (ND-70 ppm); PAHs (ND – 2 ppm); Chlorinated VOCs (ND – 200 ppm); BTEX (ND – 100 ppm) **GW:** Chlorinated VOCs (ND-7000 ppm); BTEX (ND-4000 ppm)
Groundwater Sampling	GW	Chlorinated VOCs, BTEX	Chlorinated VOCs (ND-7000 ppm); BTEX (ND-4000 ppm)
Vapor Intrusion/Indoor Air Assessment	A	Chlorinated VOCs	Unknown

(Media key: A = Air; GW = Groundwater; SW = Surface Water; SO = Soil; SE = Sediment)

Chemicals of Concern:

Trichloroethylene (TCE) is a colorless, nonflammable, non-corrosive liquid has a “sweet” odor characteristic of some chlorinated hydrocarbons.

The compound is incompatible with strong caustics, it reacts with aluminum when acidic, and it is incompatible with active metals - barium, lithium, sodium, magnesium, and titanium. Decomposition of TCE, due to contact with hot metal or ultraviolet radiation, forms products including chlorine gas, hydrogen chloride, and phosgene. Dichloroacetylene may be formed from the reaction of alkali with TCE.

The Cal-OSHA PEL for TCE is 25 PPM as an 8-hour TWA; an acceptable ceiling concentration of 300 PPM; and a STEL of 200 PPM. The OSHA PEL for TCE is 100 ppm as an 8-hour TWA; an acceptable ceiling concentration of 200 ppm; and an acceptable maximum peak ceiling of 300 ppm for no more than 5 minutes in any 2-hour period. The standard routes of entry in the body are through inhalation, percutaneous absorption, ingestion, skin and eye contact. The points of attack are the respiratory system, heart, liver, kidneys, central nervous system and skin.

Exposure to TCE vapor may cause irritation of the eyes, nose, and throat. The liquid, if splashed in the eyes, may cause burning irritation and damage. Repeated or prolonged shin contact with the liquid may cause dermatitis. Acute exposure to TCE depresses the central nervous system exhibiting such symptoms as headache, dizziness, vertigo, tremors, nausea and vomiting, irregular heart beat, sleepiness, fatigue, blurred vision, and intoxication similar to that of alcohol. Unconsciousness and death have been reported. Alcohol may make the symptoms of TCE overexposure worse. If alcohol has been consumed, the overexposed worker may become flushed. TCE addiction and peripheral neuropathy have been reported.

Tetrachloethylene (PCE)

Tetrachloroethylene (PCE) is a colorless, nonflammable liquid with a mild, chloroform-like odor.

PCE is incompatible with strong oxidizers and metals such as lithium, beryllium and barium, caustic soda, sodium hydroxide, and potash. Decomposition of PCE, due to fire, forms products including hydrogen chloride, and phosgene.

The OSHA PEL for PCE is 100 ppm as an 8-hour TWA; an acceptable ceiling concentration of 200 ppm; and an acceptable maximum peak ceiling of 300 ppm for no more than 5 minutes in any 3-hour period. The standard routes of entry in the body are through inhalation, percutaneous absorption, ingestion, skin and eye contact. The points of attack are the respiratory system, heart, liver, kidneys, central nervous system, eyes, and skin.

Symptoms that may occur as a result of exposure to PCE include irritation to the eyes, skin, nose, and throat; respiratory system distress; nausea; flushed face and neck; incoordination; headache; drowsiness; skin erythema; and liver damage.

1,1 and 1,2-Dichloroethylene (1,1-DCE; 1,2-DCE)

1,1 and 1,2-Dichloroethylene (1,1-DCE; 1,2-DCE) is a colorless, class IB flammable liquid with a slightly acrid, chloroform-like odor.

1,1 and 1,2-DCE is incompatible with strong oxidizers, strong alkalis, potassium hydroxide, and metals such as copper, and contains inhibitors to prevent polymerization.

The OSHA PEL for 1,2-DCE is 200 ppm as an 8-hour TWA. There is no OSHA PEL for 1,1-DCE. The 8-hour TWA for 1,1-DCE is 1.0 ppm. The standard routes of entry in the body are through inhalation, ingestion, skin and eye contact. The points of attack are the respiratory system, central nervous system, and eyes.

Symptoms that may occur as a result of exposure to 1,1 and 1,2-DCE include irritation to the eyes; respiratory system distress; central nervous system depression.

Vinyl Chloride (VC)

Vinyl Chloride (VC) is a colorless, liquid or flammable gas with a pleasant odor at high concentrations.

VC is incompatible with oxidizers, peroxides, and metals such as copper, aluminum, iron and steel. VC polymerizes in air, sunlight, or heat unless it is stabilized by inhibitors such as phenol. It attacks iron and steel in the presence of moisture.

The OSHA PEL for VC is 1 ppm as am 8-hour TWA, and an acceptable ceiling of 5 ppm in a 15 minute period. The standard routes of entry in the body are through inhalation, skin and eye contact. The points of attack are the respiratory system, central nervous system, liver, blood, and lymphatic system.

Symptoms that may occur as a result of exposure to VC include weakness and exhaustion; abdominal pain; gastrointestinal bleeding; enlarged liver; and pallor or cyanosis of the extremities. Liquid VC can cause frostbite. VC can also cause liver cancer.

PAHs

Polycyclic aromatic hydrocarbons (PAHs) are a group of over 100 different chemicals that are formed during the incomplete burning of coal, oil and gas, garbage, or other organic substances like tobacco or charbroiled meat. PAHs are usually found as a mixture containing two or more of these compounds, such as soot.

Some PAHs are manufactured. These pure PAHs usually exist as colorless, white, or pale yellow-green solids. PAHs are found in coal tar, crude oil, creosote, and roofing tar, but a few are used in medicines or to make dyes, plastics, and pesticides.

PAHs, as a group, are strongly hydrophobic, and therefore sorb to organic-based soil particles. Exposures to elevated levels of PAHs in the workplace could occur in coking, coal-tar, and asphalt production plants; smokehouses; and municipal trash incineration facilities.

Sorption of PAHs to soil and sediments increases with increasing organic carbon content and with increasing surface area of the sorbent particles. Lower molecular weight PAHs may also volatilize from soil. Due to this strong sorption to soil, PAHs do not tend to dissolve easily into and migrate with groundwater. Exposure from affected soil would tend to occur as a result of direct contact with affected soil or inhalation/ingestion of windborne affected soil.

BTEX

BTEX is the common abbreviation for benzene, toluene, ethyl benzene and xylene. OSHA has set permissible exposure limits for all of these contaminants that may be found at this worksite during your work activity. The levels that are set are based on an 8-hour time weighted average. Below are those values-

Benzene	1 ppm / 8 TWA
Toluene	200 ppm / 8 TWA
Ethyl Benzene	100 ppm / 8 TWA
Xylene	100 ppm / 8 TWA

Arsenic

Arsenic is a naturally occurring element widely distributed in the earth's crust and soils. In the environment, arsenic is combined with oxygen, chlorine, and sulfur to form inorganic arsenic compounds. Arsenic in animals and plants combines with carbon and hydrogen to form organic

arsenic compounds. Inorganic arsenic compounds are mainly used to preserve wood. Organic arsenic compounds are used as pesticides, primarily on cotton plants. Because arsenic is a natural component of the earth's crust, low levels of the element are found in nearly all environmental media.

Potential exposure to arsenic could occur through eating food, drinking water, or breathing air containing arsenic, breathing contaminated workplace air, or breathing sawdust or burning smoke from wood treated with arsenic. Arsenic released to land is predominantly inorganic and relatively immobile because it binds to soil particles.

For most people, diet is the largest source of exposure, with average intakes of about 40 µg/day of total arsenic (i.e., arsenic in all of its forms). Arsenic contained in soils, like other metals, tends to remain bound in solid compounds in soil or sediment. Because of these tendencies, exposure from affected soil would tend to occur primarily as a result of direct contact with affected soil or inhalation/ingestion of windborne affected soil.

TABLE 1
OCCUPATIONAL EXPOSURE LIMITS (CONCENTRATIONS IN AIR)

(CIRCLE CONTAMINANTS OF CONCERN, WRITE ADDITIONAL CONTAMINANTS AND EXPOSURE ON LAST PAGE)

CHEMICAL	ROUTES OF EXPOSURE	IDLH	Ceiling	STEL	PEL	TLV	REL	PID (IP eV)	FID	ODOR THRES-HOLD	IRRITATION THRESHOLD	ODOR DESCRIPTION
VAPORS & GASES												
Acetone	R, I, C	2500	-	750 [ACGIH]	1000	500	250	9.69	60	13	-	fragrent, mint-like
Ammonia	R, I, C	300	-	35 [NOSH, ACGIH]	50	25	25	10.18**	-	0.5-2	10	Pungent suffocating odor
Benzene	R,A,I,C	Ca [500]	-	1 [NIOSH]; 2.5 [ACGIH]	1	0.5	0.1	9.24	150	4.68	-	Solvent, aromatic
Carbon tetrachloride (Tetrachloromethane)	R,A,I,C	Ca [200]	25 [instantaneous] 200 [5 min peak in any 4 hrs]	2 [NIOSH, 60-min]; 10 [ACGIH]	2	5	Ca	11.47**	10	50	-	Sweet, pungent, ether-like
Chlorobenzene	R,I,C	1000	-	-	75	10	-	9.07	200	0.68	-	Almond-like
Chloroform	R,I,C	Ca [500]	50 [OSHA]	2 [NIOSH, 60-min]	-	10	-	11.42**	65	50	-	Sweet, pleasant
o-Dichlorobenzene	R,A,I,C	200	50 [NIOSH, OSHA]	50 [ACGIH]	-	25	-	9.06	50	0.3	E 20-30	Pleasant, aromatic
p-Dichlorobenzene	R,A,I,C	Ca [150]	-	-	75	10	Ca	8.98	-	0.18	E 80-160	Distinct, aromatic, mothball-like
Dichlorodifluoromethane (Freon 12)	R,C	15000	-	-	1000	1000	1000	11.75**	15	-	-	Ether-like when at very high concs.
1,1-Dichloroethane	R,I,C	3000	-	-	100	100	100	11.06**	80	200	-	Distinct, chloroform-like
1,2-Dichloroethane (Ethylene dichloride)	R,I,A,C	Ca [50]	100 [OSHA]	2 ppm [NIOSH]; 200 ppm [OSHA, 5-min max peak in any 3 hours]	50	10	1	11.05**	80	88	-	Chloroform-like
1,1-Dichloroethylene (1,1-DCE, Vinylidene chloride)	R,A,I,C	Ca [ND]	-	-	-	5	Ca	10.00**	40	190	-	Chloroform-like
1,2-Dichloroethylene	R,I,C	1000	-	-	200	200	200	9.65	50	0.85	-	Bitter, chloroform-like
Ethanol	R,I,C	3300	-	-	1000	1000	1000	10.47**	25	10	-	Weak, ether-like, wine-like
Ethylbenzene	R,I,C	800	-	125 [NIOSH; ACGIH]	100	100	100	8.76	100	2.3	E 200	Aromatic
Ethylene Glycol	R,I,C	ND	50 [OSHA]; 100 mg/m^3 [ACGIH]	-	-	-	-	-	-	-	-	Odorless
Formaldehyde	I,C	Ca [20]	0.1 [NIOSH, 15-min]; 0.3 [ACGIH]	2	0.75	-	Ca [0.016]	10.88**	-	0.83	-	Pungent, suffocating
Gasoline	R,I,A,C	Ca [ND]	-	500 [OSHA; ACGIH]	300	300	-	-	-	-	E 0.5	Petroleum-like
n-Hexane	R,I,C	1100	-	-	500	50	50	10.18	70	130	E.T 1400-1500	Gasoline-like
Hydrogen Cyanide	R,A,I,C	50	4.7 [ACGIH; Skin]	4.7 [NIOSH - skin]	10 [skin]		-	-	-	0.58	-	Bitter almond
Hydrogen peroxide	R,I,C	75	-	-	1	1	1	10.54**	-	-	-	Sharp
Methanol	R,I,A,C	6000	-	250 [NIOSH; ACGIH; skin]	200	200 [skin]	200	10.84**	12	1000	-	Pungent
Methyl Ethyl Ketone Peroxide	R,I,C	ND	0.2 [NIOSH; ACGIH] 0.7 [OSHA]	-	-	-	-	-	-	-	-	Characteristic odor
Methyl Chloroform (1,1,1-TCA)	R,I,C	700	350 [NIOSH, 15-min]	450 [ACGIH]	350	350	Ca	11.00**	105	20-100	-	Chloroform-like
Methylene Chloride (Dichloromethane, Methylene dichloride)	R,I,A,C	Ca [2300]	-	125	25	50	Ca	11.32**	100	25-50	E 5000	Chloroform-like
Methyl Mercaptan	R,C	150	10 [OSHA] 0.5 [NIOSH, 15-min]	-	-	0.5	-	9.44	-	-	-	Garlic, rotten cabbage
MIBK (Hexone)	R,I,C	500	-	75 [NIOSH; ACGIH]	100	50	50	9.30	-	-	-	Pleasant
Naptha (coal tar)	R,I,C	1000	-	-	100	400	100	-	-	-	-	Aromatic
Naphthalene	R,A,I,C	250	-	15 [NIOSH; ACGIH]	10	10	10	8.12	-	0.3	E 15	Mothball-like
Octane	R,I,C	1000	385 [NIOSH, 15-min]	-	500	300	75	9.82	80	48	-	Gasoline-like
Pentachlorophenol	R,A,I,C	2.5 mg/m^3	-	-	0.5 mg/m^3 [skin]	0.5 mg/m^3 [skin]	0.5 mg/m^3 [skin]	-	-	-	-	Pungent when hot, benzene-like
Phenol	R,A,I,C	250	15.6 [NIOSH, 15-min]	-	5 [skin]	5 [skin]	5 [skin]	8.50	-	0.04	E.N.T. 68	Sweet, acrid
Propane	R,C	2100	-	-	1000	1000	1000	11.07**	80	1600	-	Odorless (commonly smells foul due to additive for odor detection)
Stoddard Solvent (Mineral Sprits)	R,Cl,I	20000 mg/m^3	1800 mg/m^3 [NIOSH, 15-min]	-	500	100	350 mg/m^3	-	-	1	E 400	Kerosene-like
Styrene	R,I,A,C	700	200 [OSHA]	100 [NIOSH]; 600 [OSHA, 5-min max peak in any 3 hours]; 40 [ACGIH]	100	20	50	8.40	85	0.047	E 200-400	Sweet, floral
1,1,2,2-Tetrachloroethane	R,I,A,C	Ca [100]	-	-	5 [skin]	1 [skin]	1 [skin]	11.10**	100	1.5	-	Pungent, chloroform-like
Tetrachloroethylene (Perchloroethylene, Perc, PCE)	R,I,A,C	Ca [150]	200 [OSHA]	300 [OSHA, 5-min max peak in any 3-hours]; 100 [ACGIH]	100	25	Ca	9.32	70	4.68	N.T513-690	Chloroform-like
Toluene	R,A,I,C	500	300 [OSHA]	150 [NIOSH]; 500 [OSHA, 10-min max peak]	200	50	100	8.82	110	2.14	E300-400	Sweet, pungent, benzene-like
Trichloroethylene (TCE)	R,I,A,C	Ca [1000]	200 [OSHA]	300 [OSHA, 5-min max peak in any 2-hours]; 100 [ACGIH]	100	50	Ca	9.45	70	21.4	-	Chloroform-like
1,2,3-Trimethylbenzene	R,I,C	ND	-	-	-	-	25	8.48	-	-	-	Distinctive, aromatic
1,2,4-Trimethylbenzene	R,I,C	ND	-	-	-	-	25	8.27	-	-	-	Distinctive, aromatic
1,3,5-Trimethylbenzene	R,I,C	ND	-	-	-	-	25	8.39	-	-	-	Distinctive, aromatic
Turpentine	R,A,I,C	800	-	-	100	20	100	-	-	200	E.N 200	Pine-like
Vinyl Chloride	R,C	Ca [ND]	5 [OSHA, 15-min]	-	1	1	Ca	9.99	-	3000	-	Pleasant odor at high concs.
Xylenes	R,A,I,C	900	-	150 [NIOSH, ACGIH]	100	100	100	8.56 (m- and o-) 8.44 (p-)	111/116	1.1	E.N.T. 200	Aromatic

TABLE 1
OCCUPATIONAL EXPOSURE LIMITS (CONCENTRATIONS IN AIR)

(CIRCLE CONTAMINANTS OF CONCERN, WRITE ADDITIONAL CONTAMINANTS AND EXPOSURE ON LAST PAGE)

CHEMICAL	ROUTES OF EXPOSURE	IDLH	Ceiling	STEL	PEL	TLV	REL	PID (IP eV)	FID	ODOR THRES-HOLD	IRRITATION THRESHOLD	ODOR DESCRIPTION
DUSTS, MISTS, FUMES, AND MISCELLANEOUS COMPOUNDS												
Asbestos	R	Ca (ND)	-	-	0.1 fiber/cc	0.1 fiber/cc	0.1 fiber/cc	-	-	-	-	-
PCBs-42% Chlorine	R,A,I,C	Ca [5 mg/m^3]	-	-	1 mg/m^3 [skin]	1 mg/m^3 [skin]	0.001 mg/m^3	-	-	-	-	Mild, hydrocarbon
PCBs-54% Chlorine	R,A,I,C	Ca [5 mg/m^3]	-	-	0.5 mg/m^3 [skin]	0.5 mg/m^3 [skin]	0.001 mg/m^3	-	-	-	-	Mild, hydrocarbon
Aluminum - metal dust	R,C	ND	-	-	15 mg/m^3 (total); 5 mg/m^3 (respirable)	10 mg/m^3	10 mg/m^3 (total); 5 mg/m^3 (respirable)	-	-	-	-	-
Aluminum - soluble salts	R,I,C	ND	-	-	2 mg/m^3	2 mg/m^3	2 mg/m^3	-	-	-	-	-
Arsenic- inorganic	R,A,I,C	Ca [5 mg/m^3]	0.002 mg/m^3 [NIOSH, 15-min]	-	0.01 mg/m^3	0.01 mg/m^3	Ca	-	-	-	-	-
Barium:soluble compounds	R,I,C	50 mg/m^3	-	-	0.5 mg/m^3	0.5 mg/m^3	0.5 mg/m^3	-	-	-	-	-
Beryllium	R,C	Ca [4 mg/m^3]	0.005 mg/m^3 [OSHA]; 0.025 mg/m^3 [OSHA, 30-min max peak]; 0.0005 mg/m^3	0.01 mg/m^3 [ACGIH]	0.002 mg/m^3	0.002 mg/m^3	Ca	-	-	-	-	-
Cadmium dusts	R,I	Ca [9 mg/m^3]	-	-	0.005 mg/m^3	0.01 mg/m^3	Ca	-	-	-	-	-
Chromates (Cr(VI) Compounds) & Chromic Acid	R,I,C	Ca [15 mg/m^3]	0.1 mg/m^3 [OSHA]	-	0.001 mg/m^3	0.05 mg/m^3 [water soluble]; 0.01 mg/m^3 [insoluble]	Ca	-	-	-	-	-
Chromium (III) Compounds	R,I,C	25 mg/m^3	-	-	0.5 mg/m^3	0.5 mg/m^3	0.5 mg/m^3	-	-	-	-	-
Chromium Metal	R,I,C	250 mg/m^3	-	-	1 mg/m^3	0.5 mg/m^3	0.5 mg/m^3	-	-	-	-	-
Copper - dust & mist	R,I,C	100 mg/m^3	-	-	1 mg/m^3	1 mg/m^3	1 mg/m^3	-	-	-	-	-
Lead	R,I,C	100 mg/m^3	-	-	0.050 mg/m^3	0.05 mg/m^3	0.050 mg/m^3	-	-	-	-	-
Manganese (compounds and fume)	R,I	500 mg/m^3	5 mg/m^3 [OSHA]	3 mg/m^3 [NIOSH]	-	0.2 mg/m^3	1 mg/m^3	-	-	-	-	-
Mercury & Inorganic Mercury Compounds	R,I,A,C	10 mg/m^3	0.1 mg/m^3 [NIOSH, Skin]; 0.1 mg/m^3 [OSHA]	-	-	0.025 mg/m^3	0.05 mg/m^3 [skin]	-	-	-	-	-
Organo-Mercury Compounds	R,A,I,C	2 mg/m^3	0.04 mg/m^3 [OSHA]	0.03 mg/m^3 [NIOSH]	0.01 mg/m^3	0.01 mg/m^3 [alkyl]; 0.1 mg/m^3 [aryl]	0.01 mg/m^3	-	-	-	-	-
Nickel (metal and compounds)	R,I,C	Ca [10 mg/m^3]	-	-	1 mg/m^3	1.5 mg/m^3 [metal]; 1 mg/m^3 [soluble inorganic compounds]; 1 mg/m^3 [insoluble	0.015 mg/m^3	-	-	-	-	-
Particulate (Not otherwise regulated)	R, C	ND	-	-	15 mg/m^3 (total); 5 mg/m^3 (respirable)	10 mg/m^3 (inhalable); 3 mg/m^3 (respirable)	-	-	-	-	-	-
Portland cement	R,I,C	5000 mg/m^3	-	-	50 mppcf	10 mg/m^3	10 mg/m^3 (total); 5 mg/m^3 (respirable)	-	-	-	-	-
Selenium compounds	R,I,C	1 mg/m^3	-	-	0.2 mg/m^3	0.2 mg/m^3	0.2 mg/m^3	-	-	-	-	-
Silica, crystalline	R, C	Ca [25 mg/m^3 (cristobalie, tridymite); 50 mg/m^3 (quartz, tripoli)]	-	-	Dependent on silicon dioxide content of silica (see Appendix C of the NIOSH Pocket Guide to Chemical Hazards, 2005)	Dependent on minerology [see ACGIH 2005 TLVs and BEIs Handbook]	0.05 mg/m^3	-	-	-	-	-
Silver (metal and soluble compounds)	R,I,C	10 mg/m^3	-	-	0.01 mg/m^3	0.1 mg/m^3	0.01 mg/m^3	-	-	-	-	-
Thallium, soluble	R,A,I,C	15 mg/m^3	-	-	0.1 mg/m^3 [skin]	0.1 mg/m^3 [skin]	0.1 mg/m^3 [skin]	-	-	-	-	-
Tin (metal)	R,C	100 mg/m^3	-	-	2 mg/m^3	2	2 mg/m^3	-	-	-	-	-
Tin (organic compounds)	R,A,I,C	25 mg/m^3	-	-	0.1 mg/m^3	0.1 mg/m^3 [skin]	0.1 mg/m^3 [skin]	-	-	-	-	-
Zinc oxide dust & fume	R	500 mg/m^3	15 mg/m^3 [NIOSH, dust]	10 mg/m^3 [NIOSH; ACGIH; fume]	15 mg/m^3 (total dust); 5 mg/m^3 [respirable dust]; 5 mg/m^3 [fume]	2 mg/m^3 [respirable]	5 mg/m^3 (total dust); 5 mg/m^3 [fume]	-	-	-	-	-

NOTES & ABBREVIATIONS:

All units in parts per million (ppm) unless otherwise noted.
R = Respiratory (Inhalation)
I = Ingestion
A = Skin Absorption
C = Skin Contact
-: Not available
ND: Not detectable.
Ca = Carcinogen
** = Use 11.7 eV lamp
IP: Ionization potential
eV: Electrovolts

IDLH: Immediately dangerous to life and health
Ceiling: Highest allowable instantaneous
C = Skin and/or Eye Contact
STEL: Short-term exposure limit. Exposure period is 15 minutes unless otherwise indicated
PEL: OSHA Permissible Exposure Limit (legally-enforceable)
REL: NIOSH Recommended Exposure Limit
PID: Photoionization Detector
OSHA: United States Occupational Safety and Health Administration
NIOSH: National Institute of Occupational Safety and Health
TLV: ACGIH Threshold Limit Value
ACGIH: American Conference of Governmental Industrial Hygienists

Physical Hazards:

Indicate all hazards that may be present for each task. If any of these potential hazards are checked, it is the project manager's responsibility to determine how to eliminate/minimize the hazard to protect onsite personnel.

Copy and paste a checkmark "✓"into appropriate boxes.

Physical Hazard Checklist				
Potential Job Hazards	**Task 1** Soil Probes Installation	**Task 2** Test Boring/ Monitoring Well Installation	**Task 3** Groundwater Sampling	**Task 4** Vapor Intrusion/ Indoor Air Assessment
Confined space entry*				
Underground utilities	✓	✓		✓
Overhead utilities	✓	✓		
Electrical hazards				
Excavations greater than 4' depth				
Open excavation fall hazards				
Heavy equipment	✓	✓		✓
Drilling hazards	✓	✓		✓
Noise (above 85 dBA)	✓	✓		✓
Traffic concerns	✓	✓	✓	
Extreme weather conditions	✓	✓	✓	
Rough terrain for drilling equipment				
Buried drums				
Heavy lifting (more than 50 lbs)				
High risk fire hazard				
Poisonous insects or plants				
Water hazards				
Use of a boat				
Lockout/Tagout requirements				
Other: indoor operation of rig	✓			

***CONFINED SPACE ENTRY REQUIRES SPECIAL PROCEDURES, PERMITS AND TRAINING AND MUST BE APPROVED BY THE CORPORATE HEALTH & SAFETY MANAGER.**

Potential Activity Hazards and Hazard Controls:

Copy and paste a checkmark "✓" adjacent to potential activity hazards and relevant hazard controls.

POTENTIAL ACTIVITY HAZARDS

Abrasions and Cuts ✓
Access
Asphyxiation
Bacteria
Biological Hazards
Bloodborne Pathogens
Cave Ins
Chemical/Thermal Burns
Chemicals ✓
Cold Stress ✓
Compressed Gases
Confined Spaces
Congestion
Defective Equipment
Dermatitis
Dropping Materials/Tools to Lower Levels
Drowning or Flowing Water
Electrical Shock
Energized Equipment
Equipment Misuse ✓
Ergonomics
Excavations
Explosions
Fatigue
Fire
Flammability
Flying debris ✓
Foreign Body in Eye ✓
Frostbite/Cold ✓
Fueling and Fuel Storage ✓
Fugitive Dust ✓
Fumes ✓
Generated Wastes ✓
Guards removed
Hazardous Materials ✓
Heat Stress (cramps, exhaustion, stroke)
Heavy Equipment Operation ✓
Heavy Equipment/Stability ✓
Heavy Lifting ✓
High crime area (violence)
High Winds
Hoists, Rigging, Slings, Cables ✓
Housekeeping – Improper ✓
Illumination - Poor
Impact ✓
Inability to Maintain Communication
Inclement Weather ✓
Inclines
Insects/Reptiles
Mold
Moving Equipment, Conveyors or Vehicles ✓
Muddy Site Conditions
New Personnel
Noise ✓
Odor ✓
Overhead Utilities ✓
Overhead Work
Overloaded Equipment
Oxygen deficiency
Pinch Points ✓
Poisonous Plants
Pressure
Pressurized Lines
Radiation
Repetitive Motion
Rigging - Improper ✓
Sharp Objects ✓
Silicosis ✓
Slips, Trips, and Falls ✓
Sprains and Strains ✓
Steam
Sunburn ✓
Surface Water Run-off
Toxicity ✓
Traffic ✓
Underground Utilities ✓
Uneven Terrain
Unsafe Atmosphere
Vibration
Visibility - Poor
Visitors Known/Unknown
VOC Emissions ✓
Weight ✓
Work at Depth
Work at Heights
Work over Water
Working on Ice

HAZARD CONTROLS

Air Monitoring ✓
Appropriate Clothing/Monitoring Of Weather ✓
Appropriate Labels/Signage
Barricades/Fencing/ Silt Fencing ✓
Buddy System - Attendant✓
Chock Blocks
Confined Space Procedures
Decontamination Procedures ✓
Derived Waste Management Plan
Drinking Water/Fluids
Dust Abatement Measures ✓
Emergency Action Plan Procedures ✓
Equipment Inspection
Equipment Manuals/Training ✓
Exclusion/Work Zones ✓
Exhaust Ventilation
Eye Protection ✓
Fall Protection
Fire Extinguisher ✓
Flotation Devices/Lifelines
Gloves ✓
Ground Fault Interrupter
Grounded Hydraulic Attachments
Grounded Equipment/Tanks
Hand Signal Communication
Hard Hat ✓
Hazardous/Flammable Material Storage
Hearing Protection ✓
High Visibility Safety Vest ✓
Hoses, Access to Water
Hotwork Procedures
Isolation of Energy Sources(Lockout/Tagout)
Machine/Equipment Guards
Manual Lifting Equipment
Police Detail
Proper Lifting Techniques✓
Proper Tool for Job ✓
Proper Work Position/Tools ✓
Protective Equipment ✓
Radio Communication
Respirator, (APR) ✓
Safety Harness /Lanyard/Scaffold
Security Escort
Sloping, Shoring, Trench Box
Spill Prevention Measures
Spill Kits
Stormwater Control
Traffic Controls ✓
Procedures/Methods ✓
Vehicle Inspection
Visitor Orientation Escort
Window Cleaning/Defrost

Specific Activity Hazards and Precautions

This Health and Safety Plan (HASP) is designed to be used in conjunction with applicable GM Health and Safety Operating Guidelines (HSOGs). The HASP and HSOGs must be available on site when this plan is in use. Below is a list of HSOGs that are currently developed and available to all parties working on GMCH sites. Site personnel will have access to the entire HSOG for reference.

HSOG No.	*Health & Safety Operating Guideline*
1.1	Action Levels for Direct Reading Instrumentation
2.1	General Site Rules
2.2	Confined Space Entry
2.3	Drum Handling
2.4	Lockout/Tagout
2.5	Cold Stress
2.6	Heat Stress
2.7	Hot Work Permits
2.8	Trenching & Excavation
2.9	Electrical Safety
2.10	Power Tool Operation
2.11	Heavy Equipment Inspection
2.12	Light Equipment Operations
2.13	Fall Protection
2.14	Drilling Safety
3.1	Decontamination
3.2	First Aid
3.3	Bloodbome Pathogens
3.4	Medical Surveillance
3.5	Personal Protective Equipment
3.6	Respiratory Protection
3.7	Hazard Communication/WHMIS
4.1	Emergency Response
4.2	Severe Weather
4.3	Notification and Injury Reporting

Safety Meetings

All H&A personnel visiting the site will be given an orientation safety meeting and are required to read and sign this HASP. Daily safety meetings will be conducted onsite and documented on a Health & Safety Tailgate Meeting Form.

Utility Locators and Underground Hazards

Prior to drilling or excavating, Haley & Aldrich staff members will ensure that permission has been gained from the property owner to access the property. Contact site facilities personnel to assist with location of underground utilities. Before marking any proposed exploration location, it is critical that all readily available information on underground utilities and structures be obtained. The estimated location of utility installations, such as gas, electric, fuel, steam, sewer, telephone, fiber optic, water, drainage or any other underground installation that may be expected to be encountered during drilling work, will be identified with the appropriate authority.

Appropriate authorities include client representatives, utility companies, nonprofit organizations (e.g., "Dig-Safe), and others.

Heavy Equipment

Staff Members must be especially careful and alert when working with contractors who use heavy equipment, since equipment failure or breakage can lead to accidents and worker injury. Cranes and equipment for drilling, pile driving, test pitting and coring is of special concern. Should these devices fail during operation the likelihood of worker injury is high. Equipment of this nature should be visually inspected and checked for proper working order prior to the commencement of field work. Those that operate heavy equipment must meet all of the requirements to operate heavy equipment. Haley & Aldrich, Inc. staff members that supervise projects or are associated with such high risk projects that involve digging should use due diligence when working with a construction firm. Maintain visual contact with operators at all times and keep out of the strike zone whenever possible. Always approach heavy equipment with an awareness of the swing radius and traffic routes of each piece of equipment and never go beneath a hoisted load. High-visibility safety vests must be worn onsite at all times. Avoid fumes created by heavy equipment exhaust.

Noise Reduction

Site activities in proximity to heavy equipment often expose workers to excessive noise. It is anticipated that situations may arise when noise levels may exceed the OSHA Action Level of 85 dBA in an 8-hour time-weighted average (TWA). An example of this possibility is working in close proximity to the subcontractor during drilling activities onsite. If excessive noise levels occur, efforts will be made to control this by issuance of earplugs to all personnel and by implementing a system of hand signals understood by all.

Work Site Access & Controls (Standard Precautions)

The work area is restricted to authorized personnel. Clearly define the work area before beginning activities for the day. Caution tape and safety cones must be provided as necessary for vehicular traffic concerns and to protect passers-by. Proper housekeeping is essential to avoid creating hazards to pedestrian and vehicular traffic. Excavations in progress will not be left unattended at any time. Running equipment will not be left unattended at any time. Test borings and test pits will be backfilled upon completion and the area restored. Drilling equipment will be secured above test borings during work stoppages and at the end of the workday.

Site Security

Designated work areas will be set up as appropriate inside the fence during the site field activities, as required. A temporary fence may be installed to prevent unauthorized access to the project work areas. At a minimum, all work activities shall have a barricaded erected such as wood or barricade tape.

It is the Participants' collective responsibility to maintain a work zone free from unauthorized personnel.

Weather Related Hazards

H&A employees and their subcontractors should be aware of potential health effects and/or physical hazards of working during inclement weather. Refer to OP1003-Cold Stress and OP1015-Heat Stress for discussion on weather hazards.

Heavy Equipment Operating Indoors

During soil probe installation indoors and or during operation of any fuel combusting piece of equipment indoors, proper ventilation shall be provided. This can be accomplished through exhaust hosed to an outdoor location, fans and/or open doors. Ventilation shall be maintained through the period of operation. The air space shall be checked for the presence of Carbon monoxide every 10 minutes.

5. PROTECTIVE MEASURES

Personal Protective Equipment Requirements:

Copy and paste a checkmark "✓"into appropriate boxes.

Required PPE	Task 1 Soil Probes Installation	Task 2 Test Boring/ Monitoring Well Installation	Task 3 Groundwater Sampling	Task 4 Vapor Intrusion/ Indoor Air Assessment
Hard hat	✓	✓		✓
Safety glasses w/side shields	✓	✓	✓	✓
Steel-toe footwear	✓	✓	✓	✓
Hearing protection (plugs, muffs)	✓	✓		✓
Tyvek ™ coveralls			✓	
PE-coated Tyvek™ coveralls				
Boots, chemical resistant	✓	✓	✓	
Boot covers, disposable				
Leather work gloves	✓	✓		
Inner gloves - Nitrile	✓	✓	✓	✓
Outer gloves - Enter material here				
Tape all wrist/ankle interfaces				
Half-face respirator*				
Full-face respirator* (available)	✓	✓		
Organic vapor cartridges				
Acid gas cartridges				
Other cartridges: VOC, dust	✓	✓		
P-100 (HEPA) filters				
Face shield				
Personal Flotation Device (PFD)				
High-Visibility Safety Vest (outdoor locations)	✓	✓	✓	
Other:				
Level of protection required [C or D]:	D Mod	D Mod	D Mod	D Mod

* In the event of respirator use, H&A staff must be medically qualified, fit tested and clean shaven with no facial hair that will interfere with the seal.

The required PPE checked in any box above must be on site during the task being performed. Work shall not commence unless the required PPE is present.

Site Safety Equipment Requirements:

Check all items that are required to be on site.

Site Safety Equipment

☑ Fire Extinguisher	☑ First Aid Kit	☐ Flashlight
☐ Air horn/signaling device	☑ Cellular Phone	☐ Duct tape
☐ Ladder	☑ Barricade tape	☐ Drum dolly
☐ Two-way radio	☑ Safety cones	☑ Harness/Lanyard
☐ Other Specify		

The required equipment checked in any box above must be on site during the task being performed. Work shall not commence unless the equipment is present.

6. MONITORING PLAN AND EQUIPMENT

Is air/exposure monitoring required at this work site for personal protection? ☑ Y ☐ N

Is perimeter monitoring required for community protection? ☐ Y ☑ N

Monitoring/Screening Equipment Requirements:

Check all items that are required to be on site.

Required Monitoring/Screening Equipment

- ☑ Photo-Ionization Detector (PID) 10.2eV
- ☐ Photo-Ionization Detector (PID) 11.7eV
- ☐ Photovac Micro Tip (PID) 10.6eV
- ☐ Organic Vapor Monitor (FID)
- ☐ Photovac Gas Chromatagraph (GC)
- ☑ Combustible Gas Indicator (CGI) (LEL)
- ☑ Multiple Gas Detector LEL/O2/H2S/CO
- ☐ Dust Monitors (RAMs)
- ☐ Colorimetric tubes
- ☐ Other

The required equipment checked in any box above must be on site. Work shall not commence unless the equipment is present.

Standard Action Levels and Required Responses:

Exposure Guidelines for common contaminants are listed in Table 1 - Occupational Exposure Limits in the Chemical Hazards section above.

Requirements for PPE upgrades based on monitoring are in Table 2 - Monitoring Methods, Action Levels and Protective Measures following the Specific Monitoring Requirements section below.

Action levels for readings obtained with a multiple gas detector are listed below.

Instrument	Normal	Operating levels	Action levels – required responses
Oxygen Meter	20.9%	Between 19.5-23.5%	Below 19.5 %: leave area, requires supplied air Above 23.5%: leave area, fire hazard
CGI	0%	Less than 10%	Greater than 10%: fire/explosion hazard; cease work
Hydrogen Sulfide	0%	Less than 10 ppm.	Greater than 15 ppm (or 10 ppm for 8 hrs) requires supplied air respirator
Carbon Monoxide	0%	Less than 25 ppm	Greater than 200 ppm for 1 hour (or 25 ppm for 8 hrs) requires supplied air respirator

Standard Air Monitoring Plan (Volatiles):

- Prior to the beginning of work obtain background readings with the PID away from the site.
- Monitor the breathing zone when site soil is exposed (e.g., while drilling or excavating is occurring, etc.) with the PID.
- Monitoring should be conducted most frequently (e.g., every 15-30 minutes) when drilling or excavation first begins in a particular area and when soil is removed from the hole. After this, and if no exceedances of exposure limits are noted (see below), monitoring may be conducted less frequently (e.g., every 60 minutes).
- H&A general exposure limits will be used when a mixture of potentially volatile chemicals are suspected to be present in soil at the site.

In summary, if a reading of 10 ppm above background is detected with the PID for 5 minutes or longer, back away for a few minutes. Screen the air again after any vapors/gases have been given a chance to dissipate. If 10 ppm above background is still noted, evacuate the area and call the LHSC and PM for further guidance.

- Record monitoring data and PPE upgrades in field book or on Record of Field Monitoring form and maintain with project files.

- Air monitoring for exposure should be based on the frequency established under the Standard Air Monitoring Plan or under the Specific Monitoring Requirements. Record time, location and results of monitoring and actions taken based upon the readings.

Standard Air Monitoring Plan (Carbon Monoxide):

Field technicians shall monitor for CO during the operation of heavy equipment indoors for the soil probe installation, and if portable generators are required during other indoor tasks. This monitoring shall occur every 10 minutes during operation of the equipment engines. Frequency of monitoring shall increase and/or improvements to the exhaust ventilation shall be made if the CO reading reaches 25 ppm. Equipment must be shut down if reading exceeds 50 ppm and area ventilated. Personnel shall leave area while it is being further ventilated.

Standard Dust Control Measures and Monitoring Plan:

Dust Control Measures:

It is anticipated that exposure to airborne dust can be mitigated during work operations as necessary to control dust emissions by means of limiting the area of exposed soils and through the use of water sprays. If dust emissions cannot be controlled by these standard measures, additional measures may be employed such as the use of a tackifier (if approved) to stabilize soil exposures or by covering exposed soil and stockpiles with tarpaulins, plastic sheeting or geotextile fabric. Otherwise cease work immediately and contact the Project Manager or the Corporate Health & Safety Manager for assistance. It is not permissible for dust emissions to escape from the site at any time and perimeter dust monitoring may be required to insure public safety.

Dust Monitoring:

Although not specified for this project Respirable Aerosol Monitors (RAM) can be used to monitor total dust levels in work zones and/or at the site perimeter. These instruments do not give specific readings of contaminant concentration (e.g. metals, asbestos, etc.). Depending upon the contaminants present, it may be mandatory for all workers to upgrade to level C protection using a half-face air-purifying respirator with HEPA (P-100) filters if dust levels cannot be adequately controlled during any of the on-site tasks. The H&A Site Safety Officer (SSO) will determine PPE upgrades based upon visual determination as necessary and the OSHA PEL for each known or suspected contaminant. The OSHA PEL/STEL for Respirable Nuisance Dust is 5 mg/m^3 (8 hour TWA). Action levels for fugitive dust at the site perimeter are based upon the daily PM_{10} dust standard of 0.15 mg/m^3 in the National Ambient Air Quality Standard for Inhalable Dust (NAAQS).

Personal dust monitoring using an industrial hygiene pump and a filter cassette may be conducted on each day of operations. In such cases samples are collected from workers with the greatest potential dust exposure and analyzed by an accredited laboratory for specific contaminants.

Specific Monitoring Requirements:

Monitoring requirements and frequency is indicated by task and location below. Refer to the Site-specific HSOGs for additional information.

Monitoring Type: VOC
Equipment: PID
Task #s: 1, 2
Measurement Frequency and Duration: Soil samples retrieved from test borings and soil probes will be monitored for contaminant levels as part of the field screening procedures. Measurement duration will be 30 Seconds. The breathing zone will be periodically monitored during subsurface activities. Measurement duration will be 1 minute.
Action Level: >5 ppm sustained reading

Monitoring Type: CO
Equipment: multiple gas detector
Task #s: 1
Measurement Frequency and Duration: Every 10 minutes during heavy equipment operation indoors. Increased frequency at readings of 25 ppm, evacuation at 50 ppm.
Action Level: >25 ppm sustained reading

Monitoring Type: VOC
Equipment: PID
Task #s: 3
Measurement Frequency and Duration: PID readings will be taken at each monitoring well the first time the well is accessed prior to the start of sampling. Measurement duration will be 30 seconds.
Action Level: >5 ppm sustained reading

Monitoring Type: VOC
Equipment: PID
Task #s: 4
Measurement Frequency and Duration: The breathing zone will be periodically monitored during subsurface activities. Measurement duration will be 1 minute.
Action Level: >5 ppm sustained reading

TABLE 2
Last Revised September 2002

MONITORING METHOD, ACTION LEVELS AND PROTECTIVE MEASURES

INSTRUMENT	HAZARD	ACTION LEVEL	ACTION RESPONSE
Respirable Dust Monitor	Total Particulates	> 5 mg/m^3	Upgrade to Level C Protection
OVA, HNU[2], Photovac Microtip	Total Organic Vapors	Background	Level D Protection
		10 ppm > background or lowest OSHA permissible exposure limit, whichever is lower, or as modified for this task. Sustained for >5 minutes in the breathing zone.	Upgrade to Level C - site evacuation may be necessary for specific compounds
		50 ppm over background, unless lower values required due to respirator protection factors	Cease work; upgrade to Level B[3] may be required
Explosimeter[4] (LEL)	Flammable/Explosive Atmosphere	<10% Scale Reading	Proceed with work
		10-15% Scale Reading	Monitor with extreme caution
		>15% Scale Reading	Evacuate site
0xygen Meter[5]	Oxygen-Deficient Atmosphere	19.5% - 23.5% 0_2	Normal - Continue work
		< 19.5% 0_2	Evacuate site; oxygen deficient
		> 23.5% 0_2	Evacuate site; fire hazard
Radiation Meter[6]	Ionizing Radiation	0.1 Millirem/Hour	If > 0.1, radiation sources may be present[7]
		> 1 Millirem/Hour	Evacuate site; radiation hazard
Drager Tubes	Vapors/Gases	Species Dependent > 1 ppm vinyl chloride > 1 ppm benzene > 1 ppm 1,1-DCE	Consult Table 1 or other resources for concentration toxicity/detection data. Upgrade to Level C if concentration of compounds exceed thresholds shown at left; May need to cease work if other levels exceeded - site specific
Gas Chromatograph (GC)	Organic Vapors	3 ppm total OV > background or > lowest specific OSHA permissible exposure limit, whichever is lower	On-site monitoring or tedlar bag sample collection for off-site/laboratory analysis

Notes:
1. Monitor breathing zone.
2. Can also be used to monitor some inorganic species.
3. Positive pressure demand self contained breathing apparatus
4. Lower explosive limit (LEL) scale is 0-100%. LEL for most gasses is 15%.
5. Normal atmospheric oxygen concentration at sea level is 20%
6. Background gamma radiation is ~0.01-0.02 millirems/hour.
7. Contact H&A Health and Safety staff immediately.

Calibration and Use of Equipment:

Calibrate all monitoring equipment in accordance with manufacturers requirements, H&A calibration (OP) standards and site specific requirements (e.g., at the beginning and end of each work day). Calibration of equipment shall be documented in the field notes or Daily Field Report (DFR). Documentation should include:

- Date/time
- Zero reading before calibration
- Concentration of calibration gas
- Reading obtained with calibration gas before adjusting span\
- Final reading obtained with calibration gas after adjusting span

7. DECONTAMINATION AND DISPOSAL METHODS

Personal Hygiene Safeguards:

The following minimum personal hygiene safeguards shall be adhered to:

- No smoking or tobacco products on any Hazwoper project.
- No eating or drinking in the exclusion zone.
- It is required that personnel present on site wash hands before eating, smoking, taking medication, chewing gum/tobacco, using the restroom, or applying cosmetics and before leaving the site for the day.
- It is recommended that personnel present on site shower or bathe at home at the end of each day of working on the site.

Standard Personal Decontamination Procedures:

Outer gloves and boots should be decontaminated periodically as necessary and at the end of the day. Brush off solids with a hard brush and clean with soap and water or other appropriate cleaner whenever possible. Remove inner gloves carefully by turning them inside out during removal. Wash hands and forearms frequently. It is good practice to wear work-designated clothing while on-site which can be removed as soon as possible. Non-disposable overalls and outer work clothing should be bagged onsite prior to laundering. If gross contamination is encountered on-site contact the Project Manager and LHSC to discuss proper decontamination procedures. The steps required for decontamination will depend upon the degree and type of contamination but will generally follow the sequence below.

1. Remove and wipe clean hard hat
2. Rinse boots and gloves of gross contamination
3. Scrub boots and gloves clean
4. Rinse boots and gloves
5. Remove outer boots
6. Remove outer gloves
7. Remove Tyvek coverall
8. Remove respirator, wipe clean and store
9. Remove inner gloves

Location of Decontamination Station:

To be field located near each boring

Disposal of PPE:

PPE that is not grossly contaminated can be bagged and disposed in regular trash receptacles. PPE that is grossly contaminated must be bagged (sealed) and field personnel should communicate with the Project Manager to determine proper disposal.

Tools & Equipment Decontamination:

All decontamination should be conducted at the site and not at the office or lab.

Check all equipment and materials needed for decontamination of tools and other equipment.

☐ Acetone	☑ Distilled water	☐ Poly sheeting
☑ Alconox soap	☑ Drums for water	☐ Steam cleaner
☐ Brushes	☐ Hexane	☐ Tap water
☑ Disposal bags	☐ Methanol	☐ Washtubs
☑ 5 gallon pails	☐ Other Paper towels	

Standard Equipment Decontamination Procedures:

Air monitoring instrumentation and delicate instruments that are difficult to decontaminate or sensitive to water should be protected from contamination during use through the use of plastic sheeting. To the extent possible, efforts should be taken to limit the degree of contamination to hand tools and sampling equipment during use. Proper PPE must be worn while performing decontamination, including the wearing of chemical safety goggles and gloves. Storage or transport of decontamination solvents in squirt bottles is not permitted as they may discharge their contents upon ambient temperature change or leak if overturned. Standard equipment decontamination procedures are as follows. Any additional requirements are listed under Specific Equipment Decontamination Procedures below.

Pretreatment of heavily contaminated equipment may be conducted as necessary:

1. Remove gross contamination using a brush or wiping with a paper towel
2. Soak in a solution of Alconox and water (if possible)
3. Wipe off excess contamination with a paper towel
4. Clean with hexane or acetone and allow to dry

Standard decontamination procedure:

1. Wash using a solution of Alconox and water
2. Rinse with potable water
3. Rinse with methanol
4. Rinse with distilled water

Specific Equipment Decontamination Procedures:

1. Soil sampling and groundwater monitoring equipment will be washed with Alconox Soap and distilled water over buckets.

2. Equipment will be rinsed with distilled water over buckets.

3. Equipment will be wiped with dry paper towels.

4. Drill rigs will utilize the decontamination pad outside Building 8 to steam clean equipment.

Standard Disposal Methods for Contaminated Materials:

Excess sample solids, decontamination materials, rags, brushes, poly sheeting, etc. that are determined to be free of contamination through field screening can usually be disposed into client-approved, on-site trash receptacles. Uncontaminated wash water may be discarded onto the ground surface away from surface water bodies in areas where infiltration can occur. Contaminated materials must be segregated into liquids or solids and drummed separately for off site disposal. Any additional requirements are listed under Specific Disposal Methods for Contaminated Materials below.

Specific Disposal Methods for Contaminated Materials:

Decontamination water will be placed in the drums provided for groundwater well development water and the paper towels will be disposed of as solid waste.

Disposal Methods for Contaminated Soils:

Contaminated soil cuttings and spoils must be drummed for disposal off-site unless otherwise specifically directed. Soil cuttings and spoils determined to be free of contamination through field screening can usually be returned to the boreholes or excavations from which they came. Any additional requirements are listed under Specific Disposal Methods for Contaminated Soils below.

Specific Disposal Methods for Contaminated Soils:

Drill cuttings will be collected in drums provided.

8. CONTINGENCY PLANNING

How H&A responds to an emergency depends on whether we are at an active facility or another other location. At this facility the field technician will immediately contact site security in the event of an emergency and all site protocol will be followed.

As a rule of thumb, the following are H&A's basic responses to handling Emergencies. Typically, H&A does not mitigate emergencies.

Fire:

- Major Fires - Major fires will be mitigated by the local fire departments or by client's on-site fire/emergency response departments.
- Incipient Stage Fires -Incipient stage fires will be extinguished by on-site personnel using fire extinguishers. Only those who have received annual training may use an extinguisher.

Medical:

All H&A employee injuries and illnesses will be documented using the Supervisor's Accident / Injury / Near Miss Report (SAIR). This form is available on the Intranet.

- First Aid - First aid will be addressed using the on-site first aid kit. H&A employees are not required or expected to administer first aid/CPR to any H&A, Contractor, or Civilian personnel at any time and it is H&A's position that those who do are doing it on their behalf and not as a function of their job.
- Trauma - Based upon the nature of the injury, the injured party may be transported to the nearest hospital or emergency clinic by on-site personnel or by ambulance. First response to a trauma incident is to call facility security. H&A staff members are expected to assist in ancillary roles only such as directing ambulances to the scene. It is the discretion of the staff member on site whether an ambulance should be procured in remote locations where ambulance services will not be effective.

Hazardous Materials Spill:

- Small incidental spills (e.g. pint of motor oil) caused by H&A employees and/or by the contractor will be mitigated by the H&A staff member and/or the contractor.
- Large spills (e.g. large leak from heavy equipment fuel tank). The contractor is responsible for cleanup. In the event that it poses a serious human or environmental threat, the local Fire Department and/or client emergency response department will be contacted. Once emergency has been mitigated typically clean up will be provided by a vendor.

Rescue:

H&A employees will not enter any confined spaces for rescue purposes.

Weather Related Emergencies:

H&A employees and their subcontractors should be aware of potential health effects and/or physical hazards of working during inclement weather. Safeguards against the effects and hazards of heat stress, cold stress, frostbite, thunderstorms, and lightning, etc., are included with the section pertaining to physical hazards in this HASP.

Evacuation Alarms:

Evacuation alarms and/or emergency information will be communicated among personnel on site through verbal communication.

Emergency Services:

Emergency services will be summoned via on-site or cellular phone after contacting site security.

Emergency Evacuation Plan:

The site evacuation plan is as follows:

1. Establish a designated meeting area to conduct a head count in the event of an emergency evacuation.
2. If the work area is not near an emergency exit, exit via the closest route and meet at the designated meeting area.
3. Notify emergency response personnel (fire, police and ambulance) of the number of missing or unaccounted for employees and their suspected location.
4. Administer first aid will in the meeting area as necessary.

Under no circumstances should any personnel re-enter the site area without the approval of the corporate H&S manager, the H&S coordinator, and the fire department official in charge.

9. HEALTH & SAFETY PLAN ACKNOWEDGMENT FORM

Note: Only H&A employees sign this page.

I hereby acknowledge receipt and briefing on this Health & Safety Plan prior to the start of on-site work and declare that I understand and agree to follow the provisions and procedures set forth herein while working on this site.

PRINTED NAME	SIGNATURE	DATE

10. PRE-JOB SAFETY CHECKLIST

The following checklist is designed to help Project Managers verify that all Health & Safety requirements are satisfied for projects involving site work and to aid in the preparation of the site-specific HASP.

Please initial and date the appropriate box once each requirement has been satisfied prior to commencement of site work.

#	Project H&S Requirements	Approval by PM or LHSC (initial each box or place NA)	Date Approved
1	Project site history has been researched and summarized, current site conditions have been determined and documentation of previous investigations, risk analyses and chemical data has been assembled and summarized.		
2	Project work scope has been outlined and potential chemical and physical hazards associated with work tasks have been identified.		
3	Task Safety Analysis has been performed and attached to the HASP.		
4	H&A personnel to be involved with the project have been identified and are current with medical surveillance, OSHA 40 hour and 8 hour refresher training. Hazwoper site supervisor requirements are satisfied.		
5	Additional training requirements have been met: e.g. nuclear density gauge, DOT, Confined Space Entry, Competent Person Training for Excavation, OSHA 10 hour certification, Railway Safety Training, etc.		
6	H&A personnel that may be required to wear a respirator are medically qualified and have current certification of fit testing.		
7	Client's additional H&S requirements have been met: e.g. facility safety orientations, safety documentation, meetings, special PPE requirements		
8	H&A subcontractors have met H&A's minimum requirements including: current OSHA 40 hour training, medical surveillance, written HASP, insurance, MSDSs.		
9	MSDSs are on site and available for chemicals on site.		
10	Safety equipment is available: e.g. flashlight, telephone, ladders, traffic cones, barricade tape, fire extinguisher, first aid kit, PPE, respiratory protection, air and dust monitoring instrumentation (calibrated), personal flotation device (PFD), 90' life line with ring, decontamination equipment, etc.		
11	HASP and supporting documentation is complete and signed by all members.		

APPENDIX A
HASP Amendment Form

This Appendix is to be used whenever there is an immediate change in the project scope that would require an amendment to the HASP. For project scope changes associated with "add-on" tasks, the changes must be made in the body of the HASP. Before changes can be made, a review of the potential hazards must be initiated by the H&A Project Manager.

Amendment No.	
Site Name:	
Work Assignment No.:	
Date:	
Type of Amendment:	
Reason for Amendment:	
Alternate Safeguard Procedures:	
Required Changes in PPE:	

Project Manager Signature: _____ Date: _____

Local Health and Safety Coordinator: _____ Date: _____

This original form must remain on site with the original HASP. If additional HASPs are in the field, it is the Project Manager's responsibility to forward a signed copy of this amendment to those who have copies.

APPENDIX B
Issuance and Compliance
Site Safety Officer Role and Responsibilities
Training Requirements

This Health & Safety Plan (HASP) has been prepared in accordance with the requirements of Title 29 the Code of Federal Regulations (CFR) Section 1910.120/1926.65 to provide guidance for the protection of onsite personnel from physical harm and chemical exposure while working at the subject site.

The specific requirements of this HASP include precautions for hazards that exist during this project and may be revised as new information is received or as site conditions change.

- This HASP must be signed by all Haley & Aldrich (H&A) staff members who will work on the project, including H&A visitors. By signing the Health and Safety Plan Acknowledgement Form personnel are acknowledging that they are aware of the specific hazards of the site and agree to follow the provisions and procedures required to safeguard themselves and others from those hazards.
- This HASP or a current signed copy must be retained at the site at all times when H&A staff members are present.
- Deviations from this HASP are not permitted without prior approval from the above signed. Unauthorized deviations may constitute a violation of H&A company procedures/policies and may result in disciplinary action.
- Revisions to this HASP must be outlined within the contents of the HASP. If immediate or minor changes are necessary, the LHSC and H&A Project Manager may use Appendix A (HASP Amendment Form), located in the back of this HASP. Any revision to the HASP requires personnel to be informed of the changes and that they understand the requirements of the change.
- This HASP is not for H&A Subcontractor use. Each subcontractor engaged is responsible for all matters relating to the health and safety of their personnel and the safe operation of their equipment. This HASP will be made available as a reference so that subcontractors are informed of the potential hazards associated with the site to the extent we are aware. Subcontractors must develop their own HASP which must be, at a minimum, at least as protective as this HASP.
- This Site Specific HASP provides only site-specific descriptions and work procedures. General safety and health compliance programs in support of this HASP (e.g., injury reporting, medical surveillance, personal protective equipment (PPE) selection, etc. are described in detail in the H&A Corporate Health and Safety Program Manual and within Standard Operating Procedures (OPs). Both the manual and OPs can be located on the Company Intranet. When appropriate, users of this HASP should always refer to these resources and incorporate to the extent possible. The manual and OPs are available to clients and regulators per request.

Site Safety Officer:

The site safety officer (SSO) is defined as the individual responsible to the employer with the authority and knowledge necessary to implement the HASP and verify compliance with applicable health and safety requirements.

The H&A Project Manager may designate any person as the site safety officer (SSO) and determines the order of authority on site. Usually the highest ranking person on site is the SSO. A site safety officer must be on site at all times. When none of the designated SSOs are present on site, the senior person for H&A on site will default to the SSO. This project has identified the following hierarchy for SSO.

1. Corey Barnett

Site Safety Officer Roles and Responsibilities:

The SSO is responsible for field implementation of this HASP and enforcement of safety rules and regulations. SSO functions include:

- Act as H&A's liaison for health and safety issues with client, staff, subcontractors, and agencies.
- Verify that utility clearance has been performed by H&A subcontractors.
- Oversee day-to-day implementation of the HASP by H&A employees on site.
- Interact with subcontractor project personnel on health and safety matters.
- Verify use of required PPE as outlined in the HASP.
- Inspect and maintain H&A safety equipment, including calibration of air monitoring instrumentation used by H&A.
- Perform changes to HASP and document in Appendix A of the HASP as needed and notify appropriate persons of changes.
- Investigate and report on-site accidents and incidents involving H&A and its subcontractors.
- Verify that site personnel are familiar with site safety requirements (e.g., the hospital route and emergency contact numbers).
- Report accidents, injuries, and near misses to the H&A PM and Local Health and Safety Coordinator (LHSC) as needed.

The SSO will conduct initial site safety orientations with site personnel (including subcontractors) and conduct toolbox and safety meetings thereafter with H&A employees and H&A subcontractors at regular intervals and in accordance with H&A policy and contractual obligations. The SSO will track the attendance of site personnel at H&A orientations, toolbox talks, and safety meetings. Subcontractors will document training and provide training rosters to the H&A SSO.

The SSO will report accidents such as injury, overexposure, or property damage to the Local Health and Safety Coordinator, to the Project Manager, and to the safety managers of other on-site consultants and contractors. The SSO will consult with the safety managers of other on-site consultants and subcontractors on specific health and safety issues arising over the course of the project, as needed.

Health and Safety Training Requirements:

Personnel will not be permitted to supervise or participate in field activities until they have been trained to a level required by their job function and responsibility. H&A staff members, contractors, subcontractors, and consultants who have the potential to be exposed to contaminated materials or physical hazards must complete the training described in the following sections.

The H&A Project Manager/LHSC will be responsible for maintaining and providing to the client/site manager documentation of H&A staff members' compliance with required training as requested. Records shall be maintained per OSHA requirements.

40-Hour Health and Safety Training

The 40-Hour Health and Safety Training course provides instruction on the nature of hazardous waste work, protective measures, proper use of personal protective equipment, recognition of signs and symptoms which might indicate exposure to hazardous substances, and decontamination procedures. It is required for all personnel working on-site, such as equipment operators, general laborers, and supervisors, who may be potentially exposed to hazardous substances, health hazards, or safety hazards consistent with 29 CFR 1910.120.

8-hour Annual Refresher Training

Personnel who complete the 40-hour health and safety training are subsequently required to attend an annual 8-hour refresher course to remain current in their training. When required, site personnel must be able to show proof of completion (i.e., certification) at an 8-hr refresher training course within the past 12 months.

8-Hour Supervisor Training

On-site managers and supervisors directly responsible for, or who supervise staff members engaged in hazardous waste operations, should have eight additional hours of Supervisor training in accordance with 29 CFR 1910.120. Supervisor Training includes, but is not limited to, accident reporting/investigation, regulatory compliance, work practice observations, auditing, and emergency response procedures.

Additional Training for Specific Projects

H&A personnel will ensure their personnel have received additional training on specific instrumentation, equipment, confined space entry, construction hazards, etc., as necessary to perform their duties. This specialized training will be provided to personnel before engaging in the specific work activities including:

- Client specific training or orientation
- Competent person excavations
- Confined space entry (entrant, supervisor, and attendant)
- Heavy equipment including aerial lifts and forklifts
- First aid/ CPR
- Diving certification
- Use of fall protection
- Commercial drivers license
- Use of nuclear density gauges
- Asbestos awareness