RCRA Facility Investigation Work Plan

Volume VI

General Motors Corporation
NAO Flint Operations Site
Flint, Michigan

March 30, 2001

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BLASLAND, BOUCK & LEE, INC.
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Data Management Plan

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1. Introduction

This Data Management Plan (DMP) is submitted as an appendix to and forms part of the RCRA Facility Investigation (RFI) Work Plan prepared by General Motors Corporation (GM) for the GM NAO Flint Site in Flint, Michigan.

This DMP identifies procedures to be employed for managing information, reports, and correspondence (documents) associated with the RFI to be conducted at the Site. These documents must be readily accessible, and the integrity and accuracy of these documents must be maintained. This will be achieved by restricting access to the materials and implementing data management procedures.

This DMP has been developed by Blasland, Bouck & Lee, Inc. (BBL) and consists of two components: data management and document control.

The data management task consists of procedures used to collect, handle, and safeguard all data generated by field and laboratory programs. The task of document control involves implementing procedures to physically track all documents associated with the RFI that BBL possesses. These two tasks will be expanded upon in the following sections.

The Project Management Team (see Section 4 of Project Management Plan) will be responsible for all aspects of this DMP.

2. Data Management

The data management task of this DMP is to implement procedures relating to collection, recording, retrieval, presentation, and security of all field and laboratory data generated. The data to be managed includes, but is not limited to:

- field data;
- laboratory analytical data; and
- quality assurance/quality (QA/QC) control data.

These three categories of data and security procedures will be reviewed in the following sections.

2.1 Data Collection

2.1.1 Field Logbooks and Field Forms

Data generated in the field will be recorded in field logbooks or on field forms. Photographs of the RFI work also form part of the field database. The field logbook and field forms are the primary means of recording field-related information. The field logbooks and field forms will contain data such as the following:

- general field observations;
- field measurements and observations;
- sample location and corresponding sample number;
- relevant comments pertaining to the samples collected;
- weather conditions;
- a listing of all personnel involved in Site-related activities;
- an accurate log of all telephone conversations and Site meetings; and
- field decisions made and pertinent information associated with the decision.

The field logbooks and field forms reviewed will be numbered consecutively and maintained in accordance with the project FSP/QAPP (see Appendix C).

2.1.2 Still Photographs

Historical still photographs provide a means of visually recording Site conditions and operations.

To ensure quick and accurate retrieval, all photographs taken during RFI work will be documented, cataloged, and stored. A digital camera may be used. Documentation will consist of the following:

- identification of Site and project;
- identification of the area and/or activity photographed;
- orientation and direction of photograph;
- date and time of photograph;
- photographer's name;
- weather conditions; and
- a unique number identifying the photograph.

Cataloging of photographs will be done in a manner that ensures ease of accessibility. Storage of the photographs will be in a secure location. If a digital camera is used, photographs will form part of the electronic database for the project.

2.1.3 Analytical Data

Analytical data will be submitted by the laboratory electronically in addition to the original laboratory reports and will form part of the electronic database for the project. The database will be backed up on a regular basis.

2.2 Data Storage and Retrieval

The data collected or generated as part of the RFI will be stored in a secure manner in a location where all project materials can easily be retrieved. To the extent practicable, an electronic database will be maintained.

Field logbooks, field forms, analytical reports, reference materials, correspondence, reports, and other documents will be filed in chronological order in the project file. Computer disks will be stored in a secure area and will back up any computer information stored on BBL's computer systems. The computer-stored information will be filed under the project name and identification number.

2.3 Data Presentation

The data collected or generated as part of the RFI will be presented in tabular, graphical, or electronic formats.

Analytical data will be presented in its raw format as an appendix to the RFI Report. Summary tables of the raw analytical data will be developed to present the data in a usable format. Analytical data will be manipulated using BBL's database management system, which uses EQUiS.

Graphical data presentation in the form of figures, plans, charts, or graphs will also be included in RFI reports. Information that will be presented in this format includes sample areas, sampling locations, contaminant distribution, stratigraphic logs, geologic cross sections, and any other information where a graphical presentation would be appropriate.

Electronic data, including geographical information systems (GIS) data, will be employed to the extent practicable.

2.4 Data Security

The integrity of the data generated during the RFI will be maintained by restricting access to the data. Only personnel actively involved in the project will be permitted access to the data. The data will be accessed in accordance with BBL's standard procedures for protecting the integrity of the data.

3. Document Control

Documents used for and generated during the RFI will be stored and maintained in a unique project file. Access to the documents will be restricted to personnel actively engaged in the project, and procedures will be implemented to track the documents.

In addition to the document file maintained by BBL, a file of related documents (i.e., RFI Work Plan, analytical data) will be maintained by GM.

The documents to be covered by the document control procedures can be categorized as follows:

- background information files;
- primary data documents; and
- project documents generated during the course of the project.

These three categories will be further discussed in the following sections.

3.1 Background Information Files

The background information for the RFI consists of the following:

- reports of previous Site sampling programs;
- copies of Site files from the USEPA; and
- miscellaneous correspondence.

These documents will be included in the document control system.

3.2 Primary Data Documents

Primary data documents for the RFI may consist of the following:

- field logbooks;
- field forms;
- analytical reports;
- chain of custody forms;
- USEPA correspondence;

- personnel medical records;
- logs of meetings and telephone conversations;
- QA/QC data;
- inventory of samples;
- Site plans; and
- survey notes.

These documents will be included in the document control system.

3.3 Project Documents

Project documents may include reports generated during the RFI and forwarded to USEPA. These documents will be included in the document control system.

Appendix E

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Site Health and Safety Plan (HASP)

Health and Safety Plan

General Motors Corporation
NAO Flint Operations Site
Flint, Michigan

March 30, 2001

Health and Safety Plan

General Motors Corporation
NAO Flint Operations Site
Flint, Michigan

March 30, 2001

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Approvals and Acknowledgments

Approvals

I have read and approved this HASP with respect to project hazards, regulatory requirements, and BBL procedures.

Project Name: General Motors Corporation NAO Flint Operations Site, Flint, Michigan

3/29/2001

Derek C Hinely for Robert J. Anderson
Project Manager/Date

3/28/01
Health and Safety Officer/Date

CIH, CSP 3/26/01
Health and Safety Manager/Date

Acknowledgments

The final approved version of this HASP has been provided to the Site Supervisor. I acknowledge my responsibility to provide the Site Supervisor with the equipment, materials and qualified personnel to implement fully all safety requirements in this HASP. I will formally review this plan with the Health and Safety Staff every six months until project completion.

Derek C Hinely for Robert J Anderson 3/29/2001
Project Manager/Date

I acknowledge receipt of this HASP from the Project Manager, and that it is my responsibility to explain its contents to all Site personnel and cause these requirements to be fully implemented. Any change in conditions, scope of work, or other change that might affect worker safety requires me to notify the Project Manager and/or the Health and Safety Officer.

3/27/01
Site Supervisor/Date

Health and Safety Plan Acknowledgment

I have read this Site-Specific Health and Safety Plan, or its contents have been presented to me, and I understand the contents, and I agree to abide by its requirements.

Name (Print)	Signature	Representing	Date

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1. Introduction

1.1 Objective

The objective of remedial facility investigation (RFI) activities is to conduct environmental media sampling activities at the General Motors Corporation (GM) NAO Flint Operations Site (the Site), located in Flint, Michigan. This Health and Safety Plan (HASP) has been written to address such activities performed at the Site. Activities at the Site are expected to include the following tasks:

- Mobilization;
- Installation of Soil Borings and Groundwater Monitoring Wells;
- Groundwater Sampling and Monitoring, Including Nonaqueous Phase Liquid (NAPL);
- Oil/Sludge Sampling;
- Soil Oil and Sludge Sampling;
- Surface Water Grab Sampling;
- Inspection and Sampling Within Abandoned Buildings;
- Magnetometer/GPR Activities;
- Oversight of Test Pit Installation and Sampling;
- Decontamination Activities;
- Demobilization; and
- Confined Space Entry.

The objective of this HASP is to provide a mechanism for establishing safe working conditions at the Site. The safety organization, procedures, and protective equipment have been established based on an analysis of potential physical, chemical, and environmental hazards. Specific hazard control methodologies have been evaluated and selected to minimize the potential of injury, illness, or other incident.

1.2 Site Description

The Site is located at 902 East Hamilton Avenue in Flint, Michigan, in Genesee County (see Figure 1). The Site encompasses approximately 452 acres of land and is oriented in a north-to-south direction. It is generally bounded to the north by Stewart Avenue and Pierson Road, to the south by Harriet Street, to the east by James P. Cole Boulevard and CSX Railroad, and to the west by Industrial Avenue and North Street.

The topography of the Site is fairly flat, although the regional topography slopes east-southeast toward the Flint River (approximately 100 feet away at the Southend of the Site and approximately 3,000 feet away at the Northend of the Site).

A plastics recycling facility is located on the northeast corner of James P. Cole Boulevard and Garfield Avenue, and a Consumers Power Building is located on the southeast corner of James P. Cole Boulevard, between the Site and the Flint River. A former DuPont facility is located south of Hamilton Avenue, east of the Site. Several other industries are located east of the Site, between the Site and the Flint River, including the CSX Railroad, Interstate I-475, Bell's Produce, PPG Industries, Kasle Steel/Auto Blankers, Flint Coatings, and Lockhart Chemicals. The remaining areas surrounding the Site are generally occupied by residential neighborhoods and other industries, including Universal Systems, Flint Plating, Associated Truck, and Unit Terminal (GM).

1.3 Current and Historical Operations

Portions of the Site were originally developed in the late 1800s for the purpose of producing the "horseless carriage." In 1898, Billy Durant and J. Dallas Dort purchased the Imperial Wheel Company, making it a subsidiary of the Durant/Dort Carriage Company. After acquisition of the Imperial Wheel Company, manufacturing operations were relocated to the intersection of Hamilton Avenue and St. John Street (currently James P. Cole Boulevard).

The Buick Motor Company was first established in Flint when Flint Wagon Works purchased the company from David Buick in September 1903. In 1903, the Buick Motor Company was relocated from Detroit to the Site, on Hamilton Avenue between Industrial Avenue and St. John Street (now James P. Cole Boulevard). With David Buick as president, and Billy Durant as general manager, 16 experimental cars were produced by the end of 1903, and 37 cars were produced in 1904. The Buick Motor Company became a division of General Motors when the corporation was formed in 1908. The Buick Motor Company experienced very rapid growth and produced approximately 30,000 cars in 1910. By that time, the Buick Motor Company had expanded its facility to include the southern portion of the Site. By the end of 1923, the Buick Motor Company had produced 1 million cars, with the Buick complex continuing to grow northward from Hamilton Avenue toward Pierson Road.

In addition to the manufacturing of automobiles, in response to World War I, the Buick Motor Company began producing the Liberty Aircraft engine in 1918. Similarly, in response to World War II, the production of automobiles was stopped in 1942, and the Buick complex was converted for the production of military equipment.

Portions of the Site have recently become inactive, while others remain in full production. Recent and current manufacturing processes include:

- Machining of ferrous and nonferrous metals;
- Plating (discontinued);
- Automobile painting (discontinued);
- V-6 engine manufacturing;
- Coil spring manufacturing (discontinued);
- Torque converter manufacturing;
- Transmission components manufacturing;
- Plastic injection (discontinued); and
- Vehicle assembly (discontinued).

These manufacturing processes include(d) activities or equipment with potential environmental significance as identified below:

- Storing/conveying/using/recycling numerous liquids, including gasolines, oils, solvents, and paints, etc., via sumps, vaults, underground storage tanks (USTs), aboveground storage tanks (ASTs), collection trenches, collection vessels, and materials recovery for various manufacturing operations;
- Degreasing parts;
- Coal-fired steam generation (discontinued); and
- Industrial wastewater treatment.

For further details regarding the current and historical operations at the Site, refer to the following:

- *Description of Current Conditions for Areas South of Leith Street* (BBL, May 30, 2000); and
- *Description of Current Conditions for Areas North of Leith Street* (BBL, November 26, 2000).

1.4 Policy Statement

The policy of Blasland, Bouck & Lee, Inc. (BBL) is to provide a safe and healthful work environment for its employees and subcontractors. No aspect of operations is of greater importance than injury and illness prevention. A fundamental principle of safety management is that all injuries, illnesses, and incidents are preventable. BBL will take every reasonable step to eliminate or control hazards in order to minimize the possibility of injury, illness, or incident.

This HASP prescribes the procedures that must be followed during activities at the Site. Operational changes that could affect the health and safety of personnel, the community, or the environment will not be made without the prior approval of the BBL Project Manager (PM) and the BBL Health and Safety Officer (HSO). This document will be reviewed periodically to ensure that it is current and technically correct. Any changes in Site conditions and/or the scope of work will require a review and modification to this HASP. Such changes will be completed in the form of an addendum or a revision to the plan.

The provisions of this plan are mandatory for all BBL personnel and BBL's subcontractors assigned to the project. Subcontractors and United Auto Worker (UAW) employees should prepare their own Site-specific HASPs which must meet the basic requirements of this HASP. All visitors to BBL work areas at the sites must abide by the requirements of this plan.

1.5 References

This HASP complies with applicable Occupational Safety and Health Administration (OSHA) regulations, EPA regulations, and BBL Health and Safety policies and procedures. This plan follows the guidelines established in the following:

- Standard Operating Safety Guides, EPA (Publication 9285.1-03, June 1992).

- Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities, NIOSH, OSHA, USCG, EPA (86116, October 1985).

- Title 29 of the Code of Federal Regulations (CFR), Part 1910.

- Title 29 of the Code of Federal Regulations (CFR), Part 1926.
- Pocket Guide to Chemical Hazards, DHHS, PHS, CDC, NIOSH (1997).
- Threshold Limit Values, ACGIH (2000).
- Guide to Occupational Exposure Values, ACGIH (2000).
- Quick Selection Guide to Chemical Protective Clothing, Forsberg, K. and S.Z. Mansdorf, 2nd Ed. (1993).
- Health and Safety Policies and Procedures Manual, BBL.

1.6 Definitions

The following definitions (listed alphabetically) are applicable to this HASP:

Contamination Reduction Zone – Area between the exclusion zone and support zone that provides a transition between contaminated and clean areas. Decontamination stations are located in this zone.

Exclusion Zone – Any portions of the Site where hazardous substances are, or are reasonably suspected to be present, and pose an exposure hazard to on-Site personnel.

Incident – All losses, including first aid cases, injuries, illnesses, near misses, spills/leaks, equipment and property damage, motor vehicle accidents, regulatory violations, fires, and business interruptions.

Near Miss – An incident, in which no injury, illness, motor vehicle accident, equipment or property damage, etc., occurred, but under slightly different circumstances, could have occurred.

On-Site Personnel – All BBL, GM, and subcontractor personnel involved with the project.

Project – All on-Site work performed under the scope of work.

Site – The area described in Section 1.2 of this document, where the work is to be performed by BBL personnel and subcontractors.

Subcontractor – Includes contractors and their personnel hired by BBL.

Support Zone – All areas of the Site except the exclusion zone and contamination reduction zone. The support zone surrounds the contamination reduction zone and exclusion zone. Support equipment and break areas are located in this zone.

Visitor – All other personnel, except the on-Site personnel.

Work Area – The portion of the Site where work activities are actively being performed. This area may change daily as work progresses and includes the support zone, contamination reduction zone, and exclusion zone. If the work area is located in an area on the Site that is not contaminated, or suspected of being contaminated, the entire work area may be a support zone.

1.7 Acronyms

The following acronyms (listed alphabetically) are applicable to this HASP:

ACGIH – American Conference of Governmental Industrial Hygienists
APM – Assistant Project Manager

BBL – Blasland, Bouck & Lee, Inc.

CDC – Centers for Disease Control and Prevention

CFR – Code of Federal Regulations

COC – Constituent(s) of Concern

CRZ – Contamination Reduction Zone

DCA – 1,2-Dichloroethane

DCE – 1,1-Dichloroethene

DHHS – Department of Health and Human Services

EPA – U.S. Environmental Protection Agency

EZ – Exclusion Zone

GFCI – Ground Fault Circuit Interrupter

GM – General Motors Corporation

HASP – Health and Safety Plan

HSO – Health and Safety Officer

HSM – Health and Safety Manager

II – Incident Investigation

IPO – Incident Prevention Observation

JSA – job safety analysis

LEL – Lower Explosive Limit

MSDS – Material Safety Data Sheet

NAPL – nonaqueous phase liquid

NIOSH – National Institute of Occupational Safety and Health

NRR – Noise Reduction Rating

OSHA – Occupational Safety and Health Administration

PCB – polychlorinated biphenyl

PEL – Permissible Exposure Limit

PHS – Public Health Service

PID – photoionization detector

PM – Project Manager

PPE – personal protective equipment

ppm – parts per million

REL – Recommended Exposure Limit

SPSA – Safe Performance Self-Assessment

SS – Site Supervisor

STEL – Short-Term Exposure Limit

SZ – Support Zone

TLV – Threshold Limit Value

VOC – volatile organic compound

2. Roles and Responsibilities

2.1 All Personnel

All BBL and subcontractor personnel must adhere to the procedures outlined in this HASP during the performance of their work. Each person is responsible for completing tasks safely, and reporting any unsafe acts or conditions to their supervisor. No person may work in a manner that conflicts with these procedures. After due warnings, the PM/APM will dismiss from the Site any person or subcontractor who violates safety procedures.

All BBL and subcontractor personnel will receive training in accordance with applicable regulations and GM requirements, and will be familiar with the requirements and procedures contained in this HASP prior to initiating Site activities. In addition, all personnel will attend an initial hazard briefing prior to beginning work at the Site.

The roles of BBL personnel and subcontractors are outlined in the following sections. Key project personnel and contacts are summarized in Table 2-1.

2.2 BBL Personnel

2.2.1 Health and Safety Officer (HSO)

The HSO has overall responsibility for the technical health and safety aspects of the project, including review and approval of this HASP. Inquiries regarding BBL health and safety procedures, project procedures, and other technical or regulatory issues should be addressed to this individual. The HSO must approve changes or addenda to this HASP.

2.2.2 Project Manager (PM) and Assistant Project Manager (APM)

The PM and APM are responsible for providing resources to assure project activities are completed in accordance with this HASP, and for meeting regulatory and contractual requirements.

The PM and APM are responsible for verifying that project activities are completed in accordance with the requirements of this HASP. The PM and APM are responsible for confirming that the SS has the equipment, materials, and qualified personnel to fully implement the safety requirements of this HASP, and/or that subcontractors assigned to this project meet the requirements established by BBL and GM. It is also the responsibility of the PM and APM to:

- Consult with the HSO on Site health and safety issues;
- Ensure that subcontractors meet health and safety requirements prior to commencing work;
- Review Incident Prevention Observation (IPO) forms;
- Ensure that all incidents are thoroughly investigated;

- Approve, in writing, addenda or modifications of this HASP; and
- Suspend work or modify work practices, as necessary for personal safety, protection of property, and regulatory compliance.

2.2.3 Health and Safety Manager (HSM)

The HSM is responsible for field health and safety issues, including the execution of this HASP. Questions in the field regarding health and safety procedures, project procedures, and other technical or regulatory issues should be addressed to this individual. The HSM will advise the PM/APM on health and safety issues, and will establish and coordinate the project air monitoring program if one is deemed necessary (see Section 8.1, Air Monitoring). The HSM is the primary Site contact on health and safety matters. It is the responsibility of the HSM to:

- Provide on-Site technical assistance, if necessary;
- Participate in all incident investigations (IIs) and ensure that they are reported to the HSO and PM/APM within 2 hours and that a written report is forwarded to the HSO and PM/APM within 24 hours of the occurrence;
- Coordinate Site and personal air monitoring as required, including equipment maintenance and calibration;
- Conduct Site safety orientation training and safety meetings;
- Verify that BBL personnel and subcontractors have received the required physical examinations and medical certifications;
- Review Site activities with respect to compliance with this HASP;
- Maintain required health and safety documents and records;
- Assist the Site Supervisor (SS) in instructing field personnel on project hazards and protective procedures; and
- Review IPO forms.

2.2.4 Site Supervisor

The SS is responsible for implementing this HASP, including communicating requirements to on-Site personnel and subcontractors. The SS will be responsible for informing the PM/APM of changes in the work plan, procedures, or Site conditions so that those changes may be addressed in this HASP. Other responsibilities are to:

- Consult with the HSM on Site health and safety issues;
- Conduct IPOs at the Site, and complete the IPO forms;
- Stop work, as necessary for personal safety, protection of property, and regulatory compliance;

- Obtain a Site map and determine and post routes to medical facilities and emergency telephone numbers;
- Notify local public emergency representatives (as appropriate) of the nature of the Site operations, and post their telephone numbers (for example: local fire department personnel who would respond for a confined space rescue);
- Observe on-Site project personnel for signs of ill health effects;
- Investigate and report any incidents to the HSM;
- Verify that all on-Site personnel have had applicable training;
- Verify that on-Site personnel are informed of the physical, chemical, and biological hazards associated with the Site activities, and the procedures and protective equipment necessary to control the hazards; and
- Issue/obtain any required work permits (e.g., hot work, confined space, etc.).

2.3 Subcontractors

Subcontractors and their personnel must understand and comply with applicable regulations, Site requirements established in this HASP, and GM requirements. Subcontractors may prepare their own Site-specific HASP, which must be consistent with the requirements of this HASP.

All subcontractor personnel will receive training in accordance with applicable regulations and GM requirements, and be familiar with the requirements and procedures contained in this HASP prior to initiating Site activities. All subcontractor personnel will attend an initial hazard briefing prior to beginning work the Site. Additionally, on-Site subcontractor personnel must attend and participate in the daily Site safety meetings.

Subcontractors must designate individuals to function as the PM/APM, HSO, HSM, and SS. In some organizations it is not uncommon for the duties of the HSO to be carried out by the PM/APM. This is acceptable provided the PM/APM has the required knowledge, training, and experience to properly address all hazards associated with the work, and to prepare, approve, and oversee the execution of the Site-specific HASP. A subcontractor may designate the same person to perform the duties of both the HSM and the SS. However, depending on the level of complexity of a contractor's scope of work, it may be infeasible for one person to perform both functions satisfactorily.

2.4 All On-Site Personnel

All on-Site personnel (including subcontractors) must read and acknowledge their understanding of this HASP before commencing work, and abide by the requirements of the plan. All on-Site personnel shall sign the Health and Safety Plan Acknowledgement Form following their review of this HASP.

All BBL and subcontractor personnel will receive training in accordance with applicable regulations and GM requirements, and be familiar with the requirements and procedures contained in this HASP prior to initiating Site activities. In addition, all on-Site personnel will attend an initial hazard briefing prior to beginning work the Site and the daily safety meetings.

All on-Site personnel must perform a Safe Performance Self-Assessment (SPSA) prior to beginning each work activity. The SPSA process is presented in Section 4.1.1. This process must be performed prior to beginning each activity, and must be performed after any near miss or other incident in order to determine if it is safe to proceed. On-Site personnel will immediately report the following to the SS or HSM:

- Personal injuries and illnesses no matter how minor;
- Unexpected or uncontrolled release of chemical substances;
- Symptoms of chemical exposure;
- Unsafe or hazardous situations;
- Unsafe or malfunctioning equipment;
- Changes in Site conditions that may affect the health and safety of project personnel;
- Damage to equipment or property;
- Situations or activities for which they are not properly trained; and
- Near misses.

2.5 Visitors

All visitors to BBL work areas must check in with the SS. Visitors will be cautioned to avoid skin contact with surfaces, soils, groundwater, or other materials that may impacted or be suspected to be impacted by constituents of concern (COC).

Visitors requesting to observe work at the Site must don appropriate personal protective equipment (PPE) prior to entry to the work area and must have the appropriate training and medical clearances to do so. If respiratory protective devices are necessary, visitors who wish to enter the work area must have been respirator-trained and fit tested for a respirator within the past 12 months.

TABLE 2-1
KEY PERSONNEL

General Motors Personnel		
Role	**Name/Title**	**Address/Telephone No.**
Project Manager	Robert S. Metcalf, P.E.	General Motors Corporation General Motors Remediation Team 902 East Hamilton Avenue Mail Code: 485-185-020 Flint, MI 48550-8502
Blasland, Bouck & Lee, Inc. Personnel		
Role	**Name/Title**	**Address/Telephone No.**
Health and Safety Officer (HSO)	Jay Keough, CIH VP Health and Safety	8 South River Rd. Cranbury, NJ 08512 (609) 860-0590
Project Manager (PM)	Robert Anderson, P.G.	600 Waterfront Drive Pittsburgh, PA 15222-4741 (412) 231-6624
Assistant Project Manager (APM)	Derek C. Kaiding	6723 Towpath Road P.O. Box 66 Syracuse, NY 13214-0066 (315) 446-9120
Site Supervisor (SS)	Brian Loomis	445 East Eisenhower Parkway Suite 260 Ann Arbor, MI 48108-3324 (734) 668-1133
Health and Safety Manager (HSM)	Gregory N. Ertel	155 Corporate Woods Rochester, NY 14623-1465 (716) 292-6740
Subcontractor Personnel		
Company/Role	**Name/Title**	**Address/Telephone No.**
TBA	TBA	TBA

3. Project Hazards and Control Measures

3.1 Scope of Work

Work activities at the Site are expected to include the following:

- Mobilization;
- Installation of Soil Borings and Groundwater Monitoring Wells;
- Oil/Sludge Sampling;
- Groundwater Sampling/Monitoring, including NAPL recovery;
- Soil Oil and Sludge Sampling;
- Surface Water Grab Sampling;
- Inspection and Sampling Within Abandoned Buildings;
- Magnetometer/GPR Activities;
- Oversight of Test Pit Installation and Sampling;
- Decontamination Activities;
- Demobilization; and
- Confined Space Entry.

3.2 Field Activities, Hazards, Control Procedures

The following job safety analyses (JSAs) identify potential health, safety, and environmental hazards associated with each type of field activity. Because of the complex and changing nature of field projects, supervisors must continually inspect the Site to identify hazards that may affect on-Site personnel, the community, or the environment. The SS must be aware of these changing conditions and discuss them with the PM/APM whenever these changes impact employee health, safety, the environment, or performance of the project. The SS will keep on-Site personnel informed of the changing conditions, and the PM/APM will write and/or approve addenda or revisions to this HASP as necessary.

3.2.1 Mobilization

Site mobilization, will include establishing sample locations, determining the location of utilities and other installations, and establishing work areas. Mobilization may also include setting up equipment and establishing a temporary Site office. A break area will be set up outside of regulated work areas. Mobilization may involve clearing areas for the support zone (SZ) and contamination reduction zones (CRZ). During this initial phase, project personnel will walk the Site to confirm the existence of anticipated hazards, and identify safety and health issues that may have arisen since the writing of this plan.

Hazards: The hazards of this phase of activity are associated with vehicular traffic, heavy equipment operation, manual materials handling, installation of temporary on-Site facilities, and manual Site preparation.

Manual materials handling and manual Site preparation may cause blisters, sore muscles, and joint and skeletal injuries; and may present eye, contusion, and laceration hazards. Installation of temporary field office and support facilities may expose personnel to electrical hazards, underground and overhead utilities, and physical injury due to the manual lifting and moving of materials. The work area may present slip, trip, and fall hazards from scattered debris and irregular walking surfaces. Rainy weather may cause wet, muddy, slick walking surfaces, and unstable soil. Freezing-weather hazards include frozen, slick, and irregular walking surfaces. Vehicular traffic poses serious physical hazards to personnel should necessary precautions not be taken.

Environmental hazards include plants, such as poison ivy and poison oak; aggressive fauna, such as ticks, fleas, mosquitoes, wasps, spiders, and snakes; weather, such as sunburn, lightning, rain, and heat- or cold-related illnesses; and pathogens, such as rabies, Lyme Disease, and blood-borne pathogens.

Control: Control procedures for these hazards are discussed in Section 4, General Safety Practices. Control of hazards associated with vehicular traffic is outlined in Section 3.2.1.1.

3.2.1.1 Traffic Safety

The project Site may be located adjacent to a public or private roadways where exposure to vehicular traffic is likely. Traffic may also be encountered as vehicles enter and exit the property and in-plant traffic. To minimize the likelihood of project personnel and activities being affected by traffic, the following procedures will be implemented.

The drilling or sampling of wells may expose personnel to vehicular traffic. Cones must be placed along the shoulder of the roadway starting 100 feet from the work area to alert passing motorists to the presence of personnel and equipment. A "Slow," or "Men Working" sign must be placed at the first cone. Barricades with flashing lights should be placed between the roadway and the work area.

During drilling along a roadway, the drill rig will be aligned parallel to the roadway, facing into the oncoming traffic so as to place a barrier between the drill crew and the oncoming traffic. All crewmembers must remain behind the rig and the traffic barrier.

All Site personnel who are potentially exposed to vehicular traffic must wear an outer layer of orange warning garments, such as vests, jackets, or shirts. If work is performed in hours of dusk or darkness, workers will be

outfitted with reflective garments either orange, white (including silver-coated reflective coatings or elements that reflect white light), yellow, fluorescent red-orange, or fluorescent yellow-orange.

The flow of traffic into and out of the adjacent business must be assessed, and precautions taken to warn motorists of the presence of workers and equipment. Where possible, vehicles should be aligned to provide physical protection of people and equipment.

3.2.2 Installation of Soil Borings and Groundwater Monitoring Wells

This task includes the installation of soil borings and groundwater monitoring wells at specified locations. After the wells are completed, the wells will be developed using the standard operating procedures.

The collection of soil samples may also involve the use of direct push type boring equipment. The equipment poses a hazard if it is not properly operated. The presence of overhead utilities and underground obstacles poses a hazard if boring equipment contacts them. As the hazards are similar to those encountered when using a conventional drill rig, the required control procedures are also the same as a conventional rig and are included in the following sections.

3.2.2.1 Drilling Hazards

The primary physical hazards for this activity are associated with the use of drilling equipment. Rig accidents can occur as a result of improperly placing the rig on uneven or unstable terrain, or failing to adequately secure the rig prior to the start of operations. Exposure to vehicular traffic may create hazards to personnel involved with drilling activities. Underground and overhead utility services can create hazardous conditions if contacted by drilling equipment. Tools and equipment, such as elevators, cat lines, and wire rope, have the potential for striking, pinning, or cutting personnel.

Wire Rope: Worn or frayed wire rope presents a laceration hazard if loose wires protrude from the main bundle.

Cat Lines: Cat lines are used on drilling rigs to hoist material. Hazardous incidents that occur during cat line operations may injure the employee doing the rigging as well as injure the operator. Minimal hoisting control causes sudden and erratic load movements, which may result in hand and foot injuries.

Working Surfaces: Slippery work surfaces can increase the likelihood of back injuries, overexertion injuries, and slips and falls.

Materials Handling: The most common type of accident that occurs in material handling operations is the "caught between" situation when a load is being handled and a finger or toe gets caught between two objects. Rolling stock can shift and/or fall from a pipe rack or truck bed.

3.2.2.2 Drilling Safety Procedures

Drill Crews: All drillers must possess required state or local licenses to perform such work. All members of the drill crew shall receive Site-specific training prior to beginning work.

The driller is responsible for the safe operation of the drill rig, as well as the crew's adherence to the requirements of this HASP. The driller must ensure that all safety equipment is in proper condition and is properly used. The members of the crew must follow all instructions of the driller, wear all PPE, and be aware of all hazards and control procedures. The drill crews must participate in the Site safety meetings and be aware of all emergency procedures.

Rig Inspection: Each day, prior to the start of work, the driller and/or drill crew must inspect the drill rig and associated equipment. The following items must be inspected:

- Vehicle condition;
- Proper storage of equipment;
- Condition and/or operation of all controls, wire rope, and hydraulic lines;
- Fire extinguisher; and
- First aid kit.

Drill Rig Setup: The drill rig must be properly blocked and leveled prior to raising the derrick. The wheels that remain on the ground must be chocked. The leveling jacks shall not be raised until the derrick is lowered. The rig will be moved only after the derrick has been lowered.

Control: Before drilling, the existence and location of underground pipe, electrical equipment, and gas lines shall be determined. This will be done, if possible, by contacting the appropriate client representative to mark the location of the lines. If the client's knowledge of the area is incomplete, an appropriate device, such as a magnetometer, will be used to locate the line. The Underground/Overhead Utility Checklist (see Attachment A) shall be used to document that nearby utilities have been marked on the ground, and that the drilling areas have been cleared. The completed checklist will be in the possession of the SS prior to commencement of any intrusive investigation.

Control of vehicular traffic hazards is presented in Section 3.2.1.1, Traffic Safety.

Combustible gas readings of the general work area will be made regularly (see Section 8, Site Monitoring).

Operations must be suspended and corrective action taken if the airborne flammable concentration reaches 10% of the LEL in the immediate area (a one-foot radius) of the point of drilling, or near any other ignition sources.

Personnel shall not be permitted to ride the traveling block or elevators, nor will the cat line be used as a personnel carrier.

Overhead Electrical Clearances: If drilling is conducted in the vicinity of overhead power lines, the lines must be de-energized, or the equipment must be positioned such that no part, including the rig boom can come within the minimum clearances as follows:

Nominal System Voltage	Minimum Required Clearance
0-50kV	10 feet
51kV-100kV	12 feet
101kV-200kV	15 feet
201kV-300kV	20 feet
301kV-500kV	25 feet
501kV-750kV	35 feet
751-1000kV	45 feet

When the drill rig is in transit, with the boom lowered and no load, the equipment clearance must be at least 4 feet for voltages less than 50kV, 10 feet for voltages of 50kV to 345kV, and 16 feet for voltages above 345kV.

Rig Setup: The driller shall inspect all proposed well sites prior to drilling operations to verify a stable surface exists for the setup of the drill rig. This is especially important in areas where soft, unstable terrain is common.

All rigs will be properly blocked and leveled prior to raising the derrick. Blocking provides a more stable drilling structure by evenly distributing the weight of the rig. Proper blocking ensures that differential settling of the rig does not occur. When the ground surface is soft or otherwise unstable, wooden blocks, at least 24 inches by 24 inches and 4 inches to 8 inches thick, shall be placed between the jack swivels and the ground. The emergency brake shall be engaged, and the wheels that are on the ground shall be chocked.

Hoisting Operations: Drillers shall not engage the rotary clutch without watching the rotary table, and ensuring it is clear of personnel and equipment.

Unless the drawworks is equipped with an automatic feed control, the brake should not be left unattended without first being tied down.

Auger strings or casing shall be picked up slowly.

During instances of unusual loading of the derrick or mast, such as when making an unusually hard pull, only the driller should be on the rig floor; no one else should be on the rig or derrick.

The driller shall test the brakes on the drawworks of the drill rig each day. The brakes shall be thoroughly inspected by a competent individual each week.

A hoisting line with a load imposed shall not be permitted to be in direct contact with any derrick member or stationary equipment, unless it has been specifically designed for line contact.

Workers shall not stand near the borehole whenever any wire line device is being run.

Hoisting control stations shall be kept clean and controls labeled as to their functions.

Cat Line Operations: Only experienced personnel will be allowed to operate the cat head controls. The kill switch must be clearly labeled and operational prior to operation of the cat line. The cat head area must be kept free of obstructions and entanglements.

The operator should not use more wraps than necessary to pick up the load. More than one layer of wrapping is not permitted.

Personnel shall not stand near, step over, or go under a cable or cat line that is under tension.

Employees rigging loads on cat lines shall:

- Keep out from under the load;
- Keep fingers and feet where they will not be crushed;
- Be sure to signal clearly when the load is being picked up;
- Use standard visual signals only and not depend on shouting to co-workers; and
- Make sure the load is properly rigged, since a sudden jerk in the cat line will shift or drop the load.

Wire Rope: When two wires are broken, or rust or corrosion is found adjacent to a socket or end fitting, the wire rope shall be removed from service or resocketed. Special attention shall be given to the inspection of end fittings on boom support, pendants, and guy ropes.

Wire rope removed from service due to defects shall be cut up or plainly marked as being unfit for further use as rigging.

Wire rope clips attached with U-bolts shall have the U-bolts on the dead or short end of the rope; the clip nuts shall be re-tightened immediately after initial load carrying use and at frequent intervals thereafter.

When a wedge socket fastening is used, the dead or short end of the wire rope shall have a clip attached to it or it shall be looped back and secured to itself by a clip; the clip shall not be attached directly to the live end.

Protruding ends of strands in splices on slings and bridles shall be covered or blunted.

Except for eye splices in the ends of wires and for endless wire rope slings, wire rope used in hoisting, lowering, or pulling loads, shall consist of one continuous piece without knot or splice.

An eye splice made in any wire rope shall have not less than five full tucks.

Wire rope shall not be secured by knots. Wire rope clips shall not be used to splice rope.

Eyes in wire rope bridles, slings, or bull wires shall not be formed by wire clips or knots.

Auger Handling: Auger sections shall be transported by cart or carried by two persons. Individuals should not carry auger sections without assistance. Personnel carrying augur sections shall use proper lifting techniques.

Workers should not be permitted on top of the load during loading, unloading, or transferring of rolling stock.

When equipment is being hoisted, personnel should not stand where the bottom end of the equipment could whip and strike them.

Augers stored in racks, catwalks, or on flatbed trucks should be secured to prevent rolling.

3.2.3 Groundwater/NAPL Sampling/Monitoring

Groundwater sampling/monitoring will involve uncapping, purging (pumping water out of the well), and sampling/monitoring new and existing monitoring wells. Sampling/recovery of NAPL will also be done using similar procedures. A mechanical pump may be utilized to purge the wells; the pump may be hand-, gas-, or electric-operated. Water samples taken from the wells are then placed in containers and shipped to analytical laboratory for analysis. The physical hazards of these operations are primarily associated with the sample collection methods and procedures utilized.

Hazards: Inhalation and absorption (contact) of COCs are the primary routes of entry associated with groundwater sampling due to the manipulation of sample media and equipment, manual transfer of media into sample containers, and proximity of operations to the breathing zone. During the course of this project, different groundwater sampling methodologies may be utilized based on equipment accessibility and the types of materials to be sampled. These sampling methods may include hand or mechanical bailing. The primary hazards associated with these specific sampling procedures are not potentially serious; however, other operations in the area, or the conditions under which samples must be collected may present chemical and physical hazards. The hazards directly associated with groundwater sampling procedures are generally limited to strains/sprains from hand bailing and potential eye hazards. Exposure to soil and water containing COCs is also possible. In addition to the safety hazards specific to sampling operations, hazards associated with the operation of vehicles, especially large vehicles with limited operator visibility, is a concern. Of particular concern will be the backing up of trucks, excavation equipment, and other support vehicles.

The flora and fauna of the Site may present hazards of poison ivy, poison oak, ticks, fleas, mosquitos, wasps, spiders and snakes. The work area presents slip, trip and fall hazards from scattered debris and irregular walking surfaces. Freezing-weather hazards include frozen, slick and irregular walking surfaces. Rainy weather may cause wet, muddy, slick walking surfaces and unstable soil.

Control: To control dermal exposure during groundwater sampling/monitoring activities, a minimum of Modified Level D protection will be worn. Air monitoring may be conducted during groundwater sampling/monitoring activities to assess the potential for exposure to airborne COCs. If the results of air monitoring indicate the presence of organic vapors in a concentration causing concern, personnel will upgrade to Level C protection. Refer to Section 8, Site Monitoring for a description of air monitoring requirements and action levels. A description of each level of personal protection is included in Section 5, Personal Protective Equipment. Control procedures for environmental and general hazards are discussed in Section 4, General Safety Practices. Control of vehicular traffic hazards is presented in Section 3.2.1.1, Traffic Safety.

3.2.4 Sampling: Soil, Sludge, Oil, Surface Water, and Other Potentially Contaminated Materials

Field sampling operations will involve the collection of soil, sludge, and other materials for subsequent analysis and evaluation of potential Site contamination. The physical hazards of these operations are primarily associated with the sample collection methods and procedures utilized.

During the course of this project, the sampling methods may include hand-auger/sampling probes, manual coring devices, peristaltic pumps, hand trowels, etc. Inhalation and absorption (contact) of contaminants are the primary routes of entry associated with soil sampling due to the manipulation of sample media and equipment, manual transfer of media into sample containers, and proximity of operations to the breathing zone. To control dermal exposure during soil sampling activities, a minimum of Modified Level D protection will be worn. Air sampling

may be conducted during soil sampling to assess the potential for exposure to airborne contaminants. If the results of air monitoring indicate the presence of organic vapors in a concentration causing concern, personnel will upgrade to Level C protection. The SS will make decisions regarding PPE usage for the protection against chemical hazards based on the information in Section 5, Personal Protective Equipment, and measurements made before and during work activities. Control procedures for environmental and general hazards are discussed in Section 4, General Safety Practices. Refer to Section 8, Air Monitoring for a description of air monitoring requirements and action levels.

3.2.5 Inspection and Sampling in Abandoned Buildings

Several buildings on the Site are no longer actively in use and have not been maintained. Many of these buildings contain open pits, abandoned machinery and debris. There is also the potential for some of the building structures such as guardrails, stairs or windows to be unsecured or deteriorated. Utilities have also been disconnected so there will be no lighting or heating in the buildings.

Personnel involved in this project will have to enter these buildings for inspection, sampling or other activities related to this project. The hazards that they will exposed to will include the following:

Hazards:

- Limited lighting and visibility;
- Unstable walking and working surfaces;
- Inadequate or missing signs, barricades, and guards;
- Potential exposure to accumulated bird waste and other biological material;
- Potential exposure to asbestos materials;
- Presence of rodents or other wildlife and insects, and
- Limited exit or exit routes that are not clearly marked.

To protect against the above hazards all personnel will be briefed on and follow the guidelines listed below:

Control:

- No one will enter any abandoned structures alone, the buddy system will be utilized at all times;
- Sturdy work boots or shoes with a rugged sole will be used (preferably ANSI approved footwear);
- Everyone that enters will have a flashlight or other portable light source available;
- Entrants will continually monitor their location and be aware of the closest exit route;

- Entrants will avoid contact with any biological waste material and will utilize universal precautions (PPE, personal hygiene, training) in the event that handling or sampling is necessary; and

- Entrants will avoid disturbing or contacting any asbestos-containing material (ACM) or suspect ACM while in abandoned buildings (ACM material can include pipe insulation, floor tiles, and other building materials); and

- A system to communicate with the on-Site security will be available (radio or cellular phone).

3.2.6 Magnetometer/GPR Activities

Magnetometer and GPR subsurface surveys may be performed at select locations at the Site to investigate subsurface conditions.

Physical Hazards: The physical hazards involved with magnetometer and GPR survey work to be conducted are associated with equipment, hand tools, and the Site environment itself. There exists a potential for incidents involving personnel struck by or struck against equipment resulting in fractures, cuts, punctures, or abrasions. Walking and working on surfaces during the activities may involve slip, trip, and fall hazards.

Working Surfaces: Slippery work surfaces can increase the likelihood of back injuries, overexertion injuries, and slips and falls. All personnel should frequently inspect working surfaces and keep working surface clear of debris.

Materials Handling: The most common type of accident that occurs in material handling operations is the "caught between" situation when a load is being handled and a finger or toe gets caught between two objects. Extreme care must be taken when loading and unloading material. Proper lifting technique must be employed.

Control: Prior to initiating magnetometer and GPR survey activity, the operation will be explained to all employees. Hazards will be identified and protective measures will be explained. Equipment will be inspected and in proper working condition. Employees should receive training to address the equipment, its operations, and care. Mechanical assistance should be provided for large lifting tasks. Hearing protection is required for use when exposed to noise levels exceeding 85 dBA, or a level which commonly results in difficult conversation. Anticipated level of protection will be Level D PPE plus disposable boots and sample gloves.

3.2.7 Oversight of Test Pit Installation and Sampling

The oversight and sampling of test pit installation may be performed at various locations on Site.

Hazardous: The primary hazards associated with test pit installation and sampling oversight involve working near open excavations and potential exposure to hazardous materials. Excavations and trenches present the potential for failure and cave-in and sampling may require some contact or exposure to the contaminants of concern at the Site.

Control: To provide for a safe working environment personnel performing these activities must follow the requirements for trenching and excavation in 29 CFR 1926.650, including installation of approved trench boxes and sloping or shoring as applicable based on the soil type and depth of the excavation. A competent person as defined by the standard must be employed to identify and correct unsafe excavation conditions.

BBL personnel involved in oversight activities will maintain a safe distance from all open pits, excavations, and trenches. All sampling will be conducted as described in the section 3.2.4 Sampling: Soil, Sludge, Oil, and Other Potentially Contaminated Materials of the HASP.

3.2.8 Decontamination

Equipment/materials cleaning will be performed to control the transfer of COCs from the Site. Equipment will be cleaned by either scrubbing with a mild detergent/citrus solvent or a high pressure steam wash to remove visible dirt and dust.

Hazards: Sources of chemical hazards from decontaminating equipment are decontamination detergents or solvents, foreign matter and COCs on the equipment prior to decontamination, and rinsate from the decontamination process. Physical hazards associated with this activity are back strain, slippery surfaces, cuts and burns from the high pressure steam wash and hearing loss due high levels of noise generated by the equipment.

Control: Control procedures for these hazards are discussed in Section 4, General Safety Practices. Decisions regarding PPE will be based on the potential chemical and physical hazards on the Site, and measurements and observations made prior to and during work activities. Personnel involved in decontamination activities wear PPE typically one level lower than personnel working in the exclusion zone. PPE for this activity is specified in Section 5, Personal Protective Equipment.

3.2.9 Demobilization

Demobilization involves the removal of all tools, equipment, supplies, and vehicles brought to the Site. The hazards of this phase of activity are associated with heavy equipment operation and manual materials handling.

Hazards: Manual materials handling may cause blisters, sore muscles, and joint and skeletal injuries; and may present eye, contusion, and laceration hazards. Heavy equipment operation presents noise and vibration hazards, and hot surfaces, to operators. Personnel in the vicinity of heavy equipment operation may be exposed to physical hazards resulting in fractures, contusions, and lacerations and may be exposed to high noise levels. The work area presents slip, trip, and fall hazards from scattered debris and irregular walking surfaces. Rainy weather may cause wet, muddy, slick walking surfaces, and unstable soil. Freezing-weather hazards include frozen, slick, and irregular walking surfaces.

Environmental hazards include plants, such as poison ivy and poison oak; aggressive fauna, such as ticks, fleas, mosquitoes, wasps, spiders, and snakes; weather, such as sunburn, lightning, rain, and heat- or cold-related illnesses; and pathogens, such as rabies, Lyme Disease, and blood-borne pathogens.

Control: Control procedures for these hazards are discussed in Section 4, General Safety Practices.

3.3 Confined Space Entry

A confined space is defined as a space large enough and so configured that an employee can bodily enter and perform assigned work, has limited means for entry or exit, and is not designed for continuous employee occupancy. Some confined space work may pose additional hazards such as air contamination, flammable or explosive atmosphere, and oxygen deficiency. Confined space entry may pose the possibility of engulfment. Personnel must be properly trained in order to supervise and participate in confined space entry procedures or serve as standby attendants.

3.3.1 Confined Space Identification and Designation

Identification: The BBL Confined Space Entry Supervisor/Health and Safety Specialist is responsible to identify all confined spaces into which BBL employees or subcontractors will enter. A confined space is defined as a space that has limited entry or exit points, is not designed for continuous human occupancy, and can be entered. Entry is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space. The client is responsible to identify and provide information as to contents, expected atmosphere, and rescue procedures for all confined spaces on his/her property. If a space is not considered permit-required by the client but meets the criteria of this procedure, it shall be considered permit-required for BBL-managed entry. If a space does not meet the criteria in this procedure but is considered permit-required by the client, it will be considered a permit-required confined space by BBL.

The permit-required confined space for this project may include underground sewer lines, basement vaults, or other structures considered confined spaces by the above definition.

3.3.1.1 Duties of Personnel

Each confined space being entered shall have a minimum of one dedicated attendant and one other support person (who may have other duties) within sight or call.

3.3.1.2 Duties of Entrants

Know the hazards that may be faced during entry including information on the mode, signs or symptoms, and consequences of the exposure.

Communicate with the attendant as necessary to enable the attendant to monitor entrant status and to enable the attendant to alert entrants of the need to evacuate the space.

- Alert the attendant whenever:

  - The entrant recognizes any warning sign or symptom of exposure to a dangerous situation, or
  - The entrant detects a prohibited condition;

Exit from the permit-required confined space (permit space) as quickly as possible whenever:

- An order to evacuate is given by the attendant or the entry supervisor,
- The entrant recognizes any warning sign or symptom of exposure to a dangerous situation,
- The entrant detects a prohibited condition, or
- An evacuation alarm is activated.

Duties of Attendants:

- Knows the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure.

- Is aware of possible behavior effects of hazard exposure in authorized entrants.

- Continuously maintains an accurate count of the authorized entrants in the permit space and accurately identifies who is in the permit space by tagging the lifelines with the entrants name and recording the names of the entrants.

- Remains outside the permit space during entry operations until relieved by another attendant.

- Communicates with authorized entrants as necessary to monitor entrant status and to alert entrants to remain in the space and orders the authorized entrants to evacuate the permit space immediately under any of the following conditions:

  - If the attendant detects a prohibited condition;
  - If the attendant detects the behavioral effects of hazard exposure in an authorized entrant;
  - If the attendant detects a situation outside the space that could endanger the authorized entrants, or
  - If the attendant cannot effectively and safety perform all of his/duties.

- Summon rescue and other emergency services as soon as the attendant determines that authorized entrants may need assistance to escape from permit space hazards.

- Takes the following actions when unauthorized persons approach or enter a permit space while entry is underway:

  - Warn the unauthorized persons that they must stay away from the permit space;

  - Advise the unauthorized persons that they must exit immediately if they have entered the permit space;

  - Inform the authorized entrants and the entry supervisor if unauthorized persons have entered the permit space;

  - Perform nonentry rescues; and

  - Perform no duties that might interfere with the attendant's primary duty to monitor and protect the authorized entrants.

Duties of Entry Supervisors:

- Knows the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure.

- Verifies, by checking that the appropriate entries have been made on the permit, that all tests specified by the permit have been conducted and that all procedures and equipment specified by the permit are in place before endorsing the permit and allowing entry to begin.

- Terminates the entry and cancels the permit as required.

- Removes unauthorized individuals who enter or who attempt to enter the permit space during entry operations.

- Determines that entry operations remain consistent with terms of the entry permit and that acceptable entry conditions are maintained.

- Documents on the entry permit any incidents or circumstances requiring revisions of the confined space entry program. Such incidents include but are not limited to:

  - Unauthorized entry;
  - The detection of a condition/hazard not authorized by the permit;
  - The occurrence of an injury or near-miss during entry;
  - A change in use or configuration of the space; or
  - Employee complaints about the program.

- Prescribes procedures for coordination of entry when personnel from multiple employers will work simultaneously. Subcontractors shall follow all confined space entry procedures.

3.3.2 Procedures for Permit Space Entry

Acceptable Entry Conditions: The acceptable entry conditions for entry into each space are outlined below:

Isolation Requirements: Isolation is not practical or possible, therefore, entry conditions must be continuously monitored.

Atmospheric Hazard Controls: Atmospheric hazards must be eliminated or controlled to meet the requirements specified inn Table 3-1. Ventilation equipment may be needed to maintain these conditions.

Inspecting and Testing Procedures: The following equipment shall be available for testing each confined space:

Multi RAE instrument with PID, Oxygen, LEL, CO, and Hydrogen Sulfide Sensors.

All equipment shall be maintained in such quantity and condition, per manufacturer's recommendations to adequately monitor and assess all confined space entries.

Testing Procedures: Procedures for inspecting, monitoring, and testing the confined space to verify that acceptable conditions exist prior to and throughout the entry operation are as follows:

- Permit required confined spaces shall be tested continuously to detect if conditions change. Priority for atmospheric hazard testing shall be oxygen, combustible gases, then toxic gases.

- Communications: Provisions for continuous communication between entrants and attendants shall consist of powered communication equipment (i.e., radio) or remaining within visual and verbal contact at all times.

Personal Protective equipment (see section 5.0 for additional PPE requirements):

- Cloth coveralls minimum. Polycoated (or equivalent) protective suits if the Confined Space Entry Supervisor deems it necessary.

- Eye, face, head, and foot protection.

- A chest or parachute harness with approved lifelines at least ½-inch in diameter and 2,000 test. All lifelines shall be secured to a mechanical device or fixed point outside the confined space. Mechanical devices shall be used for all vertical entry permit spaces greater than 5 feet deep.

- Ingress and Egress Equipment: Protective barriers to be used to protect entrants from external pedestrian, vehicle, or equipment hazards.

- Rescue Equipment: All lifelines must be attached to a mechanical device outside the space such that a rescue can begin as soon as the rescuer becomes aware that a rescue is necessary. A mechanical device must be attached to the entrant in order to retrieve personnel from vertical type permit spaces more than 5 feet deep.

3.3.2.1 Permit System

Before entry is authorized, the contractor's Entry Supervisor shall complete and sign the contractor's entry permit according to their written confined space program and document that all pre-entry requirements have been met and that acceptable entry conditions exist. The complete permit shall be posted at the primary entrance to the permit space. A copy of BBL's Confined Space Entry permit is included in Attachment B.

All entry permits are valid for a maximum of one work shift and shall be canceled by the Entry Supervisor when the shift ends, confined space operations are completed, or whenever a prohibited condition arises in or near the space. All confined spaces shall be securely closed or barricaded whenever the permit is canceled. Each contractor's Entry Permit must be completely executed and include all required information.

3.3.2.2 Emergency Procedures

Each contractor shall arrange for outside rescue services. The rescue personnel must be offered an opportunity to inspect the space and practice a rescue if necessary. The means for summoning rescue services must be clearly communicated and documented on the contractor's entry permit. Security will be contacted at (810) 236-1400 in the event of any emergency.

3.3.2.3 Training

General: Prior to assignment to confined space entry work, all employees shall receive training in the hazards of confined spaces, work practices to control these hazards, and duties to be performed. Employee proficiency shall be established by testing and/or practical demonstration.

Requirements for Entrants, Attendants, Supervisors: Basic training requirements for entrants and attendants shall include Confined Space Entry (CSE) Entrant/Attendant training.

Basic training for entry supervisors and personnel conducting atmospheric testing shall include 8-hour supervisor training and Confined Space Entry Training.

Personnel assigned to attendant duties shall be trained in nonentry rescue procedures.

Requirements for Emergency Rescue Personnel: The CSS must coordinate rescue services by identifying a rescue entity and contacting them to inform them that entry will take place. Personnel assigned to provide emergency entry and rescue services shall be trained annually in the proper use of personal protective and rescue equipment. Such training shall include a simulated rescue exercise at least once every 12 months. In addition, rescue personnel shall be trained in the hazards and proper work practices for handling blood or other potentially infectious materials.

TABLE 3-1
Acceptable Entry Conditions for Confined Spaces

Parameter	Reading	Action
Total Organic Vapors (PID)	0 ppm to $\leq$ 5 ppm	Normal operations; continue breathing zone monitoring.
	>5 ppm	Ventilate space investigate cause of reading.
	>10 ppm	Evacuate Confined Space, investigate and reduce levels before re-entry
Lower Explosive Limit (LEL)	0-10 percent	Normal operations.
	>10 %	Stop work; evacuate area; investigate cause of reading.
Hydrogen Sulfide	0 to 5 ppm	Normal operations.
	5-10 ppm	Ventilate space investigate cause of reading
	>10	Stop work; evacuate area; investigate cause of reading.
Carbon Monoxide	0 to 20 ppm	Normal operations.
	20-25 ppm	Ventilate space investigate cause of reading
	<25 ppm	Stop work; evacuate area; investigate cause of reading.
Oxygen	19.5-23.5 percent	Normal operations.
	>23.5 percent	Stop work; evacuate area; investigate cause of reading.

	<19.5 percent	Stop work; evacuate area; investigate cause of reading.

3.4 Chemical Hazards

The chemical hazards associated with Site operations are related to inhalation, ingestion, and skin or eye contact with materials that are impacted by Site COCs.

Airborne concentrations of COCs may be measurable during certain activities, and may require air monitoring for potentially hazardous atmospheres during such operations. Air monitoring requirements for Site activities are outlined in Section 8.1, Air Monitoring.

The potential for inhalation of COCs during mobilization and demobilization activities is low to moderate. The potential for inhalation of COCs during the installation of soil borings and groundwater monitoring wells, groundwater sampling/monitoring, soil sampling, and decontamination activities is moderate to high. The potential for dermal contact with COCs containing environmental media or equipment during mobilization, engineering and demobilization activities is low to moderate. The potential for dermal contact with COCs containing environmental media or equipment during the installation of soil borings and groundwater monitoring wells, groundwater sampling/monitoring, soil sampling, and decontamination activities is moderate to high.

Levels of PPE to be used for each work activity were selected based on the COCs at the Site at the time this plan was written, and are discussed in Section 5, Personal Protective Equipment. As analytical data become available, this HASP may be amended to address additional COCs detected, and Material Safety Data Sheets (MSDSs) for the specific chemicals will be attached to this HASP.

A MSDS must accompany all materials brought to the Site. No material shall be used or installed by any BBL employee or subcontractor prior to review of the MSDS by the SS or HSM. Following review of MSDSs by the SS or HSM, copies shall be made and placed in this HASP. The location of MSDS for on-Site chemicals shall be communicated to all on-Site employees. All provisions of the BBL Hazard Communication Policy and Procedure Memo and 29 CFR 1910.1200 are to be followed with regard to chemicals that are to be used during on-Site activities. The MSDSs for the COCs and the chemicals in use at the Site are included in Attachment H.

4. General Safety Procedures

4.1 General Safety Rules

General safety rules for Site activities include, but are not limited to the following:

- At least one copy of this HASP must in a location at the Site that is readily available to personnel, and all project personnel shall review the plan prior to starting work;
- Consume or use food, beverages, chewing gum, and tobacco products only in the support zone or other designated area outside the EZ and CRZ. Cosmetics shall not be applied in the EZ or CRZ;
- Wash hands before eating, drinking, smoking, or using toilet facilities;
- Do not wear jewelry, including watches, while in the EZ or CRZ;
- Wear all PPE as required, and stop work and replace damaged PPE immediately;
- Secure disposable coveralls, boots, and gloves at the wrists and legs and ensure closure of the suit around the neck;
- Upon on skin contact with materials that may be impacted by COCs, remove contaminated clothing and wash the affected area immediately. Contaminated clothing must be changed. Any skin contact with materials potentially impacted by COCs must be reported to the SS or HSM immediately. If needed, medical attention should be sought;
- Practice contamination avoidance. Avoid contact with surfaces either suspected or known to be impacted by COCs, such as standing water, mud, or discolored soil. Equipment must be stored on elevated or protected surfaces to reduce the potential for incidental contamination;
- Remove PPE as required in the CRZ to limit the spread of COC-containing materials;
- At the end of each shift or as required, dispose of all single-use coveralls, soiled gloves, and respirator cartridges in designated receptacles designated for this purpose;
- Removing sediment/soil containing Site COCs from protective clothing or equipment with compressed air, shaking, or any other means that disperses contaminants into the air is prohibited;
- Inspect all non-disposable PPE for contamination in the CRZ. Any PPE found to be contaminated must be decontaminated or disposed of appropriately;
- Recognize emergency signals used for evacuation, injury, fire, etc.;
- Report all injuries, illnesses, near misses, and unsafe conditions or work practices to the SS or HSM;

TABLE 11-1
EMERGENCY CONTACT PHONE LIST

THE GM NUMBER LISTED BELOW MUST BE CONTACTED FIRST AND THE GM PROCEDURES, IF ANY, ADHERED TO BEFORE PROCEEDING WITH THE OTHER CONTACTS LISTED BELOW.

GM FACILITY EMERGENCY CONTACTS	PHONE NUMBER
Emergency (Fire or Ambulance)	(810) 236-1400
Plant Security	(810) 236-1400

THE FOLLOWING EMERGENCY NUMBERS MAY BE CONTACTED DIRECTLY FOR OFF SITE EMERGENCIES.

LOCAL EMERGENCY CONTACTS	PHONE NUMBER
Emergency Response (Ambulance)	911
Fire Department	911
Police Department	911
State Police	(810) 732-1111
Sheriff	(810) 257-3422
MEDICAL EMERGENCY CONTACTS	**PHONE NUMBER**
Hospital: Hurley Medical Center	(810) 257-9000
Local Health Department	(810) 257-3612
State Health Department	(517) 335-8000

- Use the "buddy system" during all operations requiring Level C PPE, and when appropriate, during Modified Level D operations;
- Maintain work areas in a neat and orderly manner. Dispose of trash, rubbish and other debris in designated containers;
- Obey all warning signs, tags, and barriers. Do not remove any warnings unless authorized to do so;
- Use the correct tool for the task;
- Use, adjust, alter, and repair equipment only if trained and authorized to do so, and in accordance with the manufacturers directions;
- Perform all work in a safety conscious manner;
- Personnel are to perform only tasks for which they have been properly trained and will advise their supervisor if they have been assigned a task for which they are not trained;
- Horseplay, roughhousing, practical jokes, etc., are strictly prohibited;
- The presence or consumption of alcoholic beverages or illicit drugs during the workday is strictly prohibited. Do not take prescription or over-the-counter drugs when assigned to tasks with the potential for absorption, inhalation, or ingestion of hazardous substances, unless given written approval by an appropriate health care professional;
- Remain upwind whenever possible during Site activities;
- Do not enter any confined space unless properly trained and authorized to do so;
- Follow all applicable health and safety policies and procedures; and
- Use "common sense" safety practices when working with hazardous substances:
  - **DO NOT INHALE CHEMICAL ODORS;**
  - **DO NOT EXPOSE SKIN TO LIQUIDS, CHEMICALS, OR SOIL;**
  - **AVOID DIRECT CONTACT WITH CONTAMINATED MATERIALS OR SUBSTANCES; AND**
  - **IF YOU DO GET DIRTY OR WET, CLEAN UP IMMEDIATELY.**

4.1.1 Safe Performance Self-Assessment (SPSA)

All on-Site personnel are required to perform a SPSA prior to beginning any activity. This three-step process requires each individual to:

- *Assess* the risk of the task to be performed. Ask the following questions:
  - What could go wrong?
  - What is the worst thing that could happen if something does go wrong?

- *Analyze* the ways the risk can be reduced. Ask the following questions:
  - Do I have all the necessary training and knowledge to do this task safely?
  - Do I have all the proper tools and personal protective equipment?

- *Act* to control the risk and perform the task safely.
  - Take the necessary action to perform the job safely
  - Follow written procedures, and ask for assistance if necessary

This process must be performed prior to beginning any activity, and must be performed after any near miss or other incident in order to determine if it is safe to proceed.

4.1.2 Incident Investigation (II)

An incident is any of the following events; first aid cases, injuries, illnesses, near misses, spills/leaks, equipment and property damage, motor vehicle accidents, regulatory violations, fires, and business interruptions. All incidents shall be reported to the PM/APM and HSO within 2 hours and a report shall be sent to the PM/APM and HSO within 24 hours of the occurrence.

The purpose of II is to prevent the recurrence of a similar hazardous event. II investigates all incidents in the same manner. Using the information gathered during an II, appropriate measures will be taken to protect personnel from the hazard in question. The II form is included in Attachment C.

4.1.3 Incident Prevention Observation (IPO)

The SS or the HSM will perform IPO (see Attachment D for the IPO form). The purpose of the IPO is to identify and correct potential hazards, and to positively reinforce behaviors and practices that are correct. The SS or HSM must identify potential deviations from safe work practices that could possibly result in an incident, and take prompt corrective action. The IPO process steps are:

- Identify tasks that have the greatest potential for hazardous incidents;

- Review the standard procedure for completing the task;

- Discuss with the observed employee the task and the SS/HSM role in observing the task;

- Observe the employee completing the task;

- Reference the IPO form for criteria. Complete the form, documenting positive as well as areas in need of improvement;

- Discuss the results of the IPO with the employee. Discuss corrective action necessary;
- Implement corrective action; and
- Communicate the results of the IPO and corrective action to the PM/APM and the HSO.

4.1.4 Job Safety Analysis (JSA)

A JSA is a tool used of identifying potential hazards and developing corrective or protective systems to eliminate the hazard. A JSA lists all the potential hazards associated with an activity. Hazards may be physical, such as lifting hazards or eye hazards, or environmental such as weather or biological (stinging insects, snakes, etc.). Following the identification of the hazards associated with an activity, control measures are evaluated and protective measures or procedures are then instituted. JSAs are reviewed periodically to ensure that the procedures and protective equipment specified for each activity are current and technically correct. Any changes in Site conditions and/or the scope of work may require a review and modification to the JSA in question. During this review process comments on the JSA and its procedures should be obtained from personnel associated with the activity being analyzed.

4.2 Buddy System

On-Site personnel must use the "buddy system" as required by operations. Use of the buddy system is required during all operations done in Modified Level D or Level C PPE, and when appropriate, during Level D operations. Crewmembers must observe each other for signs of chemical exposure, and heat or cold stress. Indications of adverse effects include, but are not limited to:

- Changes in complexion and skin coloration;
- Changes in coordination;
- Changes in demeanor;
- Excessive salivation and pupillary response; and
- Changes in speech pattern.

Crewmembers must also be aware of the potential exposure to possible safety hazards, unsafe acts, or noncompliance with safety procedures.

Field personnel must inform their partners or fellow crewmembers of non-visible effects of exposure to toxic materials that they may be experiencing. The symptoms of such exposure may include, but are not limited to:

- Headaches;
- Dizziness;
- Nausea;

- Blurred vision;
- Cramps; and
- Irritation of eyes, skin, or respiratory tract.

If protective equipment or noise levels impair communications, prearranged hand signals must be used for communication. Personnel must stay within line of sight of another team member.

4.3 Heat Stress

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

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

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

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

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

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

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

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

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

Heat stroke is a medical emergency. The primary signs and symptoms of heat stroke are confusion; irrational behavior; loss of consciousness; convulsions; a lack of sweating (usually); hot, dry skin; and an abnormally high body temperature, e.g., a rectal temperature of 41°C (105.8°F). If body temperature is too high, it causes death. The elevated metabolic temperatures caused by a combination of workload and environmental heat load, both of which contribute to heat stroke, are also highly variable and difficult to predict.

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

Regardless of the worker's protestations, no employee suspected of being ill from heat stroke should be sent home or left unattended unless a physician has specifically approved such an order.

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

Heat Stress Safety Precautions

Heat stress monitoring and work rest cycle implementation should commence when the ambient adjusted temperature exceeds 72°F. A minimum work rest regimen and procedures for calculating ambient adjusted temperature are described in the Table 4-1.

TABLE 4-1
WORK/REST SCHEDULE

Adjusted Temperature[b]	Work/Rest Regime – Normal Work Ensemble[c]	Work/Rest Regime – Impermeable Ensemble
90°F (32.2°C) or above	After each 45 minutes of work	After each 15 minutes of work
87.5°-90°F (30.8°-32.2°C)	After each 60 minutes of work	After each 30 minutes of work
82.5°-87.5°F (28.1°-30.8°C)	After each 90 minutes of work	After each 60 minutes of work
77.5°-82.5°F (25.3°-28.1°C)	After each 120 minutes of work	After each 90 minutes of work
72.5°-77.5°F (22.5°-25.3°C)	After each 150 minutes of work	After each 120 minutes of work

a. For work levels of 250 kilocalories/hour (Light-Moderate Type of Work)
b. Calculate the adjusted air temperature (ta adj) by using this equation: ta adj °F = ta °F + (13 x % sunshine). Measure air temperature (ta) with a standard mercury-in-glass thermometer, with the bulb shielded from radiant heat. Estimate percent sunshine by judging what percent time the sun is not covered by clouds that are thick enough to produce a shadow. (100 percent sunshine = no cloud cover and a sharp, distinct shadow; 0 percent sunshine = no shadows.)
c. A normal work ensemble consists of cotton coveralls or other cotton clothing with long sleeves and pants.
d. The information presented above was generated using the information provided in the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLV) Handbook.

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

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

- Site workers will be encouraged to drink plenty of water and electrolyte replacement fluids throughout the day.
- On-Site drinking water will be kept cool (50 to 60°F).
- A work regimen that will provide adequate rest periods for cooling down will be established, as required.
- All personnel will be advised of the dangers and symptoms of heat stroke, heat exhaustion, and heat cramps.
- Cooling devices, such as vortex tubes or cooling vests, should be used when personnel must wear impermeable clothing in conditions of extreme heat.
- Employees should be instructed to monitor themselves and co-workers for signs of heat stress and to take additional breaks as necessary.
- A shaded rest area must be provided. All breaks should take place in the shaded rest area.
- Employees must not be assigned to other tasks during breaks.
- Employees must remove impermeable garments during rest periods. This includes white Tyvek®-type garments.

All employees must be informed of the importance of adequate rest, acclimation, and proper diet in the prevention of heat stress disorders.

4.4 Cold Stress

Cold stress normally occurs in temperatures at or below freezing, or under certain circumstances, in temperatures of 40°F. Extreme cold for a short time may cause severe injury to exposed body surfaces or result in profound generalized cooling, causing death. Areas of the body that have high surface area-to-volume ratio, such as fingers, toes, and ears, are the most susceptible. Two factors influence the development of a cold weather injury: ambient temperature and the velocity of the wind. For instance, 10°F with a wind of 15 miles per hour (mph) is equivalent in chilling effect to still air at 18°F. An equivalent chill temperature chart relating the actual dry bulb temperature and wind velocity is presented in Table 4-2.

TABLE 4-2
WIND CHILL TEMPERATURE CHART

Estimated Wind Speed (in mph)	Actual Temperature Reading (°F)											
	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
	Equivalent Chill Temperature (°F)											
calm	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
5	48	37	27	16	6	-5	-15	-26	-36	-47	-57	-68
10	40	28	16	4	-9	-24	-33	-46	-58	-70	-83	-95
15	36	22	9	-5	-18	-32	-45	-58	-72	-85	-99	-112
20	32	18	4	-10	-25	-39	-53	-67	-82	-96	-110	-121
25	30	16	0	-15	-29	-44	-59	-74	-88	-104	-118	-133
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109	-125	-140
35	27	11	-4	-20	-35	-51	-67	-82	-98	-113	-129	-145
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116	-132	-148
(Wind speeds greater than 40 mph have little additional effect.)	LITTLE DANGER Maximum danger of false sense of security.				INCREASING DANGER Danger from freezing of exposed flesh within one minute.			GREAT DANGER Flesh may freeze within 30 seconds.				
	Trench foot and immersion foot may occur at any point on this chart.											

[This chart was developed by the U.S. Army Research Institute of Environmental Medicine, Natick, MA (Source: ACGIH Threshold Limit Values for Chemical Substances and Physical Agents)].

Local injury resulting from cold is included in the generic term frostbite. There are several degrees of tissue damage associated with frostbite. Frostbite of the extremities can be categorized into:

Frost Nip or Incipient Frostbite – characterized by sudden blanching or whitening of skin.

Superficial Frostbite – skin has a waxy or white appearance and is firm to the touch, but tissue beneath is resilient.

Deep Frostbite – tissues are cold, pale, and solid; extremely serious injury.

Systemic hypothermia is caused by exposure to freezing or rapidly dropping temperature. It can be fatal. Its symptoms are usually exhibited in five stages: 1) shivering; 2) apathy, listlessness, sleepiness, and (sometimes) rapid cooling of the body to less than 95°F; 3) unconsciousness, glassy stare, slow pulse, and slow respiratory rate; 4) freezing of the extremities; and 5) death. Trauma sustained in freezing or sub-zero conditions requires special attention because an injured worker is predisposed to secondary cold injury. Special provisions must be made to prevent hypothermia and secondary freezing of damaged tissues in addition to providing for first aid treatment. To

avoid cold stress, Site personnel must wear protective clothing appropriate for the level of cold and physical activity. In addition to protective clothing, preventive safe work practices, additional training, and warming regimens may be utilized to prevent cold stress.

Safety Precautions for Cold Stress Prevention

For air temperature of 0°F or less, mittens should be used to protect the hands. For exposed skin, continuous exposure should not be permitted when air speed and temperature results in a wind chill temperature of -25°F.

At air temperatures of 36°F or less, field personnel who become immersed in water or whose clothing becomes wet must be immediately provided with a change of clothing and be treated for hypothermia.

If work is done at normal temperature or in a hot environment before entering the cold, the field personnel must ensure that their clothing is not wet as a consequence of sweating. If wet, field personnel must change into dry clothes prior to entering the cold area.

If the available clothing does not give adequate protection to prevent hypothermia or frostbite, work must be modified or suspended until adequate clothing is made available or until weather conditions improve.

Field personnel handling evaporative liquid (e.g., gasoline, alcohol, or cleaning fluids) at air temperatures below 40°F must take special precaution to avoid soaking of clothing or gloves with the liquids because of the added danger of cold injury due to evaporative cooling.

Safe Work Practices

Direct contact between bare skin and cold surfaces (< 20°F) should be avoided. Metal tool handles and/or equipment controls should be covered by thermal insulating material.

For work performed in a wind chill temperature at or below 10°F, workers should be under constant protective observation (buddy system). The work rate should be established to prevent heavy sweating that will result in wet clothing. For heavy work, rest periods must be taken in heated shelters and workers should be provided with an opportunity to change into dry clothing if needed.

Field personnel should be provided the opportunity to become accustomed to cold-weather working conditions and required protective clothing.

Work should be arranged in such a way that sitting or standing still for long periods is minimized.

During the warming regimen (rest period), field personnel should be encouraged to remove outer clothing to permit sweat evaporation or to change into dry work clothing. Dehydration, or loss of body fluids, occurs insidiously in the cold environment and may increase susceptibility to cold injury due to a significant change in blood flow to the extremities. Fluid replacement with warm, sweet drinks and soups is recommended. The intake of coffee should be limited because of diuretic and circulatory effects.

4.5 Biological Hazards

Biological hazards may include poison ivy, thorny bushes and trees, snakes, ticks, mosquitoes, and other pests.

4.5.1 Tick Borne Diseases

Lyme Disease – The disease commonly occurs in summer and is transmitted by the bite of infected ticks. "Hot spots" in the United States include New York, New Jersey, Pennsylvania, Massachusetts, Connecticut, Rhode Island, Minnesota and Wisconsin.

Erlichiosis – The disease also commonly occurs in summer and is transmitted by the bite of infected ticks. "Hot spots" in the United States include New York, Massachusetts, Connecticut, Rhode Island, Minnesota and Wisconsin.

These diseases are transmitted primarily by the deer tick, which is smaller and redder than the common wood tick. The disease may be transmitted by immature ticks, which are small and hard to see. The tick may be as small as a period on this page.

Symptoms of Lyme disease include a rash or a peculiar red spot, like a bull's eye, which expands outward in a circular manner. The victim may have headache, weakness, fever, a stiff neck, and swelling and pain in the joints, and eventually, arthritis. Symptoms of erlichiosis include muscle and joint aches, flu-like symptoms, but there is typically no skin rash.

Rocky Mountain Spotted Fever (RMSF) – This disease is transmitted via the bite of an infected tick. The tick must be attached 4 to 6 hours before the disease-causing organism (Rickettsia rickettsii) becomes reactivated and can infect humans. The primary symptom of RMSF is the sudden appearance of a moderate-to-high fever. The fever may persist for two to three weeks. The victim may also have a headache, deep muscle pain, and chills. A rash appears on the hands and feet on about the third day and eventually spreads to all parts of the body. For this reason, RMSF may be confused with measles or meningitis. The disease may cause death, if untreated, but if identified and treated promptly, death is uncommon.

Control: Tick repellant containing diethyltoluamide (DEET) should be used when working in tick-infested areas, and pants legs should be tucked into boots. In addition, workers should search the entire body every three or four hours for attached ticks. Ticks should be removed promptly and carefully without crushing, since crushing can squeeze the disease-causing organism into the skin. A gentle and steady pulling action should be used to avoid leaving the head or mouth parts in the skin. Hands should be protected with surgical gloves when removing ticks.

4.5.2 Poisonous Plants

Poisonous plants may be present in the work area. Personnel should be alerted to its presence, and instructed on methods to prevent exposure.

Control: The main control is to avoid contact with the plant, cover arms and hands, and frequently wash potentially exposed skin. Particular attention must be given to avoiding skin contact with objects or protective clothing that have touched the plants. Treat every surface that may have touched the plant as contaminated, and practice

contamination avoidance. If skin contact is made, the area should be washed immediately with soap and water, and observed for signs of reddening.

4.5.3 Snakes

The possibility of encountering snakes exists, specifically for personnel working in wooded/vegetated areas. Snake venoms are complex and include proteins, some of which have enzymatic activity. The effects produced by venoms include neurotoxic effects with sensory, motor, cardiac, and respiratory difficulties; cytotoxic effects on red blood cells, blood vessels, heart muscle, kidneys, and lungs; defects in coagulation; and effects from local release of substances by enzymatic actions. Other noticeable effects of venomous snakebites include swelling, edema, and pain around the bite, and the development of ecchymosis (the escape of blood into tissues from ruptured blood vessels).

Control: To minimize the threat of snakebites, all personnel walking through vegetated areas must be aware of the potential for encountering snakes, and the need to avoid actions potentiating encounters, such as turning over logs, etc. If a snakebite occurs, an attempt should be made to safely kill the snake for identification. The victim must be transported to the nearest hospital within 30 minutes; first aid consists of applying a constriction band, and washing the area around the wound to remove any unabsorbed venom.

4.6 Noise

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

Control: All personnel must wear hearing protection, with an EPA Noise Reduction Rating (NRR) of at least 20, when noise levels exceed 85 dBA. When it is difficult to hear a co-worker at normal conversation distance, the noise level is approaching or exceeding 85 dBA, and hearing protection is necessary. All Site personnel who may be exposed to noise must also receive baseline and annual audiograms and training as to the causes and prevention of hearing loss. Noise monitoring is discussed in Section 8, Site Monitoring.

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

4.7 Spill Control

All personnel must take every precaution to minimize the potential for spills during Site operations. All on-Site personnel shall immediately report any discharge, no matter how small, to the SS.

Spill control equipment and materials will be located on the Site at locations that present the potential for discharge. All sorbent materials used for the cleanup of spills will be containerized and labeled appropriately. In the event of a spill, the SS will follow the provisions in Section 11, Emergency Procedures, to contain and control released materials and to prevent their spread to off-Site areas.

4.8 Sanitation

Site sanitation will be maintained according to OSHA requirements.

4.8.1 Break Area

Breaks must be taken in the SZ, away from the active work area after Site personnel go through decontamination procedures. There will be no smoking, eating, drinking, or chewing gum or tobacco in any area other than the SZ.

4.8.2 Potable Water

The following rules apply to all field operations:

- An adequate supply of potable water will be provided at each project Site. Potable water must be kept away from hazardous materials or media, and contaminated clothing or equipment;
- Portable containers used to dispense drinking water must be capable of being tightly closed, and must be equipped with a tap dispenser. Water must not be consumed directly from the container (drinking from the tap is prohibited) nor may it be removed from the container by dipping;
- Containers used for drinking water must be clearly marked and shall not be used for any other purpose; and
- Disposable drinking cups must be provided. A sanitary container for dispensing cups and a receptacle for disposing of used cups is required.

4.8.3 Sanitary Facilities

Access to facilities for washing before eating, drinking, or smoking, or alternate methods such as waterless hand-cleaner and paper towels will be provided.

4.8.4 Lavatory

If permanent toilet facilities are not available, an appropriate number of portable chemical toilets will be provided.

This requirement does not apply to mobile crews or to normally unattended Site locations so long as employees at these locations have transportation immediately available to nearby toilet facilities.

4.9 Emergency Equipment

Adequate emergency equipment for the activities being conducted on-Site and as required by applicable sections of 29 CFR 1910 and 29 CFR 1926 will be on Site prior to the commencement of project activities. Personnel will be provided with access to emergency equipment including but not limited to the following:

- Fire extinguishers of adequate size, class, number, and location as required by applicable sections of 29 CFR 1910 and 1926;

- Industrial first aid kits of adequate size for the number of personnel on-Site; and

- Emergency eyewash and/or shower if required by operations being conducted on-Site.

4.10 Lockout/Tagout Procedures

Only fully qualified and trained personnel will only perform maintenance procedures. Before maintenance begins, lockout/tagout procedures per OSHA 29 CFR 1910.147 will be followed.

Lockout is the placement of a device that uses a positive means, such as lock, to hold an energy or material-isolating device such that the equipment cannot be operated until the lockout device is removed. If a device cannot be locked out, a tagout system shall be used. Tagout is the placement of a warning tag on an energy or material isolating device indicating that the equipment controls may not be operated until the tag is removed by the personnel who attached the tag.

4.11 Electrical Safety

Electricity may pose a particular hazard to Site workers due to the use of permanently mounted and portable electrical equipment. If wiring or other electrical work is needed, a qualified electrician must perform it.

General electrical safety requirements include:

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

- All installations must comply with the National Electrical Safety Code (NESC), the National Electrical Code (NEC), or USCG regulations.

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

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

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

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

- All circuits must be protected from overload.

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

- Plugs and receptacles must be kept out of water unless of an approved submersible construction.
- All extension cord outlets must be equipped with ground fault circuit interrupters (GFCI).
- Attachment plugs or other connectors must be equipped with a cord grip and be constructed to endure rough treatment.
- Extension cords or cables must be inspected prior to each use, and replaced if worn or damaged. Cords and cables must not be fastened with staples, hung from nails, or suspended by bare wire.
- Flexible cords must be used only in continuous lengths without splice, with the exception of molded or vulcanized splices made by a qualified electrician.

4.12 Lifting Safety

Using proper lifting techniques may prevent back strain or injury. The fundamentals of proper lifting include:

- Consider the size, shape, and weight of the object to be lifted. A mechanical lifting device or additional persons must be used to lift an object if it cannot be lifted safely alone.
- The hands and the object should be free of dirt or grease that could prevent a firm grip.
- Gloves must be used, and the object inspected for metal slivers, jagged edges, burrs, or rough or slippery surfaces.
- Fingers must be kept away from points that could crush or pinch them, especially when putting an object down.
- Feet must be placed far enough apart for balance. The footing should be solid and the intended pathway should be clear.
- The load should be kept as low as possible, close to the body with the knees bent.
- To lift the load, grip firmly and lift with the legs, keeping the back as straight as possible.
- A worker should not carry a load that he or she cannot see around or over.
- When putting an object down, the stance and position are identical to that for lifting; the legs are bent at the knees, and the back is straight as the object is lowered.

5. Personal Protective Equipment

5.1 Levels of Protection

PPE is required to safeguard Site personnel from various hazards. Varying levels of protection may be required depending on the levels of COCs and the degree of physical hazard. This section presents the various levels of protection and defines the conditions of use for each level. Protection levels are determined based on COCs present at the Site. A summary of the levels is presented in Table 5-1 in this section.

5.1.1 Level D Protection

The minimum level of protection that will be required of BBL personnel and subcontractors at the Site will be Level D, which will be worn when Site conditions or air monitoring indicates no inhalation hazard exists. The following equipment will be used:

- Work clothing as prescribed by weather;
- Steel toe work boots, meeting ANSI Z41;
- Safety glasses or goggles, meeting ANSI Z87;
- Outer gloves chosen based on COCs worn over nitrile surgical gloves (if handling soils or groundwater);
- Hard hat, meeting ANSI Z89, when falling object hazards are present; and
- Hearing protection (if noise levels exceed 85 dBA, then hearing protection with a NRR of at least 20 dBA must be used).

5.1.2 Modified Level D Protection

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

- Tyvek® coveralls (polyethylene coated Tyvek® suits for handling liquids) when skin contact with COC-impacted media is anticipated;
- Latex/PVC overboots when contact with COC-impacted media is anticipated;
- Steel toe work boots, meeting ANSI Z41;
- Safety glasses or goggles, meeting ANSI Z87;
- Face shield in addition to safety glasses or goggles when projectiles or a splash hazards exist;

- Outer gloves chosen based on COCs worn over nitrile surgical gloves;
- Hard hat; meeting ANSI Z89 when falling object hazards are present; and
- Hearing protection (if noise levels exceed 85 dBA, then hearing protection with a NRR of at least 20 dBA must be used).

5.1.3 Level C Protection

Level C protection will be required when the airborne concentration of COCs reaches one-half the OSHA Permissible Exposure Limit (PEL) or American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV). The following equipment will be used for Level C protection:

- Full-face, air-purifying respirator with appropriate cartridges for Site COCs;
- Polyethylene coated Tyvek® suit, with ankles and cuffs taped to boots and gloves;
- Outer gloves chosen based on COCs worn over nitrile surgical gloves
- Steel toe work boots, meeting ANSI Z41;
- Chemical resistant boots with steel toes or latex/PVC overboots over steel toe boots;
- Hard hat, meeting ANSI Z89; and
- Hearing protection (if noise levels exceed 85 dBA, then hearing protection with a NRR of at least 20 dBA must be used).

5.2 Selection of PPE

Equipment for personal protection will be selected based on the potential for contact, Site conditions, ambient air quality, and the judgment of supervising Site personnel and health and safety professionals. The PPE used will be chosen to be effective against the COCs present on the Site.

5.3 Site Respiratory Protection Program

Respiratory protection is an integral part of employee health and safety at the Site due to potentially hazardous concentrations of airborne COCs. The Site respiratory protection program will consist of the following (as a minimum):

- All on-Site personnel who may use respiratory protection will have an assigned respirator.

- All on-Site personnel who may use respiratory protection will have been fit tested and trained in the use of a full-face air-purifying respirator within the past 12 months.

- All on-Site personnel who may use respiratory protection must within the past year have been medically certified as being capable of wearing a respirator. Documentation of the medical certification must be provided to the HSM, prior to commencement of Site work.

- Only cleaned, maintained, NIOSH-approved respirators will be used.

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

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

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

- Respirators will be inspected, and a negative pressure test performed prior to each use.

- After each use, the respirator will be wiped with a disinfectant, cleansing wipe. When used, the respirator will be thoroughly cleaned at the end of the work shift. The respirator will be stored in a clean plastic bag, away from direct sunlight in a clean, dry location, in a manner that will not distort the face piece.

5.4 Using PPE

Depending upon the level of protection selected, specific donning and doffing procedures may be required. The procedures presented in this section are mandatory if Modified Level D or Level C PPE is used. All personnel entering the EZ must put on the required PPE in accordance with the requirements of this HASP. When leaving the EZ, PPE will be removed in accordance with the procedures listed, to minimize the spread of COCs.

5.4.1 Donning Procedures

These procedures are mandatory only if Modified Level D or Level C PPE is used on the Site:

- Remove bulky outerwear. Remove street clothes and store in clean location;

- Put on work clothes or coveralls;

- Put on the required chemical protective coveralls;

- Put on the required chemical protective boots or boot covers;

- Tape the legs of the coveralls to the boots with duct tape;

- Put on the required chemical protective gloves;

- Tape the wrists of the protective coveralls to the gloves;
- Don the required respirator and perform appropriate fit check (Level C);
- Put hood or head covering over head and respirator straps and tape hood to facepiece (Level C); and
- Don remaining PPE, such as safety glasses or goggles and hard hat.

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

5.4.2 Doffing Procedures

The following procedures are only mandatory if Modified Level D or Level C PPE is required for the Site. Whenever a person leaves the work area, the following decontamination sequence will be followed:

- Upon entering the CRZ, rinse contaminated materials from the boots or remove contaminated boot covers;
- Clean reusable protective equipment;
- Remove protective garments, equipment, and respirator (Level C). All disposable clothing should be placed in plastic bags, which are labeled with contaminated waste labels;
- Wash hands, face and neck (or shower if necessary);
- Proceed to clean area and dress in clean clothing; and
- Clean and disinfect respirator for next use.

All disposable equipment, garments, and PPE must be bagged in plastic bags, labeled for disposal. See Section 7, Decontamination, for detailed information on decontamination stations.

5.5 Selection Matrix

The level of personal protection selected will be based upon air monitoring of the work environment and an assessment by the SS and HSM of the potential for skin contact with COCs. The PPE selection matrix is presented in Table 5-1. This matrix is based on information available at the time this plan was written. The Airborne Contaminant Action Levels in Table 8-1 should be used to verify that the PPE prescribed in these matrices is appropriate.

TABLE 5-1
PERSONAL PROTECTIVE EQUIPMENT SELECTION MATRIX

Activity	Activity
Mobilization	Level D
Installation of Soil Borings and Groundwater Monitoring Wells	Modified Level D/Level C
Groundwater Sampling/Monitoring	Modified Level D/Level C
Soil Sampling	Modified Level D
Decontamination	Modified Level D
Demobilization	Level D

6. Site Control

6.1 Authorization to Enter

Only personnel with the appropriate training and medical certifications (if respirators are required) will be allowed to work at the project Site. The SS will maintain a list of authorized persons; only personnel on the authorized persons list will be allowed to enter the Site work areas.

6.2 Site Orientation and Hazard Briefing

No person will be allowed in the work area during Site operations without first being given a Site orientation and hazard briefing. This orientation will be presented by the SS or HSM, and will consist of a review of this HASP. This review must cover the chemical, physical, and biological hazards, protective equipment, safe work procedures, and emergency procedures for the project. In addition to this meeting, daily safety meetings will be held each day before work begins.

All people entering the Site work areas, including visitors, must document their attendance at this briefing as well as the daily safety meetings on the forms included with this plan.

6.3 Certification Documents

A training and medical file may be established for the project and kept on Site during all Site operations. Specialty training, such as first aid/cardiopulmonary resuscitation (CPR) certificates, as well as current medical clearances for all project field personnel required to wear respirators, will be maintained within that file. All BBL and subcontractor personnel must provide their training and medical documentation to the HSM prior to the start of the fieldwork.

6.4 Entry Log

A log-in/log-out sheet will be maintained at the Site by the SS. Personnel must sign in and out on a log sheet as they enter and leave the work area, and the SS may document entry and exit in the field notebook.

6.5 Entry Requirements

In addition to the authorization, hazard briefing, and certification requirements listed above, no person will be allowed in any BBL work area unless they are wearing the minimum PPE as described in Section 5, Personal Protective Equipment.

6.6 Emergency Entry and Exit

People who must enter the work area on an emergency basis will be briefed of the hazards by the SS. All activities will cease in the event of an emergency. People exiting the work area because of an emergency will gather in a safe area for a head count. The SS is responsible for ensuring that all people who entered the work area have exited in the event of an emergency.

6.7 Contamination Control Zones

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

6.7.1 Exclusion Zone (EZ)

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

6.7.2 Contamination Reduction Zone

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

6.7.3 Support Zone

The SZ is a clean area outside the CRZ located to prevent employee exposure to hazardous substances. Eating and drinking will be permitted in the support area only after proper decontamination. Smoking may be permitted in the SZ, subject to Site requirements.

6.8 Marking of Work Zones

Work areas will be prominently marked and delineated using cones, caution tape, or other suitable means.

6.9 Site Inspections

The SS will conduct a daily inspection of Site activities, equipment, and procedures to verify that the required elements are in place. The inspection form in Attachment E may be used as a guide for daily inspections. A weekly audit must also be completed and forwarded to the PM/APM for review.

7. Decontamination

7.1 Personnel Decontamination

All personnel wearing Modified Level D or Level C protective equipment in the EZ must undergo personal decontamination prior to entering the SZ. The personnel decontamination area will consist of the following stations at a minimum:

Station 1: Personnel leaving the contaminated zone will remove the gross contamination from their outer clothing and boots.

Station 2: Personnel will remove their outer garment and gloves and dispose of it in properly labeled containers. Personnel will then decontaminate their hard hats, and boots with an aqueous solution of detergent or other appropriate cleaning solution. These items are then hand carried to the next station.

Station 3: Personnel will thoroughly wash their hands and face before leaving the CRZ. Respirators will be sanitized and then placed in a clean plastic bag.

7.2 Equipment Decontamination

All vehicles that have entered the EZ will be decontaminated prior to leaving the zone. If the level of vehicle contamination is low, decontamination may be limited to rinsing of tires and wheel wells with water. If the vehicle is significantly contaminated, steam cleaning or pressure washing of vehicles and equipment may be required.

7.3 Personal Protective Equipment Decontamination

Where and whenever possible, single use, external protective clothing must be used for work within the EZ or CRZ. This protective clothing must be disposed of in properly labeled containers. Reusable protective clothing will be rinsed at the Site with detergent and water. The rinsate will be collected for disposal.

When removed from the CRZ, the respirator will be thoroughly cleaned with soap and water. The respirator face piece, straps, valves, and covers must be thoroughly cleaned at the end of each work shift, and ready for use prior to the next shift. Respirator parts may be disinfected with a solution of bleach and water, or by using a spray disinfectant.

8. Site Monitoring

8.1 Air Monitoring

Air monitoring may be conducted to determine employee exposure to airborne constituents. Personal exposure monitoring may be necessary to evaluate employee exposures if direct reading instruments indicate general readings in excess of Site action levels. The monitoring results will dictate work procedures and the selection of PPE. The monitoring devices to be used, at a minimum, are a photoionization detector (PID) and a portable dust monitor. Colorimetric tube (Drager or equivalent) shall be utilized to screen 1,1-dichloroethene, dichloroethane, vinyl chloride, and methylene chloride if the total organic vapor action level is exceeded (as stated in Table 8-1). During drilling activities a combustible gas/oxygen/hydrogen sulfide/carbon monoxide (LEL/O_2) meter must be used. During drilling activities conducted inside buildings or other enclosed areas a carbon monoxide monitor must be utilized.

If BBL and one or more BBL subcontractors are working in an area, one subcontractor may conduct direct-reading air monitoring and share the results with the other BBL subcontractors working in the area. In this situation all subcontractors must coordinate air monitoring through a mutually agreed upon air monitor. The BBL HSM will be responsible for utilizing the air monitoring results to determine appropriate health and safety precautions for BBL personnel only.

Air monitoring will be conducted continuously with the LEL/O2 meter if flammable/explosive vapors are suspected, or confined space entry is required. Prior to any subsurface investigation activities, air monitoring will be conducted to establish background levels for total organic vapors (using a PID) and for dust particulates (using a dust monitor). PID and dust monitor measurements will be taken at the upwind property boundaries if necessary. Continuous real-time monitoring for organic vapors for the purpose of estimating worker exposure level will be conducted in the breathing zone with the PID during field activities. During operations that may cause airborne particulate, a dust monitor will be used to measure airborne concentrations of total particulate material. At a minimum, all readings will be manually recorded once every 30 minutes on air monitoring logs (see Attachment F) or field notebooks.

All work activity must stop where tests indicate the concentration of flammable vapors exceeds 10% of the LEL at a location with a potential ignition source. Such an area must be ventilated to reduce the concentration to an acceptable level.

8.2 Personal Air Monitoring for Methylene Chloride, 1,1-Dichloroethene, Vinyl Chloride, or Lead

To quantify the potential exposure of Site personnel to methylene chloride in the air during this project, a personal air sampling plan to determine airborne concentrations will be implemented by each BBL subcontractor on-Site. The following paragraphs outline the frequency, sampling, analytical, and record-keeping requirements associated with personal air sampling during this project. The requirements of 29 CFR 1910.1052 must also be met for methylene chloride.

If the action level of 12.5 parts per million (ppm) for methylene chloride, as determined by colorimetric tube monitoring, is exceeded, personal air sampling will be conducted in the areas of the Site where the methylene chloride action levels were exceeded. Personal air samples for methylene chloride will be collected for at least 20%

of representative employees conducting activities during which colorimetric tube sampling indicated exceedance of Site action levels. Additional personal sampling may be required during on-Site activities based on the results of the initial personal air monitoring assessment. Monitoring frequency for methylene chloride also will be based on the requirements of 29 CFR 1910.1052.

Personal samples for methylene chloride will be collected according to NIOSH Method #1005 or equivalent. Samples will be collected utilizing a personal sampling pump equipped with two charcoal tubes or by passive organic vapor dosimeter badge. The sample pump must be calibrated prior to and following sample collection to a flow rate between 0.01 - 0.02 liters/minute (L/m) with a representative sampler in place. Organic vapor dosimeter badges do not require calibration prior to use.

If the Site action level of 0.5 ppm for vinyl chloride, as determined with colorimetric tube monitoring, is exceeded, personal air sampling will be conducted in areas of the Site where the vinyl chloride action levels were exceeded. Personal air samples for vinyl chloride will be collected for at least 20% of representative employees conducting activities during which colorimetric tube sampling indicated exceedance of Site action levels. Additional personal sampling may be required during on-Site activities based on the results of the initial personal air monitoring assessment.

Personal samples for vinyl chloride will be collected according to NIOSH Method #1007 or equivalent. Samples will be collected utilizing a personal sampling pump equipped with two charcoal tubes or by passive organic vapor dosimeter badge. The sample pump must be calibrated prior to and following sample collection to a flow rate between 0.05 L/m with a representative sampler in place. Organic vapor dosimeter badges do not require calibration prior to use.

If the Site action level of 1 ppm for 1,1-dichlorethene (DCE), as determined with colorimetric tube monitoring, is exceeded, personal air sampling will be conducted in areas of the Site where the DCE action levels were exceeded. Personal air samples for DCE will be collected for at least 20% of representative employees conducting activities during which colorimetric tube sampling indicated exceedance of Site action levels. Additional personal sampling may be required during on-Site activities based on the results of the initial personal air monitoring assessment.

Personal samples for DCE will be collected according to NIOSH Method #1015 or equivalent. Samples will be collected utilizing a personal sampling pump equipped with a charcoal tube or by passive organic vapor dosimeter badge. The sample pump must be calibrated prior to and following sample collection to a flow rate between 0.01 – 0.02 L/m with a representative sampler in place. Organic vapor dosimeter badges do not require calibration prior to use.

To quantify the potential exposure of Site personnel to lead in the air during this project, a personal air sampling plan to determine airborne concentrations will be implemented by each BBL subcontractor on Site. The following paragraphs outline the frequency, sampling, analytical, and record-keeping requirements associated with personal lead air sampling during this project. The requirements of 29 CFR 1926.62 must also be met for lead

Personal air sampling will be conducted during tasks or in areas of the Site if the Site particulate action level is exceeded. Personal air samples for lead will be collected for at least 20% of representative employees conducting activities during which particulate air sampling indicated exceedance of Site action levels. Additional personal sampling may be required during on Site activities based on the results of the initial personal air monitoring assessment. Monitoring frequency for lead will also be based on the requirements of 29 CFR 1926.62.

Personal samples for lead will be collected according to NIOSH Method #7300 or equivalent. Samples will be collected utilizing a personal sampling pump equipped with a mixed cellulose ester filter. The sample pump must be calibrated prior to and following sample collection to a flow rate between 1.0 – 4.0 L/m with a representative sampler in place.

All personal samples will be submitted to an independent, American Industrial Hygiene Association-accredited laboratory for analysis. Accompanying media blanks also will be submitted to the laboratory for analysis at a rate of one blank for every five samples. Holding time requirements and field preparation procedures as specified in the respective NIOSH method will be followed.

8.3 Noise Monitoring

Noise monitoring may be conducted as required. Hearing protection is mandatory for all employees in noise hazardous areas, such as around heavy equipment. As a general rule, sound levels that cause speech interference at normal conversation distance should require the use of hearing protection.

8.4 Monitoring Equipment Maintenance and Calibration

All direct-reading instrumentation calibrations should be conducted under the approximate environmental conditions in which the instrument will be used. Instruments must be calibrated before and after use, noting the reading(s) and any adjustments that are necessary. All air monitoring equipment calibrations, including the standard used for calibration must be documented on a calibration log or in the field notebook. All completed health and safety documentation/forms must be reviewed by the HSM and maintained by the SS.

All air monitoring equipment will be maintained and calibrated in accordance with the specific manufacturer's procedures. Preventive maintenance and repairs will be conducted in accordance with the respective manufacturer's procedures. When applicable, only manufacturer-trained and/or authorized personnel will be allowed to perform instrument repairs or preventive maintenance.

If an instrument is found to be inoperative or suspected of giving erroneous readings, the HSM must be responsible for immediately removing the instrument from service and obtaining a replacement unit. ***If the instrument is essential for safe operation during a specific activity, that activity must cease until an appropriate replacement unit is obtained.*** The HSM will be responsible for ensuring a replacement unit is obtained and/or repairs are initiated on the defective equipment.

8.5 Action Levels

The following table presents airborne constituent action levels that will be used to determine the procedures and protective equipment necessary based on conditions as measured at the Site.

9. Employee Training

9.1 General

All on-Site project personnel who work in areas where they may be exposed to Site contaminants must be trained as required by OSHA Regulation 29 CFR 1910.120 (HAZWOPER). Field employees also must receive a minimum of three days of actual field experience under the direct supervision of a trained, experienced supervisor. Personnel who completed their initial training more than 12 months prior to the start of the project must have completed an 8-hour refresher course within the past 12 months. The SS must have completed an additional 8 hours of supervisory training, and must have a current first-aid/CPR certificate.

9.2 Basic 40-Hour Course

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

- General safety procedures;
- Physical hazards (fall protection, noise, heat stress, cold stress);
- Names and job descriptions of key personnel responsible for Site health and safety;
- Safety, health, and other hazards typically present at hazardous waste Sites;
- Use, application, and limitations of PPE;
- Work practices by which employees can minimize risks from hazards;
- Safe use of engineering controls and equipment on Site;
- Medical surveillance requirements;
- Recognition of symptoms and signs which might indicate overexposure to hazards;
- Worker right-to-know (Hazard Communication OSHA 1910.1200);
- Routes of exposure to contaminants;
- Engineering controls and safe work practices;
- Components of a health and safety program and a Site-specific HASP;
- Decontamination practices for personnel and equipment;
- Confined-space entry procedures; and

- General emergency response procedures.

9.3 Supervisor Course

Management and supervisors must receive an additional eight hours of training, which typically includes:

- General Site safety and health procedures;
- PPE programs; and
- Air monitoring techniques.

9.4 Site-Specific Training

Site-specific training will be accomplished by on-Site personnel reading this HASP, or through a thorough Site briefing by the PM/APM, SS, or HSM on the contents of this HASP before work begins. The review must include a discussion of the chemical, physical, and biological hazards, the protective equipment and safety procedures, and emergency procedures.

9.5 Daily Safety Meetings

Daily safety meetings will be held to cover the work to be accomplished, the hazards anticipated, the PPE and procedures required to minimize Site hazards, and emergency procedures. The SS or HSM should present these meetings prior to beginning the day's fieldwork. No work will be performed in an EZ before the daily safety meeting has been held. The daily safety meeting must also be held prior to new tasks, and repeated if new hazards are encountered. The daily safety meeting log is included in Attachment G.

9.6 First Aid and CPR

At least one employee current in first aid/CPR will be assigned to the work crew and will be on the Site during operations. Refresher training in first aid (triennially) and CPR (annually) is required to keep the certificate current. These individuals must also receive training regarding the precautions and protective equipment necessary to protect against exposure to blood-borne pathogens.

10. Medical Surveillance

10.1 Medical Examination

All personnel who are potentially exposed to Site contaminants must participate in a medical surveillance program as defined by OSHA at 29 CFR 1910.120 (f).

10.1.1 Pre-placement Medical Examination

All potentially exposed personnel must have completed a comprehensive medical examination prior to assignment, and periodically thereafter as defined by applicable regulations. The pre-placement and periodic medical examinations typically include the following elements:

- Medical and occupational history questionnaire;
- Physical examination;
- Complete blood count, with differential;
- Liver enzyme profile;
- Chest X-ray, at a frequency determined by the physician;
- Pulmonary function test;
- Audiogram;
- Electrocardiogram for persons older than 45 years of age, or if indicated during the physical examination;
- Drug and alcohol screening, as required by job assignment;
- Visual acuity; and
- Follow-up examinations, at the discretion of the examining physician or the corporate medical director.

The examining physician provides the employee with a letter summarizing his findings and recommendations, confirming the worker's fitness for work and ability to wear a respirator. Documentation of medical clearance will be available for each employee during all project Site work.

Subcontractors will certify that all their employees have successfully completed a physical examination by a qualified physician. The physical examinations must meet the requirements of 29 CFR 1910.120 and 29 CFR 1910.134. Subcontractors will supply copies of the medical examination certificate for each on-Site employee.

10.1.2 Other Medical Examinations

In addition to pre-employment, annual, and exit physicals, personnel may be examined:

- At employee request after known or suspected exposure to toxic or hazardous materials;
- At the discretion of the client, Health and Safety professional, or occupational physician in anticipation of, or after known or suspected exposure to toxic or hazardous materials; and
- At the discretion of the occupational physician.

10.1.3 Periodic Exam

Following the placement examination, all employees must undergo a pericdic examination, similar in scope to the placement examination. For employees potentially exposed over 30 days per year, the frequency of periodic examinations will be annual. For employees potentially exposed less than 30 days per year, the frequency for periodic examinations will be 18 months.

10.2 Medical Restriction

When the examining physician identifies a need to restrict work activity, the employee's supervisor must communicate the restriction to the employee and the HSM. The terms of the restriction will be discussed with the employee and the supervisor.

11. Emergency Procedures

11.1 General

Prior to the start of operations, each work area will be evaluated for the potential for fire, contaminant release, or other catastrophic event. Unusual conditions or events, activities, chemicals, and conditions will be reported to the SS/HSM immediately.

The SS/HSM will establish evacuation routes and assembly areas for the Site. All personnel entering the Site will be informed of this route and the assembly area.

11.2 Emergency Response

If an incident occurs, the following steps will be taken:

- The SS/HSM will evaluate the incident and assess the need for assistance and/or evacuation;
- The SS/HSM will call for outside assistance as needed;
- The SS/HSM will ensure the PM/APM is notified promptly of the incident; and
- The SS/HSM will take appropriate measures to stabilize the incident scene.

11.2.1 Fire

In the case of a fire at the Site, the SS/HSM will assess the situation and direct fire-fighting activities. The SS/HSM will ensure that the PM/APM is immediately notified of any fires. Site personnel will attempt to extinguish the fire with available extinguishers, if safe to do so. ***In the event of a fire that Site personnel are unable to safely extinguish with one fire extinguisher, the local fire department will be summoned.***

11.2.2 Contaminant Release

In the event of a contaminant release, the following steps will be taken:

- Notify SS/HSM immediately;
- Evacuate immediate area of release;
- Conduct air monitoring to determine needed level of PPE; and
- Don required level of PPE and prepare to implement control procedures.

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

11.3 Medical Emergency

All employee injuries must be promptly reported to the HSM/SS, who will:

- Ensure that the injured employee receives prompt first aid and medical attention;
- In emergency situations, the worker is to be transported by appropriate means to the nearest urgent care facility (normally a hospital emergency room); and
- If the injured person is a BBL employee, notify Continuum Healthcare, BBL's medical surveillance consultant, as soon as possible after an injured worker has left the Site. The caller should dial 1-800-229-3674 and follow the instructions for reaching the Injury Management Office. When the Case Manager answers, the caller should provide the information requested by the Case Manager.

11.3.1 Emergency Care Steps

Survey the scene. Determine if it is safe to proceed. Try to determine if the conditions, which caused the incident, are still a threat. Protect yourself from exposure before attempting to rescue the victim.

- ***Do a primary survey of the victim.*** Check for ***airway*** obstruction, ***breathing***, and ***circulation*** (pulse). Assess likely routes of chemical exposure by examining the eyes, mouth, nose, and skin of the victim for symptoms.
- ***Phone Emergency Medical Services (EMS).*** Give the location, telephone number used, caller's name, what happened, number of victims, victims' condition, and help being given.
- ***Maintain airway and perform rescue breathing as necessary.***
- ***Perform CPR as necessary.***
- ***Do a secondary survey of the victim. Check vital signs and do a head-to-toe exam.***

Treat other conditions as necessary. If the victim can be moved, take him/her to a location away from the work area where EMS can gain access.

11.4 First Aid - General

All persons must report any injury or illness to their immediate supervisor or the SS. Trained personnel will provide first aid. Injuries and illnesses requiring medical treatment must be documented. The SS and HSM must conduct an II as soon as emergency conditions no longer exist and first aid and/or medical treatment has been ensured. IIs must be completed and submitted to the PM/APM and HSO within 24 hours after the incident.

If first-aid treatment is required, first aid kits are kept at the CRZ. If treatment beyond first aid is required, the injured person(s) should be transported to the medical facility. If the injured person is not ambulatory, or shows any sign of not being in a comfortable and stable condition for transport, then an ambulance/paramedics should be

summoned. If there is any doubt as to the injured worker's condition, it is best to let the local paramedic or ambulance service examine and transport the worker.

11.4.1 First Aid - Inhalation

Any employee complaining of symptoms of chemical overexposure as described in Section 4, General Safety Practices will be removed from the work area and transported to the designated medical facility for examination and treatment.

11.4.2 First Aid - Ingestion

Call EMS and consult a poison control center for advice. If available, refer to the MSDS for treatment information. If the victim is unconscious, keep them on their side and clear the airway if vomiting occurs.

11.4.3 First Aid - Skin Contact

Project personnel who have had skin contact with contaminants will, unless the contact is severe, proceed through the CRZ, to the wash-up area. Personnel will remove any contaminated clothing, and then flush the affected area with water for at least 15 minutes. The worker should be transported to the medical facility if he/she shows any sign of skin reddening, irritation, or if he/she requests a medical examination.

11.4.4 First Aid - Eye Contact

Project personnel who have had contaminants splashed in their eyes or who have experienced eye irritation while in the EZ, must immediately proceed to the eyewash station in the CRZ. Do not decontaminate prior to using the eyewash. Remove whatever protective clothing is necessary to use the eyewash. Flush the eye with clean running water for at least 15 minutes. Arrange prompt transport to the designated medical facility.

11.5 Reporting Injuries, Illnesses, and Near Miss Incidents

Injuries and illnesses, however minor, will be reported to the SS immediately. The SS will complete an injury report and submit it to the HSO and the PM/APM within 24 hours.

Near miss incidents are situations in which no injury or property damage occurred, but under slightly different circumstances an injury or property damage could have occurred. Near misses are caused by the same factors as injuries, therefore they must be reported and investigated in the same manner. A SPSA must be done immediately after an injury, illness, near miss or other incident to determine if it is safe to proceed with the work.

11.6 Emergency Information

The means to summon local public response agencies such as police, fire, and ambulance will be reviewed in the daily safety meeting. These agencies are identified in Table 11-1. A map to the hospital is shown in Figure 1.

Tables

Table 3-1 Chemical Hazard Information

Substance [CAS]	IP[a] (eV)	Odor Threshold (ppm)	Route[b]	Symptoms of Exposure	Treatment	TWA[c]	STEL[d]	Source[e]	IDLH (NIOSH)[f]
Barium, soluble compounds, as Ba [7440-39-3]	NA	NA	Inh Ing Con	Irritates eyes, nose, respiratory system; skin burns, gastroentritus; musc spasm; slow pulse	Eye: Irrigate immediately Skin: Water flush immediately Breath: Respiratory support Swallow: Immediate medical attention	0.5 mg/m^3 0.5 mg/m^3 0.5 mg/m^3		PEL TLV REL	50 mg/m^3
Benzene [71-43-2]	9.24	34–119	Inh Abs Ing Con	Irritates eyes, nose, respiratory system; giddiness; headache, nausea, staggered gait; fatigue, anorexia, lassitude; dermatitis; bone-marrow depression. Carcino-genic.	Eye: Irrigate immediately Skin: Soap wash immediately Breath: Respiratory support Swallow: Immediate medical attention	1 ppm 0.5 ppm 0.1 ppm	5 ppm 2.5 ppm 1 ppm	PEL TLV REL	Ca 500 ppm
Chlorodiphenyl (42% chlorine) See polychlorinated biphenyls (PCB) [53469-21-9]	?	?	Inh Abs Ing Con	Irritated eyes; chloracne; liver damage; carcino-genic.	Eye: Irrigate immediately Skin: Soap wash immediately Breath: Respiratory support Swallow: Immediate medical attention	1 mg/m^3 (skin) 1 mg/m^3 (skin) 0.001 mg/m^3 Ca		PEL TLV REL	Ca 10 mg/m^3
Chlorodiphenyl (54% chlorine), See polychlorinated biphenyls (PCB). [11097-69-1]	?	?	Inh Abs Ing Con	Irritated eyes and skin; acne-form dermatitis; carcinogenic in animals; causes liver damage.	Eye: Irrigate immediately Skin: Soap wash immediately Breath: Respiratory support Swallow: Immediate medical attention	0.5 mg/m^3 (skin) 0.5 mg/m^3 (skin) 0.001 mg/m^3 Ca		PEL TLV REL	Ca 5 mg/m^3
Coal tar pitch volatiles [65996-93-2]	?	?	Inh Con	Eye sensitivity to light, eye and skin irritation; dermatitis, bronchitis. Carcinogenic.	Eye: Irrigate immediately Skin: Soap wash immediately Breath: Respiratory support Swallow: Immediate medical attention	0.2 mg/m^3 0.2 mg/m^3 0.1 mg/m^3* *cyclohexane extractable fraction		PEL TLV REL	Ca 80 mg/m^3
1,1-Dichloroethane (Ethylidene chloride) [75-34-3]	11.06	NA	Inh Ing Con	Irrt skin; CNS depression; liver, kidney, lung damage	Eye: Irrigate immediately Skin: Soap flush prompt Breath: Respiratory support Swallow: Immediate medical attention	100 ppm 100 ppm 100 ppm		PEL TLV REL	3,000 ppm

Table 3-1 Chemical Hazard Information

Substance [CAS]	IP[a] (eV)	Odor Threshold (ppm)	Route[b]	Symptoms of Exposure	Treatment	TWA[c]	STEL[d]	Source[e]	IDLH (NIOSH)[f]
1,2-Dichloroethylene [540-59-0]	9.65	17	Inh Ing Con	Irritated eyes and respiratory system; depressed central nervous system.	Eye: Irrigate immediately Skin: Soap wash prompt Breath: Respiratory support Swallow: Immediate medical attention	200 ppm 200 ppm 200 ppm		PEL TLV REL	4,000 ppm
Ethylbenezene [100-41-4]	8.76	NA	Inh Ing Con	Irrt eyes, skin, muc memb; headache; derm; narco, coma	Eye: Irrigate immediately Skin: Water flush prompt Breath: Respiratory support Swallow: Immediate medical attention	100 ppm 100 ppm 100 ppm	125 ppm 125 ppm	PEL TLV REL	800 ppm
Fuel oil (diesel oil, medium)	?	?	Ing Inh Con	Ingestion causes nausea, vomiting, and cramps; depressed central nervous system, headache, coma, death; pulmonary irritation; kidney and liver damage; aspiration causes severe lung irritation, coughing, gagging, dyspnea, substernal stress, pulmonary edema; bronchopneumonia; excited, then depressed, central nervous system.	Eye: Irrigate immediately Skin: Soap flush prompt Breath: Respiratory support Swallow: Immediate medical attention			PEL TLV REL	
Lead, elemental & inorganic compounds, as Pb [7439-92-1]	NA	NA	Inh Ing Con	Weakness, lassitude, insomnia; facial pallor; eye pallor, anorexia, low body weight, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremors; wrist and ankle paralysis; brain damage; kidney damage; irritated eyes; hypotension.	Eye: Irrigate immediately Skin: Soap flush prompt Breath: Respiratory support Swallow: Immediate medical attention	0.05 mg/m^3 0.05 mg/m^3 <0.1 mg/m^3* * Blood Pb<0.06 mg/100 g whole blood		PEL TLV REL	100 mg/m^3
Methylene chloride (dichloromethane) [75-09-2]	11.32	NA	Inh Abs Ing Con	Fatigue, weakness, sleepiness, lightheadedness; numbness and tingling in limbs; nausea; irritated eyes and skin.	Eye: Irrigate immediately Skin: Soap wash prompt Breath: Respiratory support Swallow: Immediate medical attention	25 ppm 50 ppm Lowest feasible concentration		PEL TLV REL	Ca 2,300 ppm

Table 3-1 Chemical Hazard Information

Substance [CAS]	IP[a] (eV)	Odor Threshold (ppm)	Route[b]	Symptoms of Exposure	Treatment	TWA[c]	STEL[d]	Source[e]	IDLH (NIOSH)[f]
Bis(2-ethylhexyl) phthalate	?	?	Inh Ing Con	Very low toxicity. Injection may cause escape of fluids into the tissues. Slight eye irritation.	Eye: Irrigate immediately Skin: Water flush Breath: Respiratory support Swallow: Immediate medical attention	NA Rat LD_{50} = 30.6 mg/kg		PEL TLV REL	?
Polychlorinated biphenyls (PCB) (Aroclor 1242) [53469-21-9] and (Aroclor 1254) [11097-69-1]	?	?	Inh Ing Abs Con	Aroclor 1242: irritated eyes; chloracne; acneform dermatitis; mildly toxic by ingestion. Poison by subcutaneous route. Carcinogenic. Aroclor 1254: irritated eyes and skin; acne-form dermatitis; poison by intravenous route. Moderately toxic by ingestion and intraperitoneal routes. Carcinogenic.	Eye: Irrigate immediately Skin: Soap wash immediately Breath: Respiratory support Swallow: Immediate medical attention	Aroclor 1242: 1 mg/m^3 (skin) 1 mg/m^3 (skin) 0.001 mg/m^3 Aroclor 1254: 0.5 mg/m^3 (skin) 0.5 mg/m^3 (skin) 0.001 mg/m^3		PEL TLV REL PEL TLV REL	Ca 10 mg/m^3 Ca 5 mg/m^3
Toluene (Toluol) [108-88-3]	8.82	0.16–37	Inh Abs Ing Con	Fatigue, weakness; confusion, euphoria, dizziness, headache; dilated pupils, lacrimation; nervousness, muscular fatigue, insomnia; paralysis; dermatitis.	Eye: Irrigate immediately Skin: Soap wash prompt Breath: Respiratory support Swallow: Immediate medical attention	200 ppm 50 ppm 100 ppm	C 300ppm 150 ppm	PEL TLV REL	500 ppm
1,1,1-Trichloroethane (methyl chloroform) [71-55-6]	11.0	390	Inh Ing Con	Headache, lassitude; central nervous system depression, poor equilibrium; irritated eyes; dermatitis; cardiac arrhythmia.	Eye: Irrigate immediately Skin: Soap wash immediately Breath: Respiratory support Swallow: Immediate medical attention	350 ppm 350 ppm	350 ppm* *15 min	PEL TLV REL	700 ppm
Trichloroethylene (TCE, trichloroethene) [79-01-6]	9.45	21.4	Inh Ing Con	Headache, vertigo; visual disturbance, tremors, somnolence, nausea, vomiting; irritated eyes; dermatitis; cardiac arrhythmia, paresthesia. Carcinogenic.	Eye: Irrigate immediately Skin: Soap wash prompt Breath: Respiratory support Swallow: Immediate medical attention	100 ppm 50 ppm 25 ppm	C 200 ppm 100 ppm	PEL TLV REL	Ca 1,000 ppm

Table 3-1 Chemical Hazard Information

Substance [CAS]	IP[a] (eV)	Odor Threshold (ppm)	Route[b]	Symptoms of Exposure	Treatment	TWA[c]	STEL[d]	Source[e]	IDLH (NIOSH)[f]
Vinylidene chloride (1,1-DCE; 1,1-Dichloroethene; 1,1-Dichloroethylene;) [75-35-4]	10.00	NA	Inh Ing Con	Irritation eyes, skin, throat; Dizziness, Headache, Nausea, Dyspnea; liver, kidney Dysfunction; Pneumonitis; Carcinogen Organs affected by exposure: Eyes, skin, Respiratory system, Central Nervous System, liver, kidneys [in animals: liver & kidney tumors]	Eye: Immediately wash eyes with large amounts of water, occasionally lifting the lower and upper lids. Get medical attention immediately. Skin: Immediately flush contaminated skin with soap and water. If this chemical penetrates the clothing, immediately remove the clothing and flush the skin with water. If irritation persists after washing, get medical attention. Breath: Move the exposed person to fresh air at once. If breathing has stopped, perform mouth-to-mouth resuscitation. Keep the affected person warm and at rest. Get medical attention as soon as possible. Swallow: Get medical attention immediately.	NE 5 ppm Ca	NE[3] 20 ppm Ca	PEL TLV REL	NE
Vinyl chloride (Chloroethylene) [75-01-4]	9.99	10-20 ppm	Inh Con	Weakness; abdominal pain, GI bleeding; enlarged liver; pallor or Cyanosis of extremities; liq: frostbite	Eye: If eye tissue is frozen, seek medical attention immediately; if tissue is not frozen, immediately and thoroughly flush the eyes with large amounts of water for at least 15 minutes, occasionally lifting the lower and upper eyelids. If irritation, pain, swelling, lacrimation, or photophobia persist, get medical attention as soon as possible. Skin: If frostbite has occurred, seek medical attention immediately; do NOT rub the affected areas or flush them with water. In order to prevent further tissue damage, do NOT attempt to remove frozen clothing from frostbitten areas. If frostbite has NOT occurred, immediately and thoroughly wash contaminated skin with soap and water. Breath: If a person breathes large amounts of this chemical, move the exposed person to fresh air at once. If breathing has stopped, perform mouth-to-mouth resuscitation. Keep the	1 ppm 1 ppm	5 ppm* * Avg not exceeding any 15 min	PEL TLV REL	Ca N.D.

Table 3-1 Chemical Hazard Information

Substance [CAS]	IP[a] (eV)	Odor Threshold (ppm)	Route[b]	Symptoms of Exposure	Treatment	TWA[c]	STEL[d]	Source[e]	IDLH (NIOSH)[f]
					affected person warm and at rest. Get medical attention as soon as possible. Swallow: none given				
Xylene (o-, m-, and p-isomers) [1330-20-7, 95-47-6, 108-38-3,106-42-3]	8.56/ 8.56/ 8.44	1.1–20	Inh Abs Ing Con	Dizziness, excitement, drowsiness, uncoordinated, staggering gait; irritated eyes, nose, throat; corneal vacuolization; anorexia, nausea, vomiting, abdominal pain; dermatitis.	Eye: Irrigate immediately Skin: Soap wash prompt Breath: Respiratory support Swallow: Immediate medical attention	100 ppm 100 ppm 100 ppm	150 ppm 150 ppm	PEL TLV REL	900 ppm

[a]IP = Ionization potential (electron volts).
[b]Route = Inh, Inhalation; Abs, Skin absorption; Ing, Ingestion; Con, Skin and/or eye contact.
[c]TWA = Time-weighted average. The TWA concentration for a normal work day (usually 8 or 10 hours) and a 40-hour work week, to which nearly all workers may be repeatedly exposed, day after day without adverse effect.
[d]STEL = Short-term exposure limit. A 15-minute TWA exposure that should not be exceeded at any time during a workday, even if the TWA is not exceeded.
[e]PEL = Occupational Safety and Health Administration (OSHA) permissible exposure limit (29 CFR 1910.1000, Table Z).
TLV = American Conference of Governmental Industrial Hygienists (ACGIH) threshold limit value—TWA.
REL = National Institute for Occupational Safety and Health (NIOSH) recommended exposure limit.
[f]IDLH (NIOSH)—Immediately dangerous to life or health (NIOSH). Represents the maximum concentration from which, in the event of respirator failure, one could escape within 30 minutes without a respirator and without experiencing any escape-impairing or irreversible health effects.
NE = No evidence could be found for the existence of an IDLH (NIOSH Pocket Guide to Chemical Hazards, Pub. No. 90-117, 1990).
C = Ceiling limit value which should not be exceeded at any time.
Ca = Carcinogen.
NA = Not applicable.
? = Unknown.
LEL = Lower explosive limits.
LC_{50} = Lethal concentration for 50 percent of population tested.
LD_{50} = Lethal dose for 50 percent of population tested.
NIC = Notice of intended change (ACGIH).

References:

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Micromedex Tomes Plus (R) System, 1992, Micromedex, Inc.
National Institute for Occupational Safety and Health Pocket Guide to Chemicals, Pub. 1990, No. 90-117, National Institute for Occupational Safety and Health.
Odor Threshold for Chemicals with Established Occupational Health Standards, American Industrial Hygiene Association, 1989.

Table 3-1 Chemical Hazard Information

Respirator Selection Guide, 3M Occupational Health and Safety Division, 1993.
Verschuseren, K., Handbook of Environmental Data on Organic Chemicals, Van Nostrand and Reinhold, 1977.
Warning Properties of Industrial Chemicals—Occupational Health Resource Center, Oregon Lung Association.
Workplace Environmental Exposure Levels, American Industrial Hygiene Association, 1992.

TABLE 8-1
AIRBORNE CONTAMINANT ACTION LEVELS

Parameter	Reading	Action
Total Organic Vapors (PID)	0 ppm to ≤ 1 ppm	Normal operations; continue breathing zone monitoring once every 30 minutes.
	>1 ppm	Screen for vinyl chloride, DCA, and DCE with colorimetric tubes.
	>1 ppm to 10 ppm	Normal operations as long as action levels for vinyl chloride or DCE are not exceeded.
	>12.5 ppm	Screen for methylene chloride with colorimetric tubes.
	>10 ppm to 50 ppm	Upgrade to Level C PPE if vinyl chloride, methylene chloride, and DCE action levels are not exceeded; increase monitoring frequency to once every 15 minutes.
	>50 ppm	Stop work; evacuate area; investigate cause of reading.
1,2-Dichloroethane (DCA) (colorimetric tube)	0 to 1 ppm	Normal operations.
	>1 ppm to 10 ppm	Upgrade to Level C PPE.
	>10 ppm	Stop work; evacuate area; investigate cause of reading.
1,1-Dichloroethene (DCE) (colorimetric tube)	0 to 1 ppm	Normal operations.
	>1 ppm to 10 ppm	Upgrade to Level C PPE; implement personal air sampling.
	>10 ppm	Stop work; evacuate area; investigate cause of reading.
Vinyl Chloride (colorimetric tube)	0 to < 0.5 ppm	Normal operations.
	>0.5 ppm	Implement personal air sampling for vinyl chloride.
	<1 ppm	Modified Level D or Level C PPE based on TOV action levels.
	≥1 ppm	Stop work; evacuate area; investigate cause of reading.
Methylene Chloride (colorimetric tube)	0 to < 12.5 ppm	Normal operations.
	>12.5 ppm	Implement personal air sampling for methylene chloride.
	<25 ppm	Modified Level D or Level C PPE based on TOV action levels.
	≥25 ppm	Stop work; evacuate area; investigate cause of reading.
Airborne Particulates	0 to 0.150 mg/m^3	Normal operations
	>0.150 mg/m^3	Initiate wetting of work area to control dust; upgrade to Level C PPE if dust control measures do not control dust within 15 minutes; implement perimeter monitoring to determine potential off-site impacts; implement personal air sampling for lead.
Oxygen	≤19.5%	Stop work, evacuate confined spaces/work area, investigate cause of reading, and ventilate area.
	>19.5% to <23.5%	Normal Operations
	≥23.5%	Stop work, evacuate confined spaces/work area, investigate cause of reading, and ventilate area.
Carbon Monoxide	0 ppm to ≤20 ppm	Normal Operations
	>20 ppm	Stop work, evacuate confined spaces/work area, investigate cause of reading, and ventilate area.

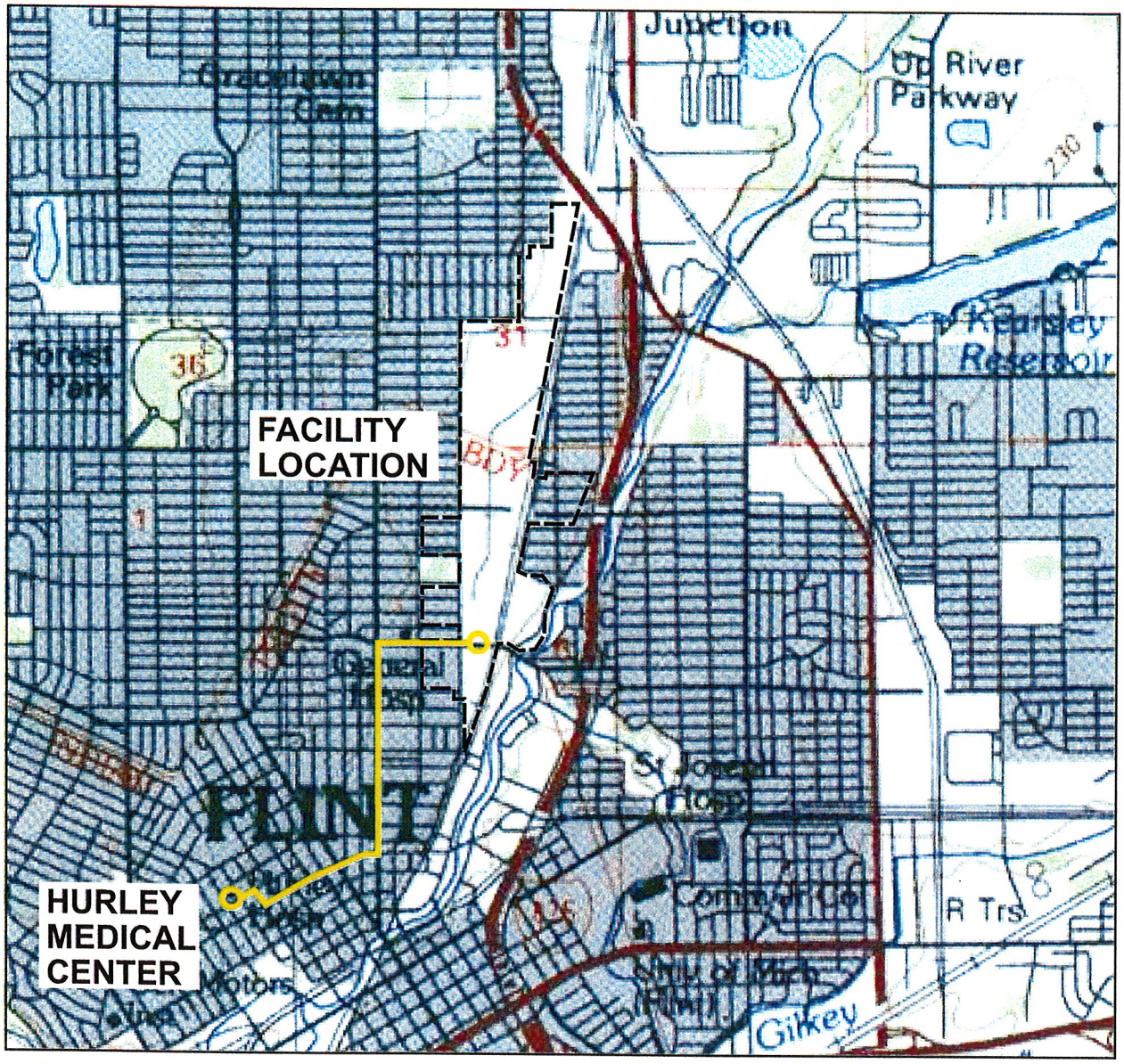
Parameter	Reading	Action
Hydrogen Sulfide	0 ppm to ≤5 ppm	Normal Operations
Hydrogen Sulfide (cont.)	>5 ppm	Stop work, evacuate confined spaces/work area, investigate cause of reading, and ventilate area.
Flammable Vapors (LEL)	<10% LEL	Normal operations
	≥10% LEL	Stop work; ventilate area; investigate source of vapors

Notes:

1. Readings for TOV are for two consecutive minutes at breathing zone height, measure with a calibrated PID.
2. Readings for particulate are for two consecutive minutes, at breathing zone height, measure with a calibrated Real Time Aerosol Monitor (RAM). Dust sampling instruments provide "total dust" levels and do not differentiate between contaminated and uncontaminated dust particles. Dust action levels are based upon total dust and not respirable dust levels Action levels are in excess of background levels, as measured either prior to activities on site or off site.

Figures

Figure 1 – Hospital Route Map



REFERENCE: Base Map Source: USGS 7.5 Min. Topo. Quads., Flint North, Flint South, Goodrich, and Davison, Michigan.

DIRECTIONS:

1. West on E Hamilton Ave
2. Turn left onto N Saginaw St
3. Turn right onto E 5th Avenue
4. Turn slight right onto N Grand Traverse Street
5. Turn left onto W 8th Avenue
6. Turn left onto Hurley Plaza to Hurley Medical Center

Area Enlargement

GENERAL MOTORS CORPORATION
FLINT MICHIGAN

HEALTH AND SAFETY PLAN

SITE LOCATION MAP

BBL BLASLAND, BOUCK & LEE, INC. *engineers & scientists*

FIGURE 1

02/01 SYR-D54-DJH LBR
64410012/64410n01.CDR

Attachments

Attachment A – Underground/ Overhead Utility Checklist

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UNDERGROUND/OVERHEAD UTILITY CHECKLIST

Project Name_____ Date_____

Location_____

Prepared By_____ Project Manager_____

This checklist must be completed for any intrusive subsurface work such as excavation or drilling. It documents that overhead and underground utilities in the work are identified and located. The Project Manager shall request utility markouts before that start of field operations to allow the client and utility companies sufficient time to provide them. If complete information is not available, a magnetometer or other survey shall be performed to locate obstacles prior to intrusive subsurface activities.

Procedure

A diagram of the work area depicting the proposal location of intrusive subsurface work sites (i.e., boring locations, excavation locations) must be attached to this form. The diagram must clearly indicate the areas checked for underground structures/utilities, and overhead power lines. This form and the diagram must be signed by the BBL Project Manager, the BBL Site Supervisor, and the client representative.

Checklist

Type of Structure	Present	Not Present	Method of Markout
Electric Power Line			
Natural Gas Line			
Telephone Line			
Water Line			
Product Line			
Sewer Line			
Steam Line			
Drain Line			
Underground Tank			
Underground Cable			
Overhead Power Line			
Overhead Product Line			
Other (Specify)			

Client Representative_____ Date_____

BBL Project Manager_____ Date_____

BBL Site Supervisor_____ Date_____

Attachment B – Confined Space Entry Permit

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CONFINED SPACE ENTRY PERMIT

All Copies of Permit Must Remain at Job Site Until the Entry is Completed

Project _____ Date _____ Time _____

Location and Description of Confined Space: _____

_____

Rescue Contact and Phone Number: _____

Entry Objectives: _____

_____

Equipment/Materials required for Entry : _____

_____

Time of Entry: _____ Expiration of Entry: _____

Required Respirator for Entry: _____

Required Protective Clothing for Entry: _____

Monitoring Interval : **Continuous** **5 minutes** **10 minutes** **15 minutes** **30 minutes**

Air Monitoring Requirements			
Monitor For	Monitoring Equipment	Calibrated	
		Date/Time	By
$\%O_2$			
% of LEL			
H_2S			
CO			
Other:			
Other:			

Names of Entrants	Names of Attendants

Entry Supervisor Authorizing Confined Space Entry Permit _____
Print

_____
Signature Date Time

Entry Supervisor Cancelling Confined Space Entry Permit _____
Print

_____
Signature Date Time

Attachment C – Incident Investigation Form

BBL
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Incident/Near-Miss Investigation Report

☐ OSHA Recordable	☐ First Aid Injury	☐ Fire	Date of Incident:
☐ Lost Workday Injury	☐ Vehicle Accident	☐ Spill/Leak	
☐ Restricted Duty Injury	☐ Equipment Damage	☐ Near Miss	Incident Number:

Every employee injury, accident, and near miss must be reported within twenty-four hours of the injury. If the incident results in hospitalization, an immediate report must be made by telephone to the Project Manager and the Health and Safety Officer.

Project Information

Project Name:	Project #
Location of Incident:	

EMPLOYEE

Name:	Employee Number:
Employment Status: ☐ Regular ☐ Part Time	How long in present job?

INJURY OR ILLNESS INFO

Where did incident / near miss occur? (number, street, city, state, zip):

EmployeeÊs specific activity at the time of the incident / near miss:

Equipment, materials, or chemicals the employee was using when the incident / near miss occurred (e.g., the equipment employee struck against or which struck employee; the vapor inhaled or material swallowed; what the employee was lifting, pulling, etc.):

Describe the specific injury or illness (e.g., cut, strain, fracture, etc.):

Body part(s) affected (e.g., back, left wrist, right eye, etc.):

Name and address of treatment provider (e.g., physician or clinic):	Phone No.:
If hospitalized, name and address of hospital:	Phone No.:

Date of injury or onset of illness / /	Time of event or exposure: ☐ AM ☐ PM

Did employee miss at least one full shiftÊs work? ☐ No ☐ Yes, 1st date absent (MM/DD/YYYY) / /

Has employee returned to work? ☐ Regular work ☐ Restricted work ☐ No

☐ Yes, date returned (MM/DD/YYYY) / /

To whom reported:	Other workers injured/made ill in this event? ☐ Yes ☐ No

Description of Incident / Near Miss: (Describe what happened and how it happened.)

Motor Vehicle Accident (MVA)

Company Vehicle? ☐ Yes ☐ No

Accident Location (street, city, state)									
Vehicle Towed?	☐ Yes ☐ No	Other Vehicle?	☐ Yes ☐ No	# Vehicles Towed		# of Injuries			

Spill

Material Spilled	Quantity	Source
Agency Notifications		

Cost of Incident $

Third Party Incidents

Name of Owner		Address	Telephone
Description of Damage:			
Witness Name		Address	Telephone
Witness Name		Address	Telephone

#	Root Cause and Contributing Factors: Conclusion (Describe in Detail Why Incident / Near Miss Occurred)
1	
2	
3	
4	
5	

Root Cause(s) Analysis (RCA):

1. Lack of skill or knowledge
2. Lack of or inadequate operational procedures or work standards
3. Inadequate communication of expectations regarding procedures or work standards
4. Inadequate tools or equipment
5. Correct way takes more time and/or requires more effort
6. Short-cutting standard procedures is positively reinforced or tolerated
7. Person thinks there is no personal benefit to always doing the job according to standards
8. Uncontrollable

#	RCA #	Solution(s): How to Prevent Incident / Near Miss From Reoccurring	Person Responsible	Due Date	Closure Date

Investigation Team Members

Name	Job Title	Date

Results of Solution Verification and Validation

Reviewed By

Name	Job Title	Date
	Project Manager	
	Health and Safety Reviewer	

Attachment D – Incident Prevention Observation Form

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Incident Prevention Observation

Observer Name	Observer Title	Contractor Company Name
Date _____ Time ____ ☐ AM ☐ PM	Project Type / Task Observed	

Background Information and Miscellaneous Comments

Observer's Positive Comments

Feedback Conducted By		**Date**		**Time**	☐ AM ☐ PM

Conclusion (Describe in Detail Why the Questionable Item Occurred). Add Any Employee Comments

Root Cause(s) Analysis (RCA):

1. Lack of skill or knowledge
2. Lack of or inadequate operational procedures or work standards
3. Inadequate communication of expectations regarding procedures or work standards
4. Inadequate tools or equipment
5. Correct way takes more time and/or requires more effort
6. Short-cutting standard procedures is positively reinforced or tolerated
7. Person thinks there is no personal benefit to always doing the job according to standards
8. Uncontrollable.

Questionable Item #	RCA #	Solution(s): How to Prevent Questionable Behavior From Reoccurring	Person Responsible	Due Date	Closure Date

Results of Solution Verification and Validation

Reviewed by	Date	Reviewed by	Date

Environmental Operations

	PRE-TASK PREPARATION	Correct	Questionable	Comments
1.	Health and Safety Plan / MSDSs on site			
2.	Employee familiar / trained on task			
3.	OSHA-required training/medical surveillance			
4.	Utility mark out / check performed			
5.	Traffic hazard addressed / work area marked			
6.	Walking / working surfaces free of hazards			
7.	Tailgate safety meeting performed			
8.	SPSA performed prior to beginning work			
9.	Communicates intentions to other personnel			
10.	Knowledge of emergency procedures			
11.	Distance between equipment and power lines			
12.	Personal protective equipment			
13.	Air monitoring equipment on site, calibrated			
14.	First aid kit / fire extinguisher on site			
15.	One person trained in first aid / CPR			
16.	Work zones established and marked			
	PERFORMING TASK			
17.	SPSA before beginning new task			
18.	Correct body positioning			
19.	Proper lifting / pushing / pulling techniques			
20.	Keep hands / body away from pinch points			
21.	Walking / working surfaces kept clear of debris			
22.	Faces traffic as appropriate			
23.	Vehicles/ barricades to protect against traffic			
24.	Drill rig located properly, blocked / chocked			
25.	Drill rig moved only with derrick lowered			
26.	Excavator located on stable ground			
27.	Eye contact made with equipment operator			
28.	Spoil at least 2 feet back from edge of excavation			
29.	Excavation shored/sloped/benched			
30.	Excavation entry controlled			
31.	Equipment/tools used properly			
32.	Electrical equipment connected through GFCI			
33.	Power tools handled properly			
34.	Electrical cords inspected / in good condition			
35.	Follows lockout / tagout procedures			
36.	Air monitoring conducted/action levels understood			
37.	Equipment decontaminated properly			
38.	Personnel decon prior to eating/drinking/smoking			
39.	Decontamination effective			
	POST – TASK			
40.	Procedures / JSA adequate			
41.	Equipment / tools stored properly			
42.	Proper storage of soil / water / waste material			
43.	Work area secured			
44.	Other			

Total #		% Safe: [(Total Correct/(Total Correct + Total Questionable)) * 100]

Attachment E – Safety Inspection Form

BLASLAND, BOUCK & LEE, INC.

Health and Safety Inspection Form

Project Name/# : _____ Date: _____

Auditor: _____

HSM on Site

SEND A COPY OF COMPLETED FORM TO THE HEALTH AND SAFETY MANAGER

	YES	NO	N/A	COMMENTS
GENERAL				
HASP on site?				
HASP finalized and approved?				
OSHA poster displayed?				
Emergency telephone numbers posted?				
Emergency eyewash immediately available?				
Emergency shower immediately available?				
Emergency Notification Means available (radio, telephone)?				
First-Aid kit immediately available?				
First-Aid kit adequately stocked?				
Proper sanitation facility on site?				
DOCUMENTATION AND RECORDKEEPING				
Only personnel listed and approved on HASP site?				
All personnel properly trained? (Check company-issued wallet cards.)				
All personnel in health monitoring program? (Check company-issued wallet cards.)				
Daily field log kept by the Site Manager?				
Levels of PPE recorded?				
Contaminant levels recorded?				
Site surveillance records kept by HSM?				
Copy of current fit test records on site?				
Calibration records maintained for air monitoring equipment?				
Accident/incident forms on site?				
Field team review sheets signed?				
Additional hospital route directions available?				
Visitors logbook being accurately maintained?				
MSDSs available for all chemicals on site?				
HASP revisions recorded?				
First-Aid kit inspected weekly?				
Are daily safety meetings held?				
Emergency procedures discussed during safety meetings?				
EMERGENCY RESPONSES				
Vehicle available on site for transportation to the hospital?				
Fire extinguishers on site and immediately available at designated work areas?				
At least one person trained in CPR and First Aid on site at all times during work activities?				
All personnel know who is trained in CPR/First Aid?				

*N/A – Not Applicable

BLASLAND, BOUCK & LEE, INC.

Health and Safety Inspection Form

	YES	NO	N/A	COMMENTS
PERSONAL PROTECTIVE EQUIPMENT (PPE)				
Proper PPE being worn as specified in HASP?				
Level of PPE being worn				
PPE adequate for work conditions?				
In not, give reason				
Upgrade/downgrade to PPE level				
Does any employee have facial hair that would interfere with fit of respirators?				
If yes, willing to shave, as necessary?				
Fit-tested within the last year? (Documentation present)				
If Level B, back-up/emergency person suited up (except for air)?				
HSM periodically inspects PPE and equipment?				
PPE not in use properly stored?				
All equipment required in HASP on site?				
Properly calibrated?				
In good condition?				
Used properly?				
Other equipment needed?				
List				
Monitoring equipment covered with plastic to minimize contamination?				
PERSONNEL AND EQUIPMENT DECONTAMINATION				
Decon area properly designated?				
Appropriate cleaning fluid used for known or suspected contaminants?				
Appropriate decon procedures used?				
Decon personnel wearing proper PPE?				
Equipment decontaminated?				
Sample containers decontaminated?				
Disposable items replaced as required?				
WORK PRACTICES				
Proper collection and disposal of potentially contaminated PPE?				
Proper collection and disposal of decon fluid?				
Water available for decon?				
Buddy system used?				
Equipment kept off drums and ground?				
Kneeling or sitting on drums or ground prohibited?				
Personnel avoid standing or walking through puddles or stained soil?				
Work zones established?				
If night work is conducted, is there adequate illumination?				

*N/A – Not Applicable

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Health and Safety Inspection Form

	YES	NO	N/A	COMMENTS
WORK PRACTICES, CONT.				
Smoking, eating, or drinking in the exclusion or CRZ prohibited?				
To the extent feasible, contaminated materials handled remotely?				
Contact lenses not allowed on site?				
Entry into excavations not allowed unless properly shored or sloped?				
Competent person on site during excavation?				
All unusual situations on site listed in HASP?				
If not, when?				
Action taken?				
HASP revised?				
CONFINED SPACE ENTRY				
Employees trained according to 1910.146 – Confined Space Entry?				
All confined spaces identified? If not, list:				
All appropriate equipment available and in good working order?				
Equipment properly calibrated?				
Confined space permits used?				
Confined space permits completely and correctly filled out?				

*N/A – Not Applicable

Comments: _____

Attachment F – Air Monitoring Log

DAILY AIR MONITORING LOG

Project: Date:

Monitoring Instrument:

Activity:

Air Monitor:

Level of Protection:

Time:	Location:	Instrument Reading:	Comments:

Attachment G – Daily Safety Meeting Log

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engineers & scientists

DAILY SAFETY MEETING LOG

PROJECT:_____ LOCATION:_____

DATE/TIME:_____ ACTIVITY:_____

1. WORK SUMMARY

2. PHYSICAL/CHEMICAL HAZARDS

3. PROTECTIVE EQUIPMENT/PROCEDURES

4. EMERGENCY PROCEDURES

5. SIGNATURES OF ATTENDEES