

Site Specific Health and Safety Plan

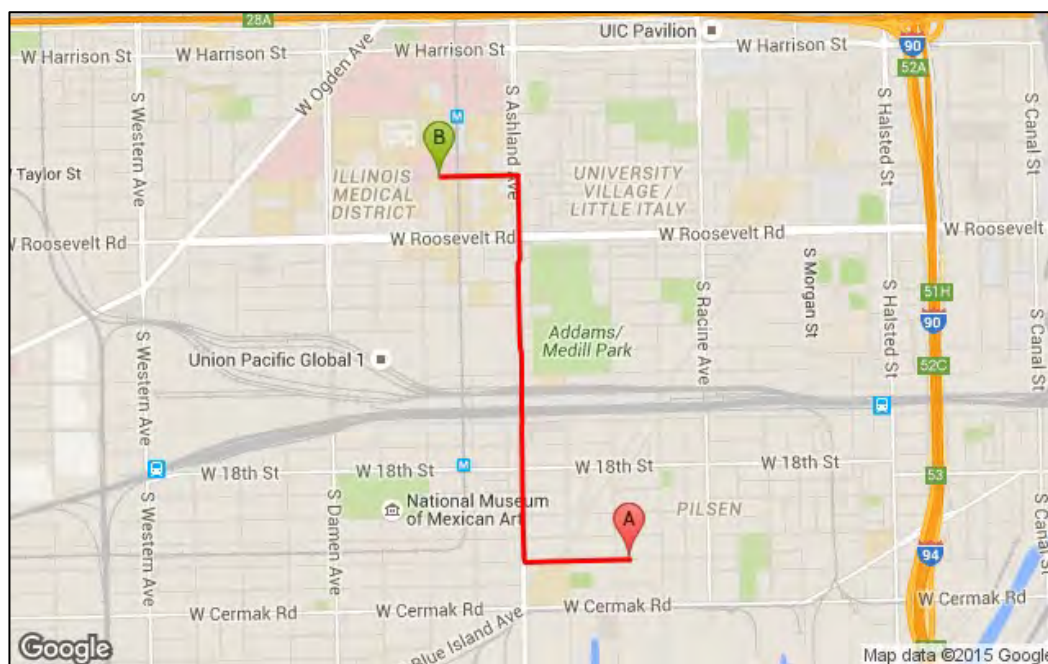
Pilsen Soil Operable Unit 1 Railroad Spur and Alley Site
Chicago, Illinois

Emergency Contact List and Hospital Route Map

Police Department	911
Fire Department	911
Hospital (University of Illinois Medical Center).....	312-355-4000
Poison Control Center	800-888-7655
GHD Project Manager (Walter Pochron).....	708-805-0029
GHD Regional Safety and Health Manager (William Doyle).....	734-536-1282
GHD Project Coordinator (Matthew Lazaric).....	312-636-8503
USEPA (Hotline).....	800-424-9346
National Response Center.....	800-424-8802
GHD Incident Reporting Hotline.....	866-529-4886

Hospital (University of Illinois Medical Center)

Emergency Route to the Hospital.



1. Head **west** on **W 21st St** toward **S Loomis St**
2. Turn **right** onto **S Ashland Ave**
3. Turn **left** onto **W Taylor St**

Destination will be on the right

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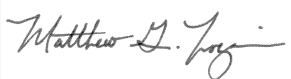


Appendices

Appendix A Project Safety Forms

Appendix B Job Safety Analysis Forms

HEALTH AND SAFETY PLAN

Signature Page

Site Name:	Pilsen Soil Operable Unit 1 (OU1) Railroad Spur and Alley Site		
Location Address:	Chicago, Illinois		
Reference No.:	039826	GHD Office:	Chicago
Anticipated Start Date:	11/16/2015	Anticipated Project Duration:	3 weeks
Prepared By (Signature):		Date:	11/5/2015
Project Manager (Signature):		Date:	11/5/2015
Reviewed By (Signature:)		Date:	11/5/2015

1. Introduction

The Health and Safety Plan (HASP) presented herein describes the health and safety procedures and emergency response guidelines to be implemented during excavation and soil stabilization activities at the Pilsen Soil Operable Unit 1 (OU1) Railroad Spur and Alley Site (Site) in Chicago, Illinois.

1.1 Purpose

The purpose of this site-specific HASP is to provide specific guidelines and establish procedures for the protection of personnel performing project field activities that are described in the scope of work. The information in this HASP has been developed in accordance with applicable standards and is, to the extent possible, based on information available to date. The HASP is also a living document, in that it must continually evolve as Site conditions develop.

GHD Services Inc. (GHD) is the primary contractor completing project activities at the Site. A vital element of GHD's Safety and Health Program is the implementation of a site-specific HASP for field activities. The HASP, as applicable to this project, requires the following measures to be implemented:

- Communicate the contents of this HASP to project personnel.
- Eliminate unsafe conditions. Efforts must be initiated to identify conditions that can contribute to an incident and to remove exposure to these conditions.
- Utilize the STAR (Stop, Think, Act, and Review) process before beginning any activity/task/job, after an incident, and/or during any unusual circumstances. Stop the activities to think about the task, analyze the task hazards and determine methods to reduce risk, and review the results with affected personnel.
- Revise or develop Job Safety Analysis (JSA) forms for activities. Supervisors and affected personnel are responsible for JSA development.
- Complete behavioral-based safety (BBS) observations via the use of the Safe Task Evaluation Process (STEP).
- Reduce unsafe acts. Please note that 88 percent of all incidents are directly caused by unsafe acts. Use the GHD BBS tools (STEPS, JSAs, STAR, etc.) to reduce the number of unsafe acts. Personnel shall make a conscious effort to work safely. A high degree of safety awareness must be maintained so that safety factors become an integral part of the task. Supervisory personnel shall ensure that personnel committing unsafe acts are held accountable via counseling, mentoring, and, if necessary, reprimand.
- Inspect frequently. Regular documented safety inspections of the work site, materials, and equipment by qualified persons ensure early detection of unsafe conditions. Safety and health deficiencies shall be corrected as soon as possible or project activities shall be suspended. Documentation of daily inspections and corrective actions should be kept with the project files.

1.2 Stop Work Authority

All GHD employees are empowered and expected to stop the work of co-workers, subcontractors, client employees, or other contractors if any person's safety or the environment are at risk. No repercussions will result from this action. Reporting of unsafe condition/acts and/or Stop Work Authority (SWA) shall be documented using the Unsafe Condition/Acts and SWA form located in Appendix A.

The discovery of any condition that would suggest the existence of a situation more hazardous than anticipated shall result in the removal of site personnel from that area and re-evaluation of the hazard and the levels of protection.

1.3 Personnel Requirements

All personnel conducting activities on site must conduct their activities in compliance with all applicable Safety and Health legislation throughout North America to include, but not limited to the Occupational Safety and Health Administration (OSHA) 29 CFR 1910, 29 CFR 1926 and GHD's policies and procedures. Project personnel must also be familiar with the procedures and requirements of this HASP. In the event of conflicting safety procedures/requirements, personnel must implement those safety practices affording the highest level of safety and protection.

1.4 Short Service Employees

GHD Employees identified as Short Service Employees (SSE) (6 months or less) shall not be permitted to work without another non-SSE employee present.

1.5 Project Management and Safety Responsibilities

Project Manager – GHD – Walter Pochron

The GHD Project Manager (PM) shall be responsible for the overall implementation of the HASP, and for ensuring that all safety and health (S&H) responsibilities are carried out in conjunction with this project. This shall include, but is not limited to, review and approval of the HASP, thoroughly investigate any accident that occurs at the Site; qualifying/directing subcontractors relative to safety and health performance; coordinating all safety and health submittals; providing the appropriate technical information to write submittals; and consultation with the Client/Owner regarding appropriate changes to the HASP.

Site Supervisor (SS) – GHD – Matthew Lazaric

Health and safety is a line management responsibility, and as such, the Site Supervisor (SS) will implement the overall onsite direction and enforcement of the health and safety for this project. The SS will be designated as the "competent person" as per OSHA regulations. The SS will report to the PM for this project.

The SS is the person who, under the supervision of the PM, shall be responsible for the overall implementation of the HASP, communication of the project requirements to all personnel, including subcontractors and visitors and is responsible for carrying out the health and safety responsibilities by making sure that:

- All underground utilities have been properly located prior to initiating work activities
- GHD's Property Access and Utility Locate form has been completed prior to initiating intrusive work
- All necessary cleanup and maintenance of safety equipment is conducted by project personnel
- JSA forms are developed, reviewed and revised accordingly
- Project personnel are implementing the STAR process before initiating activities
- Forms attached to the HASP are completed, filed, and submitted correctly
- A pre-entry briefing is conducted and documented, which will serve to familiarize on-site personnel with the procedures, requirements, and provisions of this HASP
- Safe work practices are enforced
- Personnel are observed for any ill effects, especially those symptoms caused by heat stress or chemical exposure
- Project activities are immediately shut down in the case of a medical emergency, unsafe condition, or unsafe practice
- Job site inspections are conducted as a part of quality assurance for safety and health
- Safety and health concerns are reported to project management as necessary

Safety & Health Officer (SHO) - GHD – Matthew Lazaric

The SHO is the person who, under the supervision of the PM and the Regional Safety and Health Manager (RSHM), shall be responsible for the communication of all safety requirements to project personnel and subcontractors. The SHO will have prior experience in working at hazardous waste sites and is responsible for carrying out the health and safety responsibilities by making sure that:

- The SHO is onsite at all times during the project work activities
- All necessary clean up and maintenance of safety equipment is conducted by project personnel
- Emergency services are contacted
- The Hazard Communication (HAZCOM) program is maintained on Site
- Forms attached to the HASP are completed correctly, submitted on a timely basis and then properly filed
- A pre-entry briefing is conducted, which will serve to familiarize project personnel with the procedures, requirements, and provisions of this HASP
- All necessary records are maintained in the project files (i.e., air monitoring results, calibration log sheets, incident reports, daily safety meeting forms, daily safety logbook entries, training files, etc.)
- Daily safety meetings are held and documented by the SHO
- Safe work practices for project personnel are enforced
- Safety of all visitors who enter the Site is ensured
- Communication is maintained with the Client Representatives

- Orders the immediate shutdown of project activities in the case of a medical emergency, unsafe condition, or unsafe practice
- Designate work areas and define minimum PPE requirements
- Ensure that the Initial Exposure Assessment Monitoring Program for lead has been implemented
- Provide the safety equipment, personal protective equipment, and other items necessary for GHD project personnel
- Enforce the use of all JSAs, required PPE, any additional safety equipment that is determined to be required and other items necessary for GHD personnel or subcontractor safety and assist with the development/revision of existing and additional JSA forms as necessary
- Develop any remaining Energy Control Procedures that are not provided in Appendix D
- Report safety and health concerns to GHD management as necessary

Emergency Coordinator (EC) - GHD – Matthew Lazaric

The SHO and/or his or her designee will act as the EC. The EC shall be able to implement the emergency procedures and is responsible for the following in the event of an emergency:

- The EC shall immediately respond to all imminent or actual emergency situations
- The EC shall notify all personnel and emergency response agencies, identify the problem, assess the health or environmental hazards, and take all reasonable measures to stabilize the situation
- The EC must take all reasonable measures necessary to ensure that fire, explosion, emission or discharge does not occur, re-occur, or spread. These measures may include stopping operations
- The EC shall develop Emergency Evacuation Routes on a daily bases and communicate them to all project personnel
- The EC shall also be responsible for follow-up activities after the incident such as cleanup of the affected area, maintenance and decontamination of the emergency equipment, and submission of any reports

Regional Safety & Health Manager - GHD – William Doyle

The Regional Safety & Health Manager (RSHM) is a full-time GHD employee who is trained as a safety and health professional works full-time for GHD in a health and safety role, and who serves in a consulting role to the PM, SHO, and SS regarding potential health and safety issues. The RSHM is responsible for the technical and safety aspects of the project, including review and approval of subcontractor HASPs.

Employee Safety Responsibility

GHD employees are responsible for their own safety as well as the safety of those around them. GHD employees shall use any equipment provided in a safe and responsible manner, as directed by their supervisor and will also follow the policies set forth in this HASP and the GHD Safety and Health Program.

Employees are directed to take the following actions when appropriate:

- Utilize the STAR process before initiating work
- Assist in the development and revision of JSA forms that are appropriate to their current scope of work
- Suspend any operations that may cause an imminent health hazard to employees, subcontractors, or others
- Inspect tools and other equipment before each use or as manufacturer and/or OSHA dictates
- Correct job site hazards when possible without endangering life or health
- Report safety and health concerns to the SS, PM, or RSHM

Subcontractors - Any selected subcontractor(s), if needed, will be responsible for providing both a Site Supervisor ("competent person") and a SHO to direct their activities and to meet all applicable OSHA Regulations. This may be the same individual if so qualified. These individuals will be responsible for ensuring that all contract specifications are met, including those related to Site health and safety. The names of these individuals will be presented in the subcontractor Site-specific HASP.

All subcontractor personnel working at the Site will report to the GHD SS and in keeping with OSHA requirements are required to comply with all procedures referenced in this HASP, the subcontractor HASP, and the OSHA Construction Standards as referenced in 29 CFR 1926.

Subcontractors working for GHD shall prepare and implement their own Site specific HASP for their contract work and provide all applicable Health and Safety SOPs and/or Safety Programs for use by their Site personnel. The subcontractor's HASP shall meet the minimum requirements of this HASP. GHD will review the subcontractor HASP prior to subcontractor mobilization to the Site. Subcontractors will be responsible for the health and safety of their personnel, which includes following all applicable OSHA Regulations and the subcontractors' Site-specific HASP. Subcontractors will be required to attend an initial Site briefing put on by GHD and subsequent safety meetings.

Authorized Visitors. Authorized visitors shall be provided with all known information with respect to the site operations and hazards as applicable to the purpose of their visit.

2. Site Operations

2.1 Site Location

The Site is located adjacent to South Loomis Street, to the north of Cermak Road and to the south of 21st Street in Chicago, Cook County, Illinois (see Figure 2.1). The Site consists of the alley north of West Cermak Road, between South Throop and South Loomis Streets and the railroad tracks that extend from West Cermak Road north and then west to South Laflin Street. Industrial facilities and commercial properties are located adjacent to the Site to the south, east, and west; and a combination of commercial / industrial and residential properties exist to the north of the Site. A school is located west of the Site. Figure 2.2 presents the Site layout, indicating the locations of the work zones at the Site.

The Site consists of compacted gravel and a railroad. A City of Chicago Ordinance prohibits the installation and use of water wells within the City limits. Drinking water for the entire City of Chicago comes from Lake Michigan.

2.2 Site History/Background

The United States Environmental Protection Agency (USEPA) has notified H Kramer & Company (H. Kramer), the City of Chicago (City), and Burlington Northern Santa Fe Railway (BNSF) (hereafter collectively the Parties) that each is a potentially responsible party under CERCLA for alleged soil contamination at the Pilsen Soil Operable Unit 1 Railroad Spur and Alley Site in Chicago IL (EPA Site ID C5N8-01) (OU1). The Parties have worked with USEPA to develop a Removal Work Plan for Alley-Railroad to address environmental conditions at OU1 through a removal action.

The work area is divided into the following ten parts based generally on land ownership and use as shown of Figure 2.2 and listed as follows:

1. **Area 1 Revised - Railroad West of Loomis (West Part):** This part is approximately 18 feet in width (defined as 9 feet on each side of the centerline of the rail road tracks) 490 feet long between Laflin and Loomis and is owned by the City of Chicago. This area has lead levels above 800 mg/kg but EPA samples collected in this area were below the TCLP lead criteria within the area. The rails and ties are in place and the spur is inactive.
2. **Area 2 Revised - Railroad West of Loomis (East Part):** This part is triangular in shape and approximately 120 feet long and between 18 and 45 feet wide at its widest point (defined as 9 feet on each side of the centerline of the rail road tracks with the area between the two sets of tracks at the east end included). This area is directly adjacent to Loomis and is owned by the City of Chicago. This area has lead levels above 800 mg/kg. The rails and ties are in place and the spur is inactive.
3. **Area 3 -Loomis Crossing:** This is the paved street section of Loomis where the railroad tracks formerly crossed the road. The rails and ties have been removed and there is street pavement or concrete sidewalks covering this area.
4. **Area 4 - Railroad East of Loomis (North):** This part is approximately 95 feet long and owned by H. Kramer and was used by BNSF. This part lies between Loomis and 21st Place (entrance to H Kramer). The rails and ties are still present. This area exceeds 800 mg/kg lead and has TCLP¹ lead within the area. The rail spur is inactive.
5. **Area 5- 21st Place:** - This part represents an approximate 135 foot by 75 foot area east of Loomis which is the entrance to H Kramer and is currently owned by the City. This area exceeds 800 mg/kg lead and also has TCLP lead within the area. The rail spur is inactive.
6. **Area 6 - Railroad East of Loomis (South):** This part represents an approximate 110 foot long section of railroad tracks used by BNSF and owned by H. Kramer. This part lies between the east-west alley and 21st Place (entrance to H Kramer). The rails and ties are still present. This area exceeds 800 mg/kg lead but EPA samples collected in this area were below the TCLP lead criteria within the area. The rail spur is inactive.

¹ Toxicity Characteristic Leaching Procedure (TCLP) lead concentrations above 5.0 milligrams per liter (mg/L)

7. **Area 7- North South Alley:** This part is approximately 110 feet by 25 feet in area and is owned by the City. It has a gravel/fill surface and has lead above 800 mg/kg but EPA samples collected in this area were below the TCLP lead criteria within the area.
8. **Area 8 - Unpaved East- West Alley:** This part represents an approximate 325 feet of unpaved alley along the western part and is owned by the City. This area has lead levels above 800 mg/kg and has TCLP lead within the area.
9. **Area 9 - Paved East West Alley:** This part represents an approximate 175 feet of paved alley along the eastern part and is owned by the City. This area has lead levels above 800 mg/kg. Recent inspection of this area indicates that the pavement in this area is in poor shape.
10. **Area 10 - Railroad South of Alley:** This approximately 120 feet long railroad segment is owned by DeTrinh and 1358 Cermak LLC and was used by BNSF. This part lies between the east-west alley to the north and Cermak Road to the south. The rails and ties are still present. This area exceeds 800 mg/kg lead but EPA samples collected in this area were below the TCLP lead criteria within the area. The rail spur is inactive.

2.3 Scope of Work

The objective of this project is to remediate contaminated soil exceeding the TCLP and Tier 1 standards while meeting the requirements of the City of Chicago and 35 IAC 742.305.

The work will be completed as a removal action under Title 40 Code of Federal Regulations Part 300.415.

Consistent with the scope allowed under a Removal Action, the following work is included in the Removal Action

1. Fences, warning signs, or other security or site control precautions
2. Capping of contaminated soils
3. Excavation, containment, treatment and disposal of hazardous and non-hazardous materials

A description of the remedial scope for each area is presented as follows:

1. **Area 1 Revised - Railroad West of Loomis (West Part)²:** This part is 490 feet long between Laflin and Loomis and is owned by the City of Chicago. This area has lead levels above 800 mg/kg. The removal plan for this area is as follows:
 - a. BNSF will remove the rails and ties from this area.
 - b. H. Kramer will remove the organic soils that are not suitable for backfill and dispose offsite as non-hazardous waste. Soils above the RML will be removed (excavated) down to a depth of 6 inches from the existing grade. EPA's sampling in this area below 6 inches has shown that the RML has been met below 6 inches. This excavated material will be used as backfill in Areas, 4, 5, 6, 7, 8, or 9. After the surficial materials are removed a brightly colored geotextile fabric³ will be placed over the area. Then

² Note the size of Area 1 has been revised to end near soil sample location PA-RR-26 and Area 2 has been extended to the west.

³ Daylight Orange Nonwoven Geotextile or generally equivalent material

6 inches of gravel will be placed as an engineered barrier (gravel supplied by BNSF). Bollard posts will be installed at the west end of this area and at the parking lot cross over to prevent traffic from entering the pathway⁴.

2. **Area 2 Revised - Railroad West of Loomis (East Part):** This part is approximately 120 feet long and 18 to 45 feet in width at its widest point. This area is directly adjacent to Loomis and is owned by the City of Chicago. This area has lead levels above 800 mg/kg. The rails and ties are in place and the spur is inactive. No TCLP treatment will be required. The removal plan for this area is as follows:
 - a. BNSF will remove the rails and ties from this area. .
 - b. H. Kramer will remove the organic soils that are not suitable for backfill and dispose offsite as non-hazardous waste. Soils above the RML will not be removed from Area 2. A brightly colored geotextile fabric will be placed over the area. Then 3 inches of gravel will be placed as part of an engineered barrier (gravel supplied by BNSF). A bollard post will be installed at the east end of this area to prevent traffic from entering the pedestrian pathway.
 - c. H. Kramer will then place a 3-inch asphalt layer as an engineered barrier.
3. **Area 3 - Loomis Crossing:** This is the paved street section of Loomis where the railroad tracks formerly crossed the road. The rails and ties have been removed and there is street pavement or concrete sidewalks covering this area. No remediation is required because the pavement and sidewalks are in good condition.
4. **Area 4 - Railroad East of Loomis (North):** This part is 95 feet long and owned by H. Kramer and was used by BNSF. This part lies between Loomis and 21st Place (entrance to H Kramer). The rails and ties are still present. This area exceeds 800 mg/kg lead and has TCLP lead within the northeast corner of the area. The rail spur is inactive. The removal plan for this area is as follows:
 - a. BNSF will remove the rails and ties from this area.
 - b. H. Kramer will treat in-situ the TCLP soil in the upper 0.5 feet of material within this area with a soil reagent⁵. The limits of the TCLP excavation area within Area 4 is defined in Appendix B. After treatment a waste characterization sample will be collected of the treated material for expedited TCLP lead analysis. Once the analysis confirms the treated soil is below 5 mg/L, this material will be excavated and transported off Site for disposal as non-hazardous material. The area will be re-graded and a brightly colored geotextile fabric will be placed over the area. Then a 6 inch layer of gravel will be placed and the area will be covered with a 3-inch asphalt layer as an engineered barrier.
5. **Area 5 - 21st Place:** This part represents a 135 foot by 75 foot area east of Loomis which is the entrance to H Kramer and is owned by the City. This area exceeds 800 mg/kg lead and also has TCLP lead within the area. The rail spur is inactive. The removal Plan for this area is as follows:
 - a. BNSF will removed the rails and ties from this area

⁴ The paved portion of Area 1 which is a driveway between two parking lots is not included in the Area 1 remediation area.

⁵ Free Flow-200 heavy metals stabilizing reagent by Free Flow Technologies, Ltd. at a 4-percent application rate mixed in-situ with soil.

- b. H. Kramer will treat in-situ the TCLP soil within this area with a soil reagent. The limits of the TCPL excavation area within Area 5 is defined in Appendix B. After treatment a waste characterization sample of the treated material will be collected for expedited TCLP lead analysis. Once the analysis confirms the treated soil is below 5 mg/L, this material will be excavated and transported off-Site for disposal as non-hazardous material. After the TCLP excavation, surface soils and gravel from Areas 1, 5, 6, 7, 8 or 9 can be used as backfill for the excavated area. The area will be re-graded and a brightly colored geotextile fabric will be placed over the area.
 - c. The City will then place a 6-inch layer of gravel and the area will be covered with a 6-inches asphalt layer as an engineered barrier⁶.
- 6. **Area 6 - Railroad East of Loomis (South):** This part represents a 110 foot long section of railroad tracks used by BNSF and owned by H. Kramer. This part lies between the east-west alley and 21st Place (entrance to H Kramer). The rails and ties are still present. This area exceeds 800 mg/kg lead but EPA samples collected in this area were below the TCLP lead criteria within the area. The rail spur is inactive. The removal plan for this area is as follows:
 - a. BNSF will remove the rails and ties from this area.
 - b. H. Kramer will place a brightly colored geotextile fabric over the area. Then 6 inches of gravel will be placed and the area will be covered with a 3-inch asphalt layer as an engineered barrier.
- 7. **Area 7- North South Alley:** This part is 110 feet by 25 feet in area and is owned by the City. It has a gravel/fill surface and has lead above 800 mg/kg but EPA samples collected in this area were below the TCLP lead criteria within the area. The removal plan for this area is as follows:
 - a. H. Kramer will re-grade the area and then place a brightly colored geotextile fabric over the area.
 - b. The City will then place a 6-inch layer and the area will be covered with a 3-inch asphalt layer as an engineered barrier.
- 8. **Area 8 - Unpaved East-West Alley:** This part represents 325 feet of unpaved alley along the western part and is owned by the City. This area has lead levels above 800 mg/kg and has TCLP lead within the area. The short section of the rail spur at the west end of this area is inactive. The removal plan for this area is as follows;
 - a. BNSF will remove the rails and ties from this area.
 - b. H. Kramer will treat in-situ the TCLP soil within this area with a soil reagent. The limits of the TCPL excavation area within Area 8 is defined in Appendix B. After treatment a waste characterization sample of the treated material will be collected for expedited TCLP lead analysis. Once the analysis confirms the treated soil is below 5 mg/L, this material will be excavated and transported off-Site for disposal as non-hazardous material. After the TCLP excavation, surface soils and gravel from Areas 1,,5,6,7,8, or 9

⁶ The western portion of Area 5 (area west of RR tracks) is covered with brick pavers. These pavers will not be removed but instead will be incorporated into the engineered barrier. The City will place 3-inches of asphalt over the brick pavers.

will be used as backfill for the excavated area. The area will be re-graded and a brightly colored geotextile fabric will be placed over the area

- c. The City will then place 6 inches of gravel and the area will be covered with a 3-inch asphalt layer as an engineered barrier.
9. **Area 9 - Paved East West Alley:** This part represents 175 feet of paved alley along the eastern part and is owned by the City. This area has lead levels above 800 mg/kg. Remediation is needed in this area because the pavement is in poor condition. The removal plan for this area is as follows;
- a. H. Kramer will re-grade this area in conjunction with Area 8 and a brightly colored geotextile fabric will be placed over the area.
 - b. The City will then place 6 inches of gravel and the area will be covered with a 3-inch asphalt layer as an engineered barrier.
10. **Area 10 - Railroad South of Alley:** This 120 feet long railroad segment is owned by DeTrinh and 1358 Cermak LLC and was used by BNSF. This part lies between the east-west alley to the north and Cermak Road to the south. The rails and ties are still present. This area exceeds 800 mg/kg lead but EPA samples collected in this area were below the TCLP lead criteria within the area. The rail spur is inactive. The removal plan for this area (pending access) is as follows:
- a. BNSF will remove the rails and ties from this area.
 - b. H. Kramer will install a brightly colored geotextile fabric over the area. Then 6 inches of gravel will be placed and the area will be covered with a 3-inch asphalt layer as an engineered barrier.

The following sampling and monitoring activities will be performed for the removal action activities.

- Collecting soil samples from treated soils to ensure the treated soils are below to objective of 5 milligrams/per liter (mg/L) for lead
- Conduct downwind particulate monitoring during earth moving activities associated with the removal action
- Conduct construction personnel air filter sampling for lead and arsenic

During these activities personnel may come in contact with impacted soil and/or groundwater. If Site operations are altered or if additional tasks are assigned, this HASP will be revised to address the change in activities.

This HASP covers the specific site activities that will be conducted by GHD personnel and their subcontractors. The activities listed here, and in the attached JSAs cover the tasks being performed onsite.

Driving, Site Reconnaissance and Walk-through Activities Mob/Demob of Personnel, Material, and Equipment, Collection of Soil Samples, Excavation Oversight, Decontamination of Sampling Equipment and Personnel, and Site Inspection (Construction).

3. Basis for Design

Regulations set forth by OSHA in Title 29, CFR, Parts 1910 and 1926 (29 CFR 1910 and 1926) form the basis of this HASP. Emphasis is placed on Section 1926.65 (Hazardous Waste Operations and Emergency Response), 1910 Subpart I (Personal Protective Equipment), 1910 Subpart Z (Toxic and Hazardous Substances), 1926 Subpart O (Motor Vehicles and Mechanized Equipment), and 1926 Subpart F (Excavations). Some of the specifications within this section are in addition to the OSHA regulations, and reflect the positions of the United States Environmental Protection Agency (USEPA), the National Institute for Occupational Safety and Health (NIOSH), and the United States Coast Guard (USCG) regarding safe operating procedures at hazardous waste sites.

This HASP follows the guidelines established in the following:

- i. *Standard Operating Safety Guides*, USEPA (Publications 9285.1-03, June 1992)
- ii. *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities*, NIOSH, OSHA, USCG, USEPA (86-116), October 1985)
- iii. Title 29 of the CFR, Part 1926.65
- iv. Title 29 of the CFR, Parts 1910 and 1926
- v. *Pocket Guide to Chemical Hazards*, DHHS, PHS, CDC, NIOSH (1997)
- vi. *Threshold Limit Values*, ACGIH (1998-1999)
- vii. *Quick Selection Guide to Chemical Protective Clothing*, Forsberg, K. and S.Z. Mandsorf, 2nd Ed. (1993)

The health and safety of the public and project personnel and the protection of the environment will take precedence over cost and scheduling considerations for all project work.

4. Personal Protective Equipment (PPE)

4.1 General

PPE is required to safeguard project personnel from various hazards. Varying levels of protection may be required depending on the level of contaminants and the degree of physical hazard. This section presents the various levels of protection and defines the conditions of use for each level.

4.2 Levels of Protection

Protection levels are determined based upon contaminants present in the work area. The specific protection levels to be employed at the Site for each work task are presented in each JSA form, which are found in Appendix B. The sections presented below provide additional information on the specific PPE that will be worn during the project activities.

Protection levels provided by PPE selection shall be upgraded or downgraded based upon a change in site conditions or the review of the results of air monitoring or the initial exposure assessment-monitoring program.

All proposed changes to protection levels and PPE requirements will be reviewed and approved prior to their implementation by the SS.

4.2.1 Level D Protection

The minimum level of protection that will be required for all project personnel working at the Site will be Level D. The following equipment will be worn:

- i) Work clothing as prescribed by the weather
- ii) Steel-toed work boots, meeting American National Standard Institute (ANSI) Z41
- iii) Safety glasses or goggles, meeting ANSI Z87
- iv) Reflective safety vest when working near heavy equipment
- v) Hard hat, meeting ANSI Z89
- vi) Hearing protection (if noise levels exceed 85 dBA, then hearing protection with a USEPA Noise Reduction Rating (NRR) of at least 20 dBA must be used)

4.2.2 Modified Level D Protection

Modified Level D will be worn when airborne contaminants are not present at levels of concern, but project activities present an increased potential for skin contact with hazardous materials, such as during excavation, construction and operation and maintenance activities therefore Modified Level D is the minimum level of PPE to be used in an active Exclusion Zone. Modified Level D consists of:

- i) Tyvek® coveralls
- ii) Steel-toed toe work boots
- iii) Outer reusable or disposable neoprene, rubber or latex over boots
- iv) Safety glasses or chemical goggles
- v) Hard hat
- vi) Face shield in addition to safety glasses or chemical goggles when projectiles or splash hazards are a potential hazard
- vii) Reflective safety vest when working near heavy equipment
- viii) Nitrile inner and outer gloves
- ix) Hearing protection (as necessary)

4.2.3 Level C Protection

Level C protection will be required when the airborne concentration of suspected contaminants exceeds the ACGIH TLV or the OSHA permissible exposure limits (PELs) and to meet the initial requirements of the OSHA Standard for Lead (29 CFR 1926.62) and arsenic (29 CFR 1926.1118).

The following equipment will be worn for Level C protection:

- i) Full-face air purifying respirator (APR) with particulate filters (P-100) which are NIOSH/MSHA approved
- ii) Tyvek® suit, ankles, and cuffs taped to boots and gloves

- iii) Nitrile inner and outer gloves
- iv) Steel-toed toe work boots
- v) Outer reusable or disposable neoprene, rubber or latex over boots
- vi) Reflective safety vest when working near heavy equipment
- vii) Hard hat, ANSI approved
- viii) Hearing protection (as necessary).

4.2.4 Selection of PPE

Equipment for personal protection will be selected based on the potential for contact, current conditions at the Site, ambient air quality, and the judgment of the PM, SHO, SS and the RSHM. The PPE used will be chosen to be effective against the contaminants of concern present at the Site.

4.3 Respiratory Protection

Respiratory protection is an integral part of personnel health and safety at sites with potential airborne contamination.

Respiratory protection will be worn by personnel during some of the project activities. Site personnel required to work in these areas will wear an air-purifying respirator, follow the procedures and guidelines as described below, and follow OSHA regulations.

All personnel required to use this equipment shall first be instructed in how to properly fit a respirator to achieve the required face-piece-to-face seal for respiratory protective purposes. The presence of beards, sideburns, eyeglasses, and the absence of upper or lower dentures could affect this face seal. AER Site workers will not be allowed to work wearing any respirator where the face piece does not properly seal to the workers face.

The air-purifying respirator cartridges selected for use during project work at this site are P100 filters which will provide protection for particulates. These cartridges have the ability to protect against the known contaminant concentrations.

All cartridges will be changed prior to breakthrough or at a minimum daily. Changes will also be made when Site personnel begin to experience increased inhalation resistance or breakthrough of a chemical warning property.

4.3.1 Site Respiratory Protection Program

The Site respiratory protection program will consist of the following:

- i) All project personnel who may use respiratory protection will have an assigned respirator
- ii) All project personnel who may use respiratory protection will have been fit tested using a quantitative (QNT) type fit test protocol and trained in the use of a full-face piece APR within the past 12 months
- iii) All project personnel who may use respiratory protection must, within the past year, have been medically certified as being capable of wearing a respirator. The SHO will verify the medical surveillance for all project personnel who may potentially wear an APR.

- iv) Only cleaned, maintained, NIOSH approved respirators are to be used on this Site
- v) If respirators are used, the respirator cartridge is to be properly disposed of at the end of each work shift, prior to expected breakthrough or when filter load-up occurs
- vi) Contact lenses are not to be worn when a respirator is worn
- vii) All project personnel who may use respiratory protection must be clean. Mustaches and sideburns are permitted, but they must not touch the sealing surface of the respirator
- viii) Respirators will be inspected and a negative pressure test performed prior to each use
- ix) 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.

The potential presence of metals in some of the project work areas presents a health and safety hazard for project personnel. Elevated levels of metals have been identified to be present in soils at the site (Table 2.1). OSHA has a specific construction standard for lead (1926.62) and arsenic (1926.1118) that shall be implemented as required. The regulations require employers to document the level of exposure to lead and arsenic when it is present in the work place. Project personnel will be advised by the PM or SS as to the locations of lead and arsenic at the Site prior to initiation of work activities. The lead and arsenic standards require employers to treat employees as if they are being exposed to levels above the action level until such time they can demonstrate that they are not. This determination will be accomplished with the exposure assessment monitoring that will be conducted during initial stages of that project (See section 5.1). Until it is demonstrated that project personnel are not being exposed to lead and arsenic above the action level, project personnel will wear air-purifying respirators with cartridges that will provide protection against the lead and arsenic and wear disposable Tyvek® coveralls.

Action levels to determine the level of respiratory protection necessary for particulates are based on the concentration of Site contaminants measured within the breathing zone. Based upon the results of an industrial hygiene air monitoring modeling program the mixture PEL total dust levels (action levels) have been calculated using "worst case" scenario concentrations in the Site soil specifically lead with a safety factor of 4. The action levels and appropriate respiratory protection are as follows:

Sustained Particulate Reading Above Background Within Worker Breathing Zone in milligrams per cubic meter	Action taken
0 to 0.48 mg/m ³	Full-face respirator available
0.48 to 24mg/m ³	Wear full-face respirator with P100 filters, evaluate need for additional engineering controls
>24 mg/m ³	Stop work. Implement additional engineering controls

If the ambient concentrations of particulates are due to identifiable substances, the level of respiratory protection may be altered by the SHO.

4.4 Using PPE

Depending upon the level of protection selected for this project, specific donning and doffing procedures may be required. The procedures presented in this section are mandatory if Level C PPE is used.

All personnel entering the Exclusion Zone (EZ) must put on the required PPE in accordance with the requirements of this plan. When leaving the EZ, PPE will be removed in accordance with the procedures listed, to minimize the spread of contamination.

4.4.1 Donning Procedures

These procedures are mandatory only if Level C PPE is used on the project:

- i) Remove bulky outerwear. Remove street clothes and store in clean location
- ii) Put on work clothes or coveralls
- iii) Put on the required chemical protective coveralls or rain gear
- iv) Put on the required chemical protective boots or boot covers
- v) Tape the legs of the coveralls to the boots with duct tape
- vi) Put on the required chemical protective gloves
- vii) Tape the wrists of the protective coveralls to the gloves
- viii) Don the required respirator and perform appropriate fit check
- ix) Put hood or head covering overhead and respirator straps and tape hood to face piece
- x) Don remaining PPE, such as 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.

4.4.2 Doffing Procedures

The following procedures are only mandatory if Level C PPE is required for this project. Whenever a person leaves a Level C work site, the following decontamination sequence will be followed:

- i) Upon entering the Contaminant Reduction Zone (CRZ), rinse contaminated materials from the boots or remove contaminated boot covers
- ii) Clean reusable protective equipment
- iii) Remove protective garments, equipment, and respirator. All disposable clothing should be placed in a covered container which is labeled
- iv) Wash hands, face, and neck and shower as soon as possible
- v) Proceed to clean area and dress in clean clothing
- vi) Clean and disinfect respirator for next use

All disposable equipment garments, and PPE must be placed in covered containers and labeled for disposal. See Section 8.0 for detailed information on decontamination stations.

4.5 Selection Matrix

The level of personal protection selected will be based upon real time air monitoring of the work environment and an assessment by the SS and/or SHO of the potential for skin contact with contaminated materials. The PPE selection matrix is presented on each JSA form, which are presented in Appendix B. This matrix is based upon the information that is available at the time this plan was written. The exposure levels presented in Table 2.2 should be used to verify that the PPE prescribed is appropriate.

4.6 Duration of Work Tasks

The duration of activities involving the usage of PPE will be established by the SHO based upon ambient temperature and weather conditions, the capacity of personnel to work in the designated level of PPE (heat stress, see Section 6.2) and limitations of the protective equipment (i.e., ensemble permeation rates, life expectancy of the APR cartridges, etc.) As a minimum, rest breaks will be observed at the following intervals:

- i) 15 minutes midway between shift start-up and lunch
- ii) One-half to one hour for lunch
- iii) 15 minutes in the afternoon, between lunch and shift end

All rest breaks will be taken in the clean area (Support Zone [SZ]) after full decontamination and PPE removal. Additional rest breaks will be observed based upon the heat stress monitoring guidelines presented in Section 5.1.16.

4.7 Limitations of Protective Clothing

PPE ensembles have been selected to provide protection against contaminants at anticipated concentrations in the groundwater. However, no protective garment, glove, or boot is chemical-proof, nor will it afford protection against all chemical types. Permeation of a given chemical through PPE is a complex process governed by contaminant concentrations, environmental conditions, physical condition of the protection garment, and the resistance of a garment to a specific contaminant; chemical permeation may continue even after the source of contamination has been removed from the garment.

In order to obtain optimum usage from PPE, the following procedures are to be followed by all project personnel using PPE:

- i) When using disposable coveralls, don a clean, new garment after each rest break or at the beginning of each shift
- ii) Inspect all clothing, gloves, and boots both prior to and during use for:
 - a) Imperfect seams
 - b) Non-uniform coatings
 - c) Tears
 - d) Poorly functioning closures
- iii) Inspect reusable garments, boots, and gloves both prior to and during use for:
 - a) Visible signs of chemical permeation

- b) Swelling
- c) Discoloration
- d) Stiffness
- e) Brittleness
- f) Cracks
- g) Any sign of puncture
- h) Any sign of abrasion

Reusable gloves, boots, or coveralls exhibiting any of the characteristics listed above will be discarded. PPE used in areas known or suspected to exhibit elevated concentrations of contaminants will not be reused.

5. Project Hazards and Control Measures

This section identifies the general hazards associated with specific activities and presents the documented or potential health and safety hazards that exist at the Site. Every effort will be made to reduce or eliminate these hazards. Those which cannot be eliminated must be guarded against by use of engineering controls and/or PPE.

A JSA identifies potential safety, health, and environmental hazards associated with each type of field activity. A JSA shall be developed for each work activity that will be performed at the Site. Appendix B presents JSAs for the known activities that will take place at the Site. Because of the complex and changing nature of field projects, supervisors must continually inspect the work site to identify hazards that may harm project personnel, the community, or the environment. The SS or SHO must be aware of these changing conditions and discuss them with the RSHM and the PM whenever these changes impact project personnel health, safety, the environment, or performance of the project. The SS or SHO will keep all personnel informed of the changing conditions and will write or approve addenda or revisions to this HASP as necessary.

Engineering controls consisting of the application of water prior to implementing earth moving activities will be used to control dust/particulate matter from being generated during these activities.

5.1 Chemical Hazards

Preventing exposure to toxic chemicals is a primary concern. Chemical substances can enter the unprotected body by inhalation, skin absorption, ingestion, or through a puncture wound (injection). A contaminant can cause damage at the point of contact or can act systematically, causing a toxic effect at a part of the body distant from the point of initial contact.

Chemical exposures are generally divided into two categories: acute and chronic. Symptoms resulting from acute exposures usually occur during or shortly after exposure to a sufficiently high concentration of a contaminant. The concentration required to produce such effects varies widely from chemical to chemical. The term "chronic exposure" generally refers to exposures to "low" concentrations of a contaminant over a long period of time. The "low" concentrations required to produce symptoms of chronic exposure depend upon the chemical, the duration of each exposure,

and the number of exposures. For a given contaminant, the symptoms of an acute exposure may be completely different from those resulting from chronic exposure.

For either chronic or acute exposure, the toxic effect may be temporary and reversible, or may be permanent (disability or death). Some chemicals may cause obvious symptoms such as burning, coughing, nausea, tearing eyes, or rashes. Other chemicals may cause health damage without any such warning signs (this is a particular concern for chronic exposures to low concentrations). Health effects such as cancer or respiratory disease may not become manifest for several years or decades after exposure. In addition, some toxic chemicals may be colorless and/or odorless, may dull the sense of smell, or may not produce any immediate or obvious physiological sensations. Thus, a worker's senses or feelings cannot be relied upon in all cases to warn of potential toxic exposure.

The effects of exposure not only depend on the chemical, its concentration, route of entry, and duration of exposure, but may also be influenced by personal factors such as the individual's smoking habits, alcohol consumption, medication use, nutrition, age, and sex.

An important exposure route of concern at the Site is inhalation. The lungs are extremely vulnerable to chemical agents. Even substances that do not directly affect the lungs may pass through lung tissue into the bloodstream, where they are transported to other vulnerable areas of the body. Some toxic chemicals present in the atmosphere may not be detected by human senses (i.e., they may be colorless, odorless, and their toxic effects may not produce any immediate symptoms). Respiratory protection is therefore extremely important if there is a possibility that the work site atmosphere may contain such hazardous substances. Chemicals also can enter the respiratory tract through punctured eardrums. Where this is a hazard, individuals with punctured eardrums should be medically evaluated specifically to determine if such a condition would place them at an unacceptable risk and preclude their working at the task in question.

Direct contact of the skin and eyes by hazardous substances is another important route of exposure. Some chemicals directly injure the skin. Some pass through the skin into the bloodstream where they are transported to vulnerable organs. Skin absorption is enhanced by abrasions, cuts, heat, and moisture. The eye is particularly vulnerable because airborne chemicals can dissolve in its moist surface and be carried to the rest of the body through the bloodstream (capillaries are very close to the surface of the eye). Wearing protective equipment, not using contact lenses in contaminated atmospheres (since they may trap chemicals against the eye surface), keeping hands away from the face, and minimizing contact with liquid and solid chemicals can help protect against skin and eye contact.

Although ingestion should be the least significant route of exposure at the Site, it is important to be aware of how this type of exposure can occur. Deliberate ingestion of chemicals is unlikely; however, personal habits such as chewing gum or tobacco, drinking, eating, smoking cigarettes, and applying cosmetics at the Site may provide a route of entry for chemicals.

The last primary route of chemical exposure is injection, whereby chemicals are introduced into the body through puncture wounds (i.e., by stepping or tripping and falling onto contaminated sharp objects). Wearing safety shoes, avoiding physical hazards, and taking common sense precautions are important protective measures against injection.

5.1.1 Chemical Hazard Controls

Exposure to potential on-site contaminants/chemicals, such as those listed in Table 2.1 and to chemical-containing products, which may be brought to the Site shall be controlled by:

- Monitoring air concentrations with appropriate equipment in the breathing zone
- Revising JSAs to list chemical hazards and associated hazard controls on a task-specific basis
- Employing dust control measures such as wetting the immediate area
- Using PPE/respiratory protection, as appropriate, in areas known to have concentrations above the specified action level for each contaminant
- Reviewing SDSs for the chemical-containing product that is being used

5.1.2 Skin Contact and Absorption Contaminants

Skin contact with chemicals may be controlled by use of the proper PPE and good housekeeping procedures. The proper PPE (e.g., Tyvek®, gloves) as described in Section 4.0 shall be worn for all activities where contact with potentially harmful media or materials is anticipated. Utilize manufacturer data on permeation and degradation to minimize skin contact potential.

5.1.3 Hazard Communication

Personnel required to handle or use hazardous materials as part of their job duties will be trained and educated in accordance with the Hazard Communication standard as applicable. The training shall include instruction on the safe use and handling procedures of hazardous materials, how to read and access SDSs, and the proper labeling requirements.

The appropriate SDS for the chemical-containing products in use at the Site will be maintained by the SS and available for project personnel throughout the course of the project.

5.1.4 Flammable and Combustible Liquids

The storage, dispensing, and handling of flammable and combustible liquids must be in accordance with industry standards such as National Fire Protection Agency (NFPA) guidelines. The specific flammable or combustible liquids used at the site may include gasoline, diesel, kerosene, oils, and solvents.

Flammable and combustible liquids are classified according to flash point. This is the temperature at which the liquid gives off sufficient vapors to readily ignite. Flammable liquids have flash points below 100°F (37.8°C). Combustible liquids have flash points above 100°F (37.8°C) and below 200°F (93.3°C).

Storage

Many flammables can ignite at temperatures at or below room temperature. They are far more dangerous than combustibles when they are heated. As a result, these products must be handled very carefully. At normal temperatures, these liquids can release vapors that are explosive and hazardous to employee health. Exposure to heat can cause some of these liquids to break down into acids, corrosives, or toxic gases. For this reason, flammable and combustible liquids should be

stored in cool, well ventilated areas away from any source of ignition. Always consult the SDS of the product for specific information.

Flammable and combustible liquids must be stored in designated areas. Such areas must be isolated from equipment and work activity that may produce flames, sparks, heat, or any form of ignition, including smoking. The most practical method is the use of one or more approved (commercially available) flammable/combustible liquid storage cabinets.

Cabinets must be labeled "Flammable – Keep Fire Away." Doors must be kept closed and labeled accordingly. Containers must be kept in the cabinet when not in use.

General Requirements

- Keep containers of flammable/combustible liquids closed when not in use.
- Keep flammable/combustible liquids in designated areas and approved cabinets.
- Do not allow use of unapproved containers for transfer or storage. Use only approved safety cans (5-gallon maximum) with a spring closing lid and spout cover, designated to safely relieve internal pressure when exposed to heat or fire.
- Use only approved self-closing spigots, faucets, and manual pumps when drawing flammable/combustible liquids from larger containers/barrels.
- Use only approved metal waste cans with lids for disposal of shop towels/oily rags.
- Designate "Smoking" and "No Smoking" areas.
- Designate fueling areas.
- Observe all signs indicating "No Smoking," "No Flames," and "No Ignition."

Transferring Flammable/Combustible Liquids

- This seemingly routine task can be hazardous if certain precautions are not followed. Grounding and bonding must be observed at all times to prevent the accumulation of static electricity when transferring flammable/combustible liquids from one container/barrel to another.
- Drums should be grounded to a grounding rod using a #4 copper conductor.
- Bonding is necessary between conductive containers (e.g., a barrel and a 5-gallon container).

5.2 Physical Hazards

Physical hazards that may be present during project work include: potential for close proximity to heavy equipment, noise, overhead or underground utilities, vehicle traffic, material handling, heavy lifting, electrical or stored energy, excavations, use of hand and power tools, slip/trip/hit/fall injuries, hot work (e.g., welding, cutting, and open flame), heat/cold stress, biological hazards, other potential adverse weather conditions, and aggressive or menacing behavior. In addition, personnel must be aware that the protective equipment worn may limit dexterity and visibility and may increase the difficulty of performing some tasks.

5.2.1 Heavy Equipment Safety

Heavy Equipment

Personnel operating heavy equipment (such as backhoes) and personnel working in the vicinity of heavy equipment shall adhere to the following practices:

- Heavy equipment is to be inspected when equipment is initially mobilized, delivered to a job site, or after it is repaired and returned to service, to ensure that it meets all manufacturer and OSHA specifications (e.g., fire extinguishers, backup alarms, etc.).
- Heavy equipment is to be inspected on a daily basis. Documentation of this daily pre-operational inspection is to be filed with the project files.
- Heavy equipment is only to be operated by authorized, competent operators.
- Seat belts are to be provided on heavy equipment that is not designed for stand-up operation.
- Equipment/vehicles whose payload is loaded by crane, excavator, loader, etc. will have a cab shield and/or canopy to protect the operator.
- Personnel will not be raised/lowered in buckets.
- Personnel will not ride on fender steps or any place outside the cab.
- Before leaving the equipment controls, ensure that the equipment is in its safe resting position. For a backhoe, apply the parking brake, put the front loader bucket down on the ground level, and ensure that the rear excavator bucket is locked in the travel position. Bulldozers and scraper blades, loader buckets, dump bodies, and similar equipment will be fully lowered or blocked when not in use.
- Before raising any booms, buckets, etc., check for overhead obstructions.
- Employees involved in the operation shall not wear any loose-fitting clothing, as it has the potential to be caught in moving machinery.
- Personnel shall wear high visibility safety vests, steel-toed shoes, safety glasses, hearing protection, and hard hats during heavy equipment operations.
- When moving heavy equipment or when working within 10 feet of a stationary object or in tight quarters, a spotter will be used.

5.2.2 Noise

Project activities that include working in close proximity to heavy equipment, or using power tools that generate noise levels exceeding the decibel range of 85 dBA, will require the use of hearing protection with a Noise Reduction Rating (NRR) of at least 20. Hearing protection (earplugs/muffs) will be available to personnel and visitors requiring entry into these areas.

When it is difficult to hear a coworker 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 high noise levels will participate in GHD's Hearing Conservation Program.

5.2.3 Utility Clearances

Elevated superstructures (e.g., back hoes, scaffolding, ladders, cranes) shall remain a distance of 10 feet away from utility lines (<50 kV) and 20 feet away from power lines (>50 kV). Underground utilities, if present, shall be clearly marked and identified prior to commencement of work. Follow local/state/provincial regulations and client requirements with regards to utility locating requirements (e.g., One-Call).

Personnel involved in intrusive work shall:

- Confirm proposed excavation(s) and heavy truck routes are not in the area of subsurface utilities. This meeting is to be documented.
- Review and adhere to GHD's Subsurface Utility Clearance Protocol. Use prudent digging techniques inside 18 inches of the outside edge of an underground facility. This distance will vary based on state law, facility/client requirements, etc.
- Utilize the Property Access/Utility Clearance Data Sheet (QSF-019). This is to be completed prior to initiating excavation activities.
- Be able to determine the minimum distance from marked utilities, identify the work that can be conducted with the assistance of the locator line service, coordinate document/drawing review, and inspect the site for manholes, catch basins, valve boxes, etc. that may indicate the direction/depth of underground installations. Marking indicates only the approximate location of buried lines. After obtaining the facility owner's permission, hand dig test holes (or use an equivalent means) in a careful and prudent manner to determine the precise location of underground facility lines. If the location of the lines is still undeterminable after hand digging/probing/soft digging, call the facility owner for additional direction and assistance prior to initiating intrusive operations.
- If you must expose a line, state law requires GHD to protect and support the underground facility line while working at the site.

5.2.4 Vehicle Traffic and Control

The following safety measures are to be taken by GHD personnel that have the potential to be exposed to vehicle traffic:

- A high visibility safety vest meeting ANSI Class II garment requirements is to be worn at all times
- Employees will work using the "buddy system"
- Cones and other visible markers will be used to demarcate a safe work zone around the active work zone(s)
- Appropriate signage will be posted as necessary, to inform roadway/parking lot users of any additional control measures necessary to protect the public and GHD employees

5.2.5 Material Handling and Storage

Material handling and storage practices to be conducted at the project site include manual lifting of materials and possibly the use of hoisting and rigging equipment. As a rule, use mechanical means for lifting heavy loads whenever possible.

General Storage Practices

The basic safety requirement for storage areas is that the storage of materials and supplies shall not create a hazard. Additional general storage area practices include the following:

- Bags, containers, bundles, etc. stored in tiers shall be stacked, blocked, interlocked, and limited in height so that they are stable and secure against sliding or collapse.
- All stacked materials, cargo, etc. shall be examined for sharp edges, protrusions, signs of damage, or other factors likely to cause injury to persons handling these objects. Defects should be corrected as they are detected.
- Storage areas shall be kept free from accumulation of materials that constitute hazards from tripping, fire, explosion, or pest haborage.
- Storage areas shall have provisions to minimize manual lifting and carrying. Aisles and passageways shall provide for the movement of mechanical lifting and conveyance devices.
- Stored materials shall not block or obstruct access to emergency exits, fire extinguishers, alarm boxes, first aid equipment, lights, electrical control panels, or other control boxes.
- "NO SMOKING" signs shall be conspicuously posted, as needed, in areas where combustible or flammable materials are stored and handled.

Cylindrical materials such as pipes and poles shall be stored in racks or stacked on the ground and blocked.

Special Precautions for Hazardous or Incompatible Materials Storage

Generally, materials are considered hazardous if they are ignitable, corrosive, reactive, or toxic. Manufacturers and suppliers of these materials must provide the recipient with SDSs, which describe their hazardous characteristics and give instructions for their safe handling and storage.

Many hazardous materials are incompatible, which means they form mixtures that may have hazardous characteristics not described on the individual SDSs. The following special precautions shall be followed regarding the storage of hazardous materials:

- Based on the information available on the SDSs, incompatible materials shall be kept in separate storage areas
- Warning signs shall be conspicuously posted, as needed, in areas where hazardous materials are stored

5.2.6 Manual Lifting

Proper lifting takes the hazard out of moving heavy objects. Below are some items that should be considered prior to a lift.

- Establish that you can lift the load safely; if the load is in excess of 50 pounds, you are required to ask for assistance
- Use a mechanical lifting device if available
- Inspect route to be traveled, confirming sufficient clearance
- Look for any obstructions or spills

- Inspect the object to determine how it should be grasped
- Look for any sharp edges, slivers, or other things that may cause personal injury
- Do not move any object that will obstruct your field of vision when transporting the load

When lifting objects, use the following proper lifting techniques:

- Feet must be parted, with one foot alongside the object being lifted and one foot behind. When the feet are comfortably spread, a more stable lift can occur and the rear foot is in a better position for the upward thrust of the lift.
- Use the squat position and keep the back straight - but remember that straight does not mean vertical. A straight back keeps the spine, back muscles, and organs of the body in correct alignment, and minimizes the compression of the guts that can cause a hernia.
- Grip is one of the most important elements of correct lifting. The fingers and the hand are extended around the object, using the full palm. Fingers have very little power, so use the strength of your entire hand.
- The load must be drawn close, and the arms and elbows must be tucked into the side of the body. Holding the arms away from the body increases the strain on the arms and elbows. Keeping the arms tucked in helps keep the body weight centered.

The body must be positioned so that the weight of the body is centered over the feet. This provides a more powerful line of thrust and also ensures better balance. Start the lift with a thrust of the rear foot. Do not twist your back while lifting and moving heavy objects.

5.2.7 Hand and Power Tools

Hand Tools

- Hand tools must meet the manufacturer's safety standards
- Hand tools must not be altered in any way
- At a minimum, eye protection must be used when working with hand tools
- Wrenches (including adjustable, pipe, end, and socket wrenches) must not be used when jaws are sprung to the point that slippage occurs
- Impact tools (such as drift pins, wedges, and chisels) must be kept free of mushroom heads
- Wooden handles must be free of splinters or cracks and secured tightly to the tool
- Any damaged or defective tools must be immediately removed from service and tagged for destruction

Power Tools

- All power tools must be inspected regularly and used in accordance with the manufacturer's instructions and the tool's capabilities
- Electric tools must not be used in areas subject to fire or explosion hazards, unless they are approved for that purpose
- Portable electric tools must be connected to a Ground Fault Circuit Interrupter (GFCI) when working in wet areas

- Proper eye protection must be used when working with power tools
- Personnel must be trained in the proper use of each specific tool
- Any damaged or defective power tools must be immediately tagged and removed from service

5.2.8 Electrical Hazards

Only qualified individuals will be allowed to perform work on electrical circuits or perform electrical work on equipment. No employee shall be permitted to work on any part of an electrical power circuit unless the person is protected against electric shock by de-energizing the circuit and grounding it, or ensuring that it has been locked and tagged out:

- All electrical wiring and equipment shall be a type listed by Underwriters Laboratories (UL) or Factory Mutual (FM) for the specific application.
- All installations shall comply with the National Electric Code (NEC) and the National Electric Safety Code (NESC).
- All electrical circuits shall be grounded according to NEC and NESC Code. GFCIs shall be used in the absence of properly grounded circuitry or when portable tools must be used around wet areas.
- Generators and like equipment will be grounded in accordance with NEC, unless exempted by NEC 250-6.
- All live wiring or equipment shall be guarded to protect all persons or objects from harm.

5.2.9 Excavations

A designated competent person will observe all GHD excavation and trenching operations that employees shall enter. The competent person shall be responsible for evaluating and inspecting excavation and trenching operations to prevent possible cave-in and entrapment, and to avoid other hazards presented by excavation activities.

Each employee in an excavation shall be protected from cave-ins by one of three systems:

- Sloping and benching systems
- Shoring
- Shielding systems

All excavation and trenching operations shall be conducted in accordance and in compliance with OSHA's Standards for the Construction Industry, specifically outlined in GHD's Safety and Health Program for excavation and trenching activities [If Excavation activities are being performed by GHD personnel, attach the GHD Excavation Program. This program is found on My Portal/Safety and Health/Safety and Health Documents/Safety and Health Policy Manuals/US/Written Safety Programs/Excavation Program]. At a minimum, the following safety guidelines shall be adhered to while conducting excavation and trenching activities:

- Excavation and trenching operations require pre-planning to determine whether sloping or shoring systems are required, and to develop appropriate designs for such systems. Also, the

estimated location of all underground installations must be determined before digging/drilling begins. Necessary clearances must be observed.

- If there are any nearby buildings, walls, sidewalks, trees, or roads that may be threatened or undermined by the excavation, or where the stability of any of these items may be endangered by the excavation, they must be removed or supported by adequate shoring, bracing, or underpinning.
- Excavations may not go below the base of footings, foundations, or retaining walls unless they are adequately supported or a person who is registered as a Professional Engineer (PE) has determined that they will not be affected by the soil removal. Civil engineers or those with licenses in a related discipline and experience should be consulted in the design and use of sloping and shoring systems. PE qualifications must be documented in writing.

Access and Egress

Personnel access and egress from trench and/or excavations are as follows:

- A stairway, ladder, ramp, or other means of egress must be provided in trenches greater than 4 feet deep and for every 25 feet of lateral travel
- All ladders shall extend 3 feet above the top of the excavation
- Structural ramps used for access or egress of equipment will be designed by a competent person qualified in structural design or by a licensed professional engineer

Atmosphere Monitoring and Testing

Air quality is measured using three parameters: oxygen concentration, flammability, and the presence of hazardous substances.

Employees should not be exposed to atmospheres containing less than 19.5 percent oxygen or having a lower flammable limit greater than 10 percent, and employees should not be exposed to hazardous levels of atmospheric contaminants.

Whenever potentially hazardous atmospheres are suspected in excavations and trenches, a competent person shall test the atmosphere. Detector tubes, gas monitors, and explosion meters are examples of monitoring equipment that may be used.

In the event that an unusual odor or liquid is suspected in excavations and trenches, the competent person shall stop work on the site and arrange for air quality assessment and mitigation, if necessary.

Atmospheric testing and monitoring shall be performed in excavations in or adjacent to landfill areas, in areas where hazardous materials are/were stored, or in areas where the presence of hazardous materials is suspected.

Daily Inspections

The competent person shall perform daily inspections of excavations, the adjacent areas, and all protective systems for situations that could potentially result in slope failure.

Additionally, the competent person shall be aware of the potential for confined space situations and other hazardous work conditions.

The competent person shall inspect, evaluate, and complete the excavation checklist at the following intervals:

- Prior to the start of work, after each extended halt in work, and as needed throughout the shift, as new sections of the excavation or trench are opened
- After every rainstorm and other natural or manmade event that may increase the load on the walls of the excavation, or otherwise affect their stability

The inspections shall be documented using the GHD Excavation Inspection Checklist Form, which is presented in Appendix A.

The competent person shall stop the work and instruct all employees to leave the excavation or trench when any potential hazards are detected. The competent person has the authority to immediately suspend work if any unsafe condition is detected.

5.2.10 Slip/Trip/Hit/Fall

Slip/trip/hit/fall injuries are the most frequent of all injuries to workers. They occur for a wide variety of reasons, but can be minimized by the following prudent practices:

- Spot check the work area to identify hazards
- Establish and utilize a pathway free of slip and trip hazards
- Beware of trip hazards such as wet floors, slippery floors, and uneven surfaces or terrain
- Carry only loads you can see over
- Keep work areas clean and free of clutter, especially in storage rooms and walkways
- Communicate hazards to on-site personnel
- Secure all loose clothing and ties, and remove jewelry while around machinery.
- Report and/or remove hazards
- Keep a safe buffer zone between workers using equipment and tools

5.2.11 Heat Stress

Recognition and Symptoms

Temperature stress is one of the most common illnesses faced by project personnel when working in elevated temperatures and/or humidity. Acclimatization and frequent rest periods must be established for conducting activities where temperature stress may occur. Below are listed signs and symptoms of heat stress. Personnel should follow appropriate guidelines if any personnel exhibit these symptoms:

- Heat Rash: Redness of skin. Frequent rest and change of clothing.
- Heat cramps: Painful muscle spasms in hands, feet, and/or abdomen. Administer lightly salted water by mouth, unless there are medical restrictions.
- Heat Exhaustion: Clammy, moist, pale skin, along with dizziness, nausea, rapid pulse, fainting. Remove to cooler area and administer fluids.

- Heat Stroke: Hot dry skin; red, spotted, or bluish; high body temperature of 104°F; mental confusion; loss of consciousness; convulsions or coma. Immediately cool victim by immersion in cool water. Wrap with wet sheet and sponge with cool liquid while fanning, treat for shock. **DO NOT DELAY TREATMENT. COOL BODY WHILE WAITING AMBULANCE.**

Work Practices

The following procedures will be carried out to reduce heat stress:

- Heat stress monitoring
- Acclimatization
- Work/rest regimes (schedule of breaks) - mandatory breaks scheduled in summer months or during high risk activities for heat stress
- Heat stress safety personal protective equipment (cool-vests, bandanas, etc.)
- Liquids that replace electrolytes, water, and salty foods available during rest
- Use of buddy system

Acclimatization

The level of heat stress at which excessive heat strain will result depends on the heat tolerance capabilities of the worker. Each worker has an upper limit for heat stress, beyond which the resulting heat strain can cause the worker to become a heat casualty. In most workers, appropriate repeated exposure to elevated heat stress causes a series of physiologic adaptations called acclimatization, whereby the body becomes more efficient in coping with the heat stress. Work/rest regimes should be planned as a component of project preparation and discussed during the daily tailgate safety meetings.

Worker Information and Training

All new and current employees who work in areas where there is a reasonable likelihood of heat injury or illness should be kept informed through continuing education programs (e.g., hazards, effects, preventative measures, drug/alcohol interaction).

5.2.12 Sun Exposure

Overexposure to sunlight is a common concern when field activities occur during warm weather conditions. Overexposure can occur on clear, sunny days as well as on overcast and cloudy days. Ultraviolet (UV) rays from the sun can cause skin damage or sunburn, but can also result in vision problems, allergic reactions, and other skin concerns. Two types of UV rays are emitted from the sun: UVA and UVB rays.

UVB rays cause sunburn, skin cancer, and premature aging of the skin. UVB rays stimulate tanning but are also linked to other problems such as impaired vision, skin rashes, and some allergic and other reactions to certain drugs. Extra care should be taken if activities are to be conducted on or near water. Sunlight reflected off the surface of the water is intensified resulting in accelerated effects. The following steps should be taken to protect against overexposure to sunlight:

- **Always Use Sunscreen:** Apply a broad-spectrum sunscreen with Sun Protection Factor (SPF) of at least 15 or higher liberally on exposed skin. Reapply every 2 hours or more. Even waterproof sunscreen can come off when you towel off or sweat.
- **Cover Up:** Wearing tightly woven, loose-fitting, and full-length clothing is a good way to protect your skin from UV rays.
- **Wear a Hat:** A hat with a wide brim offers good sun protection to your eyes, ears, face, and the back of your neck – areas particularly prone to overexposure to the sun.
- **Wear Sunglasses That Block 99 to 100 Percent of UV Radiation:** Sunglasses that provide 99 to 100 percent UVA and UVB protection will greatly reduce sun exposure that can lead to cataracts and other eye damage. Check the label when buying sunglasses.
- **Seek Shade:** Shade is a good source of protection, but keep in mind that shade structures (e.g., trees, umbrellas, canopies) do not offer complete sun protection.
- **Limit Time in the Midday Sun:** The sun's rays are strongest between 10 a.m. and 4 p.m. Whenever possible, limit exposure to the sun during these hours.

5.2.13 Cold Stress

Cold stress is similar to heat stress, in that it is caused by a number of interacting factors including environmental conditions, clothing, and workload, as well as the physical and conditioning characteristics of the individual. Fatal exposures to cold have been reported in employees failing to escape from low environmental air temperatures or from immersion in low temperature water. Hypothermia, a condition in which the body's deep core temperature falls significantly below 98.6°F (37°C), can be life threatening. A drop in core temperature to 95°F (35°C) or lower must be prevented.

Air temperature is not sufficient to determine the cold hazard of the work environment. The wind chill must be considered as it contributes to the effective temperature and insulating capabilities of clothing. The equivalent chill temperature should be used when estimating the combined cooling effect of wind and low air temperatures on exposed skin or when determining clothing insulation requirements to maintain the body's core temperature.

The body's physiologic defense against cold includes constriction of the blood vessels, inhibition of the sweat glands to prevent loss of heat via evaporation, glucose production, and involuntary shivering to produce heat by rapid muscle contraction.

The frequency of incidents increases with cold temperature exposures as the body's nerve impulses slow down, individuals react sluggishly, and numb extremities make for increased clumsiness. Additional safety hazards include ice, snow blindness, reflections from snow, and possible skin burns from contact with cold metal.

Pain in the extremities may be the first early warning of danger to cold stress. During exposure to cold, maximum severe shivering develops when the body temperature has fallen to 95°F (35°C). This must be taken as a sign of danger to the employees on site, and cold exposures should be immediately terminated for any employee when severe shivering becomes evident. Useful physical or mental work is limited when severe shivering occurs.

Predisposing Factors for Cold Stress

Certain predisposing factors make an individual more susceptible to cold stress. The project team members are responsible for informing the SHO/SS to monitor an individual, if necessary, or use other means of preventing/reducing the individual's likelihood of experiencing a cold related illness or disorder.

Predisposing factors that will increase an individual's susceptibility to cold stress are listed below:

- **Dehydration:** The use of diuretics and/or alcohol, or diarrhea can cause dehydration. Dehydration reduces blood circulation to the extremities.
- **Fatigue During Physical Activity:** Exhaustion reduces the body's ability to constrict blood vessels. This results in the blood circulation occurring closer to the surface of the skin and the rapid loss of body heat.
- **Age:** Some older and very young individuals may have an impaired ability to sense cold.
- **Poor Circulation:** Vasoconstriction of peripheral vessels reduces blood flow to the skin surface.
- **Heavy Work Load:** Heavy workloads generate metabolic heat and make an individual perspire even in extremely cold environments. If perspiration is absorbed by the individual's clothing and is in contact with the skin, cooling of the body will occur.
- **Use of PPE:** PPE usage that traps sweat inside the PPE may increase an individual's susceptibility to cold stress.
- **Lack of Acclimatization:** Acclimatization, the gradual introduction of workers into a cold environment, allows the body to physiologically adjust to cold working conditions.
- **History of Cold Injury:** Previous injury from cold exposures may result in increased cold sensitivity.

Prevention of Cold Stress

A variety of measures can be implemented to prevent or reduce the likelihood of employees developing cold related ailments and disorders. These include acclimatization, fluid and electrolyte replenishment, eating a well-balanced diet, wearing warm clothing, the provision of shelter from the cold, thermal insulation of metal surfaces, adjusting work schedules, and employee education.

- **Acclimatization:** Acclimatization is the gradual introduction of workers into the cold environment to allow their bodies to physiologically adjust to cold working conditions. However, the physiological changes are usually minor and require repeated uncomfortably cold exposures to induce them.
- **Fluid and Electrolyte Replenishment:** Cold, dry air can cause employees to lose significant amounts of water through the skin and lungs. Dehydration affects the flow of blood to the extremities and increases the risk of cold injury. Warm, sweet, caffeine-free, non-alcoholic drinks and soup are good sources to replenish body fluids.
- **Eating a Well-Balanced Diet:** Restricted diets including low salt diets can deprive the body of elements needed to withstand cold stress. Eat high-energy foods throughout the day.

- **Warm Clothing:** Maintaining air space between the body and outer layers of clothing is beneficial in order to retain body heat. However, the insulating effect provided by such air spaces is lost when the skin or clothing is wet.
- **Work/Rest Regimes:** Schedule work during the warmest part of the day, if possible. Rotate personnel and adjust the work/rest schedule to enable employees to recover from the effects of cold stress.

The parts of the body most important to keep warm are the feet, hands, head, and face. As much as 40 percent of body heat can be lost when the head is exposed.

5.2.14 Adverse Weather Conditions

The SS shall decide on the continuation or discontinuation of work based on current and pending weather conditions. Electrical storms, heavy rains, hurricanes, tornado warnings, and sustained strong winds (approximately 40 mph) are examples of conditions that would call for the discontinuation of work and evacuation of site.

In addition, no work with elevated super structures (i.e., excavation and/or Crane operations) will be permitted during any type of electrical storm or during wind events that have wind speeds exceeding 40 mph.

5.3 Biological Hazards

Project personnel will be conducting numerous activities that have the possibility of encountering biological hazards, which could include exposure to bloodborne pathogens, insects, spiders, dogs, rodents, and snakes. This section identifies precautions to be taken if these hazards are encountered.

5.3.1 Vegetation Overgrowth

Overgrown weeds, bushes, trees, grass and other vegetation are fire and safety hazards. There are a number of hidden hazards not immediately recognized due to the overgrowth of vegetation in areas where field activities may occur, including discarded junk, litter, and debris. Construction materials such as boards, nails, concrete, and other debris may be hidden beneath blades of tall grass, weeds, and bushes. Other hazards may include steep slopes, potholes, trenches, soft spots, dips, etc., all dangerously concealed from the view of the individual walking or operating motorized equipment in the area. Additionally, there are biological hazards such as snakes, ticks, chiggers, and mosquitoes that breed in overgrowth conditions.

Here are some simple actions you can take:

- i) Assess the work area and determine if the area requires vegetation clearance. Consider that overgrowth that extends above the lowest level of motorized equipment (i.e., bumper or fender) or 6 inches above your ankle has hidden hazards that you will not be able to readily identify.
- ii) Determine if the area is safe to walk or whether you need motorized equipment. Consider the limitations of the equipment.
- iii) Identify slip, trip, and fall hazards and remove from the general work area. Remember to give adequate clearance so that the items being removed do not pose future hazards.

- iv) Adequately protect yourself against the hazards by wearing boots that protect the ankles, long pants, and using insecticides.
- v) Consider the limitations of manual or mechanical equipment for the clearance of overgrowth, particularly the safety hazards when using sling blades, machetes, weed eaters, bush hogs, or other brush removing equipment.

Before taking any action, determine whether there are any ecological issues that would affect or prevent the removal of overgrowth in protected areas such as wetlands, wildlife habitats, or sanctuaries for endangered and/or protected species.

5.3.2 Poisonous Plants

Common Poison Ivy grows as a small plant, a vine, and a shrub. Poison Ivy occurs in every state. The leaves always consist of three glossy leaflets. Poison Sumac grows as a woody shrub or small tree 5 to 25 feet tall. It usually contains nine leaves, with eight paired leaves and one on top, and is common in swampy areas. The plants are potent sensitizers and can cause mild to severe allergic reaction, referred to as "contact dermatitis". *These plants are found in the U.S. and Canada.*

Dermatitis, in Rhus-sensitive persons, may result from contact with the milky sap found in the roots, stems, leaves, and fruit, and may be carried by contacted animals, equipment, or apparel.

The best form of prevention is to avoid contact. Wearing long sleeves and gloves, and disposable clothing, such as Tyvek®, is recommended in high-risk areas to avoid exposure from contaminated apparel. Barrier creams and cleaners are also recommended.

5.3.3 Insects

Ticks

Ticks are blood feeding external parasites of mammals, birds, and reptiles throughout the world. Some human diseases of current interest in the United States caused by tick-borne pathogens include Lyme disease, ehrlichiosis, babesiosis, Rocky Mountain spotted fever, tularemia, and tick-borne relapsing fever. Lyme disease is caused by a bacterial parasite called spirochete and is spread by infected ticks that live in and near wooded areas, tall grass, and brush. The ticks that cause the disease in the Northeast and Midwest are often no bigger than a poppy seed or a comma in a newsprint. The peak months for human infection are June through October. There are many other tick borne diseases such as Rocky Mountain spotted fever, which can be carried by a variety of ticks. The prevention and treatment of these diseases are similar to those of Lyme disease.

Prevention

Preventative measures include wearing light-colored clothing, keeping clothing buttoned, tucking pant legs in socks, and keeping shirttails tucked in. Periodic checks for ticks should be made during the day, and especially at night. Hair should also be checked by parting it and combing through it to make sure that no ticks have attached to the scalp. Also, check clothing when it is first removed, before ticks have a chance to crawl off.

The most common repellents recommended for ticks are N,N-dimethyl-m-toluamide, or DEET. It is important to follow the manufacturer's instructions found on the container for use with all insecticides especially those containing DEET.

In general, DEET insect repellent should only be applied to clothing, not directly on the skin. Do not apply to sunburns, cuts, or abrasions. Use soap and water to remove DEET once indoors.

Removal

The best way to remove a tick is removal by tweezers. If tweezers are not available, cover your fingers (tissue paper) while grasping the tick. It is important to grasp the tick as close as possible to the site of attachment and use a firm steady pull to remove it. When removing the tick, be certain to remove all the mouthparts from your skin so as not to cause irritation or infection. Wash hands immediately after with soap and water, and apply antiseptic to the area where tick was removed. Get medical attention if necessary.

Symptoms of Lyme Disease

The first symptoms of Lyme disease usually appear from 2 days to a few weeks after an infected tick bites a person. Symptoms usually consist of a ring-like red rash on the skin where the tick attached, and is often bulls eye like with red on the outside and clear in the center. The rash may be warm, itchy, tender, and/or "doughy" and appears in only 60 to 80 percent of infected persons. An infected person also has flu-like symptoms of fever, fatigue, chills, headaches, a stiff neck, and muscle aches and pains (especially knees). Rashes may be found some distance away from original rash. Symptoms often disappear after a few weeks.

Bees, Wasps, and Yellow Jackets

Insects that sting are members of the order Hymenoptera of the class Insecta. There are two major subgroups: aphids (honeybees, bumblebees) and vespids (wasps, yellow jackets, hornets). Aphids are docile and usually do not sting unless provoked. The stinger of the honeybee has multiple barbs, which usually detaches after a sting. Vespids have few barbs and can inflict multiple stings.

Types of stinging insects that might be encountered on this project site may include:

- Carpenter Bees
- Bumblebees
- Mud Dauber Wasps
- Yellow Jackets
- Cicada Killer Wasps
- Giant Hornets
- Honeybees
- Paper Wasps

Symptoms

If you are stung there are three types of reactions you can have, a normal, a toxic, or an allergic reaction.

- Normal reaction - only lasts a few hours and consists of pain, redness, swelling, itching, and warmth near the sting area.
- Toxic reaction - will last for several days and results from multiple stings and may cause cramps, headaches, fever, and drowsiness.
- Allergic reaction - might cause hives, itching, swelling, tightness in the chest area and a possibility of breathing difficulties, dizziness, unconsciousness, and cardiac arrest.

The stingers of many *Hymenoptera* may remain in the skin and should be removed as quickly as possible without concern for the method of removal. An ice cube placed over the sting will reduce pain; aspirin may also be useful. Persons with known hypersensitivity to such stings should carry a kit containing epinephrine in a prefilled syringe. Antihistamines may help decrease hives and

angioedema. Persons who have severe symptoms of anaphylaxis, have positive venom skin test results, and are at risk for subsequent stings should receive immunotherapy regardless of age or time since anaphylaxis.

Precautions

The following precautions can help you avoid stings. Try to wear light colored clothing and shy away from dark or floral prints. Avoid wearing perfumes, hairsprays, colognes, and scented deodorants while working outside. If eating outside, keep all food and drinks covered; sweet foods and strong scents attract stinging insects as well. Never swat or swing at the insect, it is best to wait for it to leave, softly blow it away, or gently brush it aside. Seek medical attention when the reaction to a sting includes swelling, itching, dizziness, or shortness of breath.

If physical control measures are not effective, use a pesticide that will have a minimal impact on both you and the environment.

Mosquitoes

Mosquitoes are common pests that can be found in any state and any work environment where warm, humid conditions exist. Mosquitoes can pass along diseases such as West Nile virus and Malaria. Several different methods can be used to control adult mosquito populations: repellants such as DEET, mosquito traps, foggers, and vegetation and water management. ***Mosquitoes are found from the tropics to the Arctic Circle and from lowlands to the peaks of high mountains.***

Chiggers (*trombiculidae*)

Trombiculidae is a family of mites called **trombiculid mites** (also called *berry bugs*, *harvest mites*, *red bugs*, *scrub-itch mites*, and, in their larval stage, *chiggers*). Trombiculidae live in the forests and grasslands and are also found in low, damp areas where vegetation is rank such as woodlands, berry bushes, orchards, along lakes and streams, and even in drier places where vegetation is low such as lawns, golf courses, and parks. They are most numerous in early summer when grass, weeds, and other vegetation are heaviest. These relatives of ticks are nearly microscopic measuring 0.4 mm (1/100 of an inch) and have a chrome-orange hue.

In their larval stage they attach to various animals, including humans, and feed on skin, often causing itching. The severe itching is accompanied by red pimple-like bumps (papules) or hives and skin rash or lesions on a sun-exposed area. For humans, itching usually occurs after the larvae detach from the skin.

In the United States, they are found mostly in the southeast, the south, and the Midwest. They are not present, or barely found, in far northern areas, in high mountains, and in deserts.

Prevention

Chiggers are commonly found on the tip of blades of grasses to catch a host, so keeping grass short and removing brush and wood debris where potential mite hosts may live can limit their impact on an area. Sunlight that penetrates the grass will make the lawn drier and make it less favorable for chigger survival.

Chigger bites can be minimized by the use of tightly woven protective clothing, including long pants, which make it hard for them to reach warm, covered areas of the body. Application of insect repellent containing DEET to the shoes, lower trousers, and skin is also useful. Because they are found in grass, staying on trails, roads, or paths can prevent contact.

Treatment

To reduce the itching, an application of anti-itch cream containing hydrocortisone or benzyl benzoate is often used. Hydrogen peroxide and capsaicin cream has also been effective, as has common household vinegar (5 percent acetic acid). Another good way to relieve itching is to apply heat - either by using a hand held shower with water hot as one can stand, or by heating the bite with a hair dryer. The heat method will relieve itching for about 4 hours and will require repeating. An Epsom salt bath may also help alleviate itching.

Removal

The most effective way of removing chiggers is by washing the affected areas with warm water and soap. This must be done as soon as possible after exposure or possible exposure. Carefully wash the ankles, feet, behind the knees, and under the arms and chest. Wading for a few minutes in salt water will both get rid of the mites on one's skin and clothing and also alleviate the itching from their bites. Clothing, especially pants and socks, should be immediately discarded after returning from areas where exposure may have occurred. However, once symptoms appear, it may be too late to prevent further bites. Taking a hot bath when already covered with chigger bites may be uncomfortable and increase itching symptoms. Do not rub and scratch the skin aggressively, as this can break the skin and leave it vulnerable to a more serious infection.

5.3.4 Threatening Dogs

If you are approached by a frightened or menacing dog:

- i) Do not attempt to run and don't turn your back
- ii) Stay quiet, and remember to breathe
- iii) Be still, with arms at sides or folded over chest with hands in fists
- iv) Slowly walk away sideways
- v) Don't stare a dog in the eyes, as this will be interpreted as a threat
- vi) Avoid eye contact
- vii) If you have a jacket, you could wrap it around your arm and should he snap, take the bite harmlessly
- viii) Try calling its bluff. Yell, "sit!" "Stay!" or "go home!" You might convince the dog that you are the stronger in the situation.

5.3.5 Rodents

Rodentia: (rats, mice, beavers, squirrels, guinea pigs, capybaras, coypu)

Rodents, or Rodentia, are the most abundant order of mammals. There are hundreds of species of rats; the most common being the black and brown rat.

The **Brown Rat** has small ears, blunt nose, and short hair. It is approximately 14 to 18 inches long (with tail). They frequently infest garbage/rubbish, slaughterhouses, domestic dwellings, warehouses, shops, and supermarkets, in fact anywhere there is an easy meal and potential nesting sites.

The **Black Rat** can be identified by its tail, which is always longer than the combined length of the head and body. It is also slimmer and more agile than the Norwegian or Brown rat. Its size varies according to its environment and food supply.

The **House Mouse** has the amazing ability to adapt and it now occurs more or less in human dwellings. In buildings, mice will live anywhere and they are very difficult to keep out. Mice are also totally omnivorous; in other words, they will eat anything.

Rats and mice often become a serious problem in cold winter months when they seek food and warmth inside buildings. They may suddenly appear in large numbers when excavation work disturbs their in-ground nesting locations or their food source is changed.

There are six major problems caused by rats and mice:

- i) They eat food and contaminate it with urine and excrement
- ii) They gnaw into materials such as paper, books, wood, or upholstery, which they use as nest material. They also gnaw plastic, cinder blocks, soft metals such as lead and aluminum, and wiring, which may cause a fire hazard
- iii) Rats occasionally bite people and may kill small animals
 - a. they, or the parasites they carry (such as fleas, mites, and worms), spread many diseases such as salmonella, trichinosis, rat bite fever, hantavirus, Weil's disease, and the bubonic plague;
 - b. rats can damage ornamental plants by burrowing among the roots or feeding on new growth or twigs. They also eat some garden vegetables, such as corn and squash
- iv) Rats and mice are socially unacceptable. These rodents have been a problem for centuries, chiefly because they have an incredible ability to survive and are so difficult to eliminate. In addition, they are extremely compatible with human behavior and needs.

5.3.6 Snakes

Snakes may be found in any region of the country. While many snakes encountered are not venomous, a few are; so it is best that you give a wide berth to all snakes. Of the 7,000 venomous snakebites reported each year, only about 15 prove to be fatal, so your chances of survival are extremely high. The usual snake encounter is one in which they see you before you see them, and they slither away from you quickly, startling you. If you see a snake, back away from it slowly and do not touch it. If you or someone you know are bitten try to see and remember the color and shape of the snake, which can help with treatment of the snakebite.

Venomous snakes include the Coral Snake, Cobra, and Pit Vipers, such as the Cottonmouth (Water Moccasin), Copperhead, and Rattlesnake. The venom of pit vipers is primarily *hematoxic* because it acts upon the victim's blood system. This venom breaks down blood cells and blood vessels and affects heart action. Bite victims experience severe burning pain, localized swelling and

discoloration for the first 3 to 30 minutes, followed by nausea, vomiting, and occasional diarrhea and usually shock.

Preventing Snakebites

Watching where you step, put your hands, or sit down is one of the best ways to prevent snakebites. Poisonous snakes live on or near the ground and often like rocks, woodpiles, and other spots that offer both a place to sun and a place to hide. Most bites occur in and around the ankle. About 99 percent of all bites occur below the knee, except when someone accidentally picks up or falls on the snake.

Watching where you step and wearing boots in tall grass can prevent most snakebites. Another means to protect against snakebites is snake chaps.

Emergency First Aid for Poisonous Snakebite

Although it is important to obtain medical aid immediately, emergency first aid can slow the spread of poison from the bite. Remain calm and avoid unnecessary movement, especially if someone is with you. The rate of venom distribution throughout your body will be slower if you are still and quiet. *Do not* use home remedies, and *do not* drink alcoholic beverages.

In addition, learn the following procedures so you do not waste time before getting medical attention.

If less than 60 minutes is required to reach a hospital or other medical aid, follow this procedure:

- i) Apply a constricting band 2 to 4 inches on each side of the bite. The band should be loose enough to slip your finger under without difficulty, so that you do not cut off circulation completely. Properly applied, the constricting band can be left safely in place for 1 hour without adjustment.
- ii) If ice is available, place some in a towel, shirt, or other piece of cloth and apply it to the bite area. Do not bind it to the bite, but keep it loosely in place. Do not use the ice pack for more than *1 hour*. The objective is to cool the venom and slow its action, but not to freeze the tissue.
- iii) The primary function of the constricting band and ice pack is to slow the spread of venom through your body. Remove them slowly so there will not be a sudden rush of venom through your blood stream.

Bloodborne Pathogens

Hepatitis and other communicable diseases are largely transmitted through exposure to bodily fluids containing the hepatitis virus, which could be found on refuse encountered in subsurface investigations. This includes activities occurring at landfills, sewage treatment facilities, sewers, topical spreading of treated waste and medical wastes (e.g., contaminated needles and syringes). Individuals performing tasks for these types of project should consult with their physicians and be properly vaccinated. The primary method of transmission depends on the prevalence of the disease in a given area.

Hepatitis A is a liver disease caused by the hepatitis A virus. Hepatitis A can affect anyone and can occur in situations ranging from isolated cases of disease to widespread epidemics.

Hepatitis B is a serious disease caused by a virus that attacks the liver. The virus, which is called hepatitis B virus (HBV), can cause lifelong infection, cirrhosis (scarring) of the liver, liver cancer, liver failure, and death.

Hepatitis C is a liver disease caused by the hepatitis C virus (HCV), which is found in the blood of persons who have the disease. HCV is spread by contact with the blood of an infected person.

Hepatitis D is a liver disease caused by the hepatitis D virus (HDV), a defective virus that needs the hepatitis B virus to exist. HDV is found in the blood of persons infected with the virus.

Hepatitis E is a liver disease caused by the hepatitis E virus (HEV) and is transmitted in much the same way as hepatitis A virus. Hepatitis E, however, does not often occur in North America.

Prevention

Preventative measures include wearing appropriate PPE: leather work gloves, a long sleeved shirt, and safety footwear. Several vaccines have been developed for the prevention of hepatitis B and C virus infection. Vaccines rely on the use of one of the viral proteins (hepatitis B surface antigen or HBsAg). The vaccine was originally prepared from plasma obtained from patients who had long-standing hepatitis B virus infection. However, currently these are more often made using recombinant technology, though plasma-derived vaccines continue to be used; the two types of vaccines are equally effective and safe.

6. General Safety Practices

6.1 General Safety Issues

- i) At least one copy of this HASP must be at the project Site, in a location readily available to all personnel, and reviewed by all project personnel prior to starting work.
- ii) All project personnel must use the buddy system (working in pairs or teams).
- iii) Food, beverages, or tobacco products must not be present or consumed in the EZ and CRZ. Cosmetics must not be applied within these zones.
- iv) Emergency equipment such as eyewash, fire extinguishers, etc., must be removed from storage areas and staged in readily accessible locations.
- v) Contaminated waste, debris, and clothing must be properly contained and legible and understandable precautionary labels must be affixed to the containers.
- vi) Removing contaminated soil from protective clothing or equipment with compressed air, shaking, or any other means that disperses contaminants into the air is prohibited.
- vii) Containers must be moved only with the proper equipment, and must be secured to prevent dropping or loss of control during transport.
- viii) Visitors to the Site must abide by the following. All visitors must be instructed to stay outside the EZ and CRZ and remain within the SZ during the extent of their stay. Visitors must be cautioned to avoid skin contact with surfaces which are contaminated or suspected to be contaminated.

6.2 Buddy System

All project personnel must use the buddy system. Visual contact must be maintained between crew members at all times, and crew members must observe each other for signs of chemical exposure, heat, or cold stress. Indications of adverse effects include, but are not limited to:

- i) Changes in complexion and skin coloration
- ii) Changes in coordination
- iii) Excessive salivation and pupillary response
- iv) Changes in speech pattern.

Project personnel must also be aware of potential exposure to possible safety hazards, unsafe acts, or noncompliance with safety procedures. Individuals must inform their partners or fellow team members of non-visible effects of exposure to toxic materials. The symptoms of such exposure may include:

- i) Headaches
- ii) Dizziness
- iii) Nausea
- iv) Blurred vision
- v) Cramps
- vi) 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.

6.3 Sanitation

Site sanitation will be maintained according to OSHA and Department of Health requirements.

6.3.1 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 the area other than the SZ.

6.3.2 Potable Water

The following rules apply for all project field operations:

- i) An adequate supply of potable water will be provided at the Site. Potable water must be kept away from hazardous materials, contaminated clothing, and contaminated equipment
- ii) 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 drunk directly from the container, nor dipped from the container
- iii) Containers used for drinking water must be clearly marked and not used for any other purpose

- iv) Disposable cups must be supplied, and both a sanitary container for unused cups and a receptacle for disposing of used cups must be provided

6.3.3 Sanitary Facility

Access to facilities for washing before eating, drinking, or smoking will be provided.

6.3.4 Trash Collection

Trash collected from the CRZ will be separated as potentially contaminated waste. Trash collected in the support and break areas will be disposed of as non-hazardous waste. Trash receptacles will be set up in the CRZ and in the SZ.

7. Site Control

7.1 Authorization to Enter

All personnel working in EZs must have completed hazardous waste operations initial training as defined under OSHA Regulation 29 CFR 1926.65; have completed their training or refresher training within the past 12 months, and have been certified by a physician as fit for hazardous waste operations in order to enter a Site area designated as an EZ or CRZ. Personnel without such training or medical certification may enter the designated SZ only. The SHO will maintain a list of authorized persons; only personnel on the authorized list will be allowed within the EZ or CRZ.

7.2 Site Orientation and Hazard Briefing

No person will be allowed in the general work area during project operations without first being given a Site orientation and hazard briefing. This orientation will be presented by the SHO, 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. A Training Acknowledgement Form is provided in Appendix A for documentation purposes. In addition to this meeting, Daily Safety Meetings will be held each day before work begins. All individuals on the Site, including visitors, must document their attendance to the initial briefing as well attending the Daily Safety Meetings. Appendix A also presents the forms that will be used for documenting the Daily Safety Meeting.

7.3 Certification Documents

The PM, SS, and SHO are responsible for ensuring that all personnel working at the Site meet the training and medical surveillance requirements. Subcontractor personnel must provide their training and medical documentation to the SHO prior to the start of fieldwork.

7.4 Entry Requirements

In addition to the authorization, hazard briefing and certification requirements listed above, no person will be allowed to enter the Site unless he or she is wearing the minimum support zone PPE as described in Section 4.0. Personnel entering the EZ or CRZ must wear the required PPE for those locations.

7.5 Emergency Entry and Exit

Individuals who must enter the Site on an emergency basis will be briefed of the hazards by the SHO. All hazardous activities will cease in the event of an emergency and any sources of emissions will be controlled, if possible.

People exiting the Site because of an emergency will gather in a safe area for a head count. The SHO is responsible for ensuring that all people who entered the work area have exited in the event of an emergency.

7.6 Contamination Control Zones

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

7.6.1 Exclusion Zone (EZ)

The EZ consists of the specific work area, or may be the entire area of suspected contamination. All personnel 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 EZ.

7.6.2 Contamination Reduction Zone (CRZ)

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.

7.6.3 Support Zone (SZ)

The SZ is a clean area outside the CRZ located to prevent personnel from 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.

8. Site Decontamination Program

It is the responsibility of the SS and SHO to ensure that all personnel and pieces of equipment are properly decontaminated according to the procedures outlined below.

8.1 Contamination Prevention

One of the most important aspects of decontamination is the prevention of the spread of contamination. Good contamination prevention will minimize personnel and public exposure. Proper decontamination procedures and the following procedures of contamination avoidance shall reduce the potential spread of contamination include:

- i) Do not walk through areas of obvious or known contamination
- ii) Do not handle or touch contaminated materials directly
- iii) Fasten all closures on suits, covering with tape if necessary
- iv) Take particular care to protect any skin injuries
- v) Stay upwind of airborne contaminants, when possible

8.2 Personal Decontamination

All PPE will be disposed of and/or decontaminated at the conclusion of each workday as described below. Decontamination procedures will follow the concept of deconning the most contaminated PPE first.

All disposable equipment shall be removed before meal breaks and at the conclusion of the workday and replaced with new equipment prior to commencing work. In addition, respirator cartridges will be changed as breakthrough is obtained, as directed by the SS and SHO. Respiratory equipment and other non-disposables will be fully decontaminated and then placed in a clean storage area. Respirator decontamination will be conducted daily whenever respirators are being worn. Project personnel will inspect their respirator on a daily basis to ensure its proper operation.

8.2.1 Level D Decontamination

Level D decontamination procedures are as follows:

Step 1 - Remove all visible contamination and loose debris by washing with clean, water

Step 2 - Remove all outer clothing that came in contact with the contamination (i.e., boot covers and outer gloves) and either dispose of in disposable container or wash in detergent solution and rinse

Step 3 - Remove protective clothing; dispose of in disposable container

Step 4 - Wash and rinse hands

8.2.2 Level C Decontamination

Level C decontamination procedures to be utilized as follows:

Step 1 - Remove all visible contamination and loose debris by washing with clean water

Step 2 - Remove all outer clothing that came in contact with the contamination (i.e., boot covers and outer gloves) and either dispose of in disposable container or wash in detergent solution and rinse

Step 3 - Remove protective clothing; dispose of in disposable container

Step 4 - Remove respirator, sanitize prior to reuse

Step 5 - Remove inner gloves; dispose of in disposable container

Step 6 - Wash and rinse hands with soap and water

8.2.3 Equipment Decontamination

All vehicles and pieces of equipment (e.g., excavators) that have entered any EZ will be decontaminated at the decontamination pad prior to leaving the Site. If the level of vehicle contamination is low, decontamination may be limited to rinsing the body, frame and tracks or wheels on the equipment with water. If the vehicle or piece of equipment is significantly contaminated, steam cleaning or pressure washing of vehicles and equipment may be required.

A designated decontamination area will also be established/set up so that pieces of equipment may be cleaned (decontaminated as necessary).

The wash waters from all decontamination stations will be collected and disposed of according to the appropriate environmental regulations.

9. Site Monitoring

9.1 Air Monitoring

This section of the HASP presents the requirements for conducting air monitoring at the Site. The air-monitoring program is designed to ensure protection for personnel working on Site as well as the surrounding community. The on-Site monitoring program will be conducted by the SS or designee (i.e., Environmental Monitoring Technician) and will consist of monitoring project personnel exposures to dust/particulate matter. Air monitoring will be conducted to evaluate airborne contaminant levels. The monitoring results will dictate work procedures and the selection of PPE. The monitoring device to be used, at a minimum, is an aerosol monitor.

Monitoring for particulates for the purpose of estimating worker exposure level will be conducted in the work area with the aerosol monitor during project activities. At a minimum, all readings will be recorded on an hourly basis on air monitoring logs or field notebooks.

Air monitoring will be conducted continuously with the aerosol monitor during excavation or intrusive work. All work activity will be halted and reevaluated where sustained readings indicate the concentration of particulates exceeds 24 mg/m^3 above background.

9.2 Initial Exposure Assessment Monitoring Program

The presence of lead and arsenic in the soils at the Site represents a potential a health and safety hazard for project personnel. OSHA has a specific construction standard for lead (1926.62) and arsenic (1926.1118). The standard requires employers to document the level of lead that personnel are being exposed to when it is present in the work place. The lead standard requires employers to treat employees as if they are being exposed to lead above the action level until such time they can demonstrate that their personnel are not. This determination will be accomplished with the exposure assessment monitoring that will be conducted during initial stages of the project where samples will be collected during the startup of activities where personnel will face the potential for exposure. The contractor performing excavation work will need to focus on OSHA's requirements for lead. The PM and SS will determine the number and frequency of sampling events. At a minimum, sampling will be conducted at the initiation of each new task where there is potential for exposure or when Site conditions change significantly (e.g. from wet to dry conditions). Until it is demonstrated that project

personnel are not being exposed to lead above the action levels, project personnel will wear full-face air purifying respirators and disposable Tyvek® coveralls.

The PM and SS will implement other required elements of the lead and arsenic standards as may be required based on a review of the air sampling analytical data. NIOSH Method 7300 for metals will be followed during sample collection and analysis. The samples will be sent to an American Industrial Hygiene Association (AIHA) accredited laboratory for analysis with a request for rush turn-around time. Results for all personnel air sampling will be shared with all project personnel. The PM and SS will make a determination as to which other contaminants present at the site will be sampled for and the frequency of this additional air sampling.

9.3 Particulate/Fugitive Dust Monitoring, /Response Levels and Actions

Particulate concentrations will be monitored continuously at one upwind and two downwind designated monitoring stations. The particulate monitoring will be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. In addition, fugitive dust migration should be visually assessed during all work activities.

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the designated work area, then dust suppression techniques will be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed $150 \mu\text{g}/\text{m}^3$ above the upwind level and provided that no visible dust is migrating from the designated work area. This action level has been set to protect the health of the surrounding community.
2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than $150 \mu\text{g}/\text{m}^3$ above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within $150 \mu\text{g}/\text{m}^3$ of the upwind level and in preventing visible dust migration.
3. All readings must be recorded and be available for review.

The following fugitive dust suppression and corrective procedures will be employed at the Site.

1. Reasonable fugitive dust suppression techniques will be employed during all remedial activities, which may generate fugitive dust.
2. The following techniques are generally effective for the controlling of the generation and migration of dust during construction activities and may be employed as necessary:
 - (a) Applying water on haul roads
 - (b) Wetting equipment and excavation faces
 - (c) Spraying water on buckets during excavation and dumping

- (d) Hauling materials in properly tarped or watertight containers
- (e) Restricting vehicle speeds to 10 mph
- (f) Covering excavated areas and material after excavation activity ceases
- (g) Reducing the excavation size and/or number of excavations

When techniques involving water application are used, care must be taken not to use excess water, which can result in unacceptably wet conditions. Using atomizing sprays will prevent overly wet conditions, conserve water, and provide an effective means of suppressing the fugitive dust.

9.4 Noise Monitoring

Noise monitoring may be conducted as required. Hearing protection is mandatory for all individuals in noise hazardous areas, such as around heavy equipment and machinery. As a general rule, sound levels that cause speech interference at normal conversation distance should require the use of hearing protection. If noise levels are detected above 85 decibels (dBA) then GHD will ensure that all project personnel have been included in the company's Hearing Conservation Program and GHD will post the appropriate warning signs at the Site.

9.5 Monitoring Equipment Maintenance and Calibration

The aerosol monitor should be calibrated under the approximate environmental conditions the instrument will be used. The instrument must be calibrated before and after use, noting the reading(s) and any adjustments which 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 documentation/forms must be reviewed by the SHO.

The aerosol monitor will be maintained and calibrated in accordance with the specific manufacturers' procedures. Preventive maintenance and repairs will be conducted in accordance with the respective manufacturers' 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 SHO must be responsible for immediately removing the instrument from service and obtaining a replacement unit. The SHO will be responsible for ensuring a replacement unit is obtained and/or repairs are initiated on the defective equipment.

10. Personnel Training

10.1 General

Required project personnel as discussed in Section 1.0 must have completed hazardous waste operations-related training, as required by the OSHA Standard 29 CFR 1926.65. Field personnel also receive a minimum of 3 days of actual field experience under the direct supervision of a trained, experienced supervisor. Personnel who completed their training more than 12 months prior to the start of the project must have, if required, completed an 8-hour refresher course within the past 12 months. The SS must also have completed an additional 8 hours of training that is required by OSHA for supervisors.

10.2 Basic 40-Hour Course

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

- i) General safety procedures
- ii) Physical hazards (fall protection, noise, and heat stress, cold stress)
- iii) Names and job descriptions of key personnel responsible for Site health and safety
- iv) Safety, health, and other hazards typically present at hazardous waste sites
- v) Use, application, and limitations of PPE
- vi) Work practices by which individuals can minimize risks from hazards
- vii) Safe use of engineering controls and equipment on site
- viii) Medical surveillance requirements
- ix) Recognition of symptoms and signs, which might indicate overexposure to hazards
- x) Worker right-to-know (Hazard Communication OSHA 1926.59/1910.1200)
- xi) Routes of exposure to contaminants
- xii) Engineering controls and safe work practices
- xiii) Components of a Site HASP
- xiv) Decontamination practices for personnel and equipment
- xv) Confined space entry procedures
- xvi) General emergency response procedures

10.3 Supervisor Course

Management and supervisors receive an additional 8 hours of training which typically includes:

- i) General Site safety and health procedures
- ii) Emergency procedures
- iii) PPE programs
- iv) Air monitoring techniques

10.4 Site-Specific Training

Site-specific training will be accomplished through a Site briefing on the contents of this HASP before work begins. This training will be presented by the Project Manager, SS, or SHO. The training will include a discussion of the chemical, physical, and biological hazards, the protective equipment and safety procedures, and emergency procedures. The Training Acknowledgement Form that shall be used is found in Appendix A.

10.5 Daily Safety Meetings

Daily Safety Meetings will be held to cover safety concerns for the work that will be conducted each day. The meeting will cover emergency response procedures and the hazards anticipated during the project work on this day, the protective clothing required and any required procedure that will

minimize hazards. These meetings will be presented by the SS or SHO 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 forms that shall be used for documenting the daily safety meetings are also found in Appendix A.

10.6 First Aid and CPR

At least one individual 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) are 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.

11. Medical Surveillance Program

11.1 Medical Examination

All required personnel who will enter a Site EZ or CRZ must have successfully completed a pre-placement and/or annual physical examination prior to entering one of these work zones. This medical surveillance program must comply with OSHA 29 CFR 1926.65(f).

11.1.1 Pre-Placement Medical Examination

All on-Site project personnel who will enter an EZ or CRZ must have completed a comprehensive medical examination within the past 12 months that meets the requirements of applicable OSHA Regulations. The annual medical examination typically includes the following elements:

- i) Medical and occupational history questionnaire
- ii) Physical examination
- iii) Complete blood count, with differential
- iv) Liver enzyme profile
- v) Chest X-ray, once every 3 years, for non-asbestos workers
- vi) Pulmonary function test
- vii) Audiogram
- viii) Electrocardiogram for persons older than 45 years of age, or if indicated during the physical examination
- ix) Drug and alcohol screening, as required by job assignment
- x) Visual acuity
- xi) Follow-up examinations, at the discretion of the examining physician or the corporate medical director

The examining physician provides the individual and employer with a report summarizing the findings confirming the worker's fitness for work and ability to wear a respirator. Documentation of medical clearance will be available for project personnel during all project work.

Subcontractors will certify that all of their personnel have successfully completed a physical examination by a qualified physician. The physical examination must meet the requirements of 29 CFR 1926.65 and 29 CFR 1910.134 as described above. Subcontractors will supply copies of the medical examination certificate for each of their on-Site workers.

11.1.2 Other Medical Examination

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

- i) At any individual's request after known or suspected exposure to toxic or hazardous materials
- ii) At the discretion of the client, SHO, or occupational physician in anticipation of, or after known or suspected exposure to toxic or hazardous materials
- iii) At the discretion of the occupational physician

11.1.3 Periodic Exam

Following the placement examination, all personnel must undergo a periodic examination, similar in scope to the placement examination. For individuals potentially exposed over 30 days per year, the frequency of periodic examinations will be annual. For personnel potentially exposed less than 30 days per year, the frequency for periodic examinations may be 24 months or as determined by the physician.

11.1.4 Medical Restriction

When the examining physician identifies a need to restrict work activity, the individual's supervisor must communicate the restriction to the individual, the individual's supervisor, and the SHO. The terms of the restriction will be discussed with the individual and his/her supervisor. Every attempt should be made to keep the individual working, while not violating the terms of the medical restriction.

12. Emergency Procedures

12.1 General

The work area will be evaluated for the potential for fire, explosion, chemical release, or other catastrophic events. Unusual events, activities, chemicals, and conditions will be reported to the SS and SHO immediately.

The SS and SHO will establish evacuation routes and assembly areas for each work area. All personnel entering the Site will be informed of these routes and assembly areas. If necessary, a Site plan will be made marking the evacuation routes and will be posted at conspicuous locations.

12.2 Emergency Response

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

- i) The SS will evaluate the incident and assess the need for assistance and/or evacuation
- ii) The SS or SHO will call for outside assistance as needed and report the incident **within 1 hour** through the GHD Incident Reporting Hotline. The number is 1-866-529-4886

- iii) The SS will act as liaison between outside agencies and on-Site personnel
- iv) The SS will ensure the Project Manager and the RSHM are notified promptly of the incident;
- v) The SS will take appropriate measures to stabilize the incident scene

12.2.1 Fire

In the case of a fire on the Site, the SS will assess the situation and direct firefighting activities. The SS will ensure that the client Site representative (as appropriate) 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, the local fire department will be summoned via 911 or other number.

12.2.2 Spill

If a spill occurs, the following steps will be taken:

- i) Notify SS and or SHO immediately
- ii) Evacuate immediate area of spill
- iii) Conduct air monitoring to determine needed level of PPE
- iv) Don required level of PPE and prepare to make entry to apply spill containment and control procedures
- v) Absorb or otherwise clean up the spill and containerize the material, sorbent, and affected soils. If the spill has occurred inside the treatment facility wash down the spill into the floor sump.

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

12.3 Medical Emergency

All personnel injuries must be promptly reported to the SS and SHO. The SS and SHO will:

- i) Ensure that the injured person receives prompt first aid and medical attention
- ii) In emergency situations, the worker is to be transported by appropriate means to the nearest urgent care facility (normally a hospital emergency room)
- iii) The Project Manager and RSHM are to be notified by project personnel as soon as possible after the worker has left the Site

12.3.1 First Aid - General

All persons must report any near loss incident, accident, injury, or illness to their immediate Supervisor, SHO and the SS. Trained personnel will provide First Aid. Injuries and illnesses requiring medical treatment must be documented. The PM with the help of the SS must conduct an accident investigation as soon as emergency conditions no longer exist and first aid and/or medical treatment has been ensured. These two reports must be completed and submitted to the PM and RSHM 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 should be transported to the medical facility. If the injured 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. Otherwise, perform the following:

- i) 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
- ii) Do a Primary Survey of the Victim: Check for airway obstruction, breathing, and pulse. Assess likely routes of chemical exposure by examining the eyes, mouth, nose, and skin of the victim for symptoms
- iii) 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
- iv) Maintain Airway and Perform Rescue Breathing: As necessary
- v) Perform CPR: As necessary
- vi) Do a Secondary Survey of the Victim: Check vital signs and do a head-to-toe exam
- vii) Treat Other Conditions: As necessary. If the victim can be moved, take him to a location away from the work area where EMS can gain access

12.3.2 First Aid - Inhalation

Any individual complaining of symptoms of chemical overexposure as described in Section 5.1.5 will be removed from the work area and transported to the designated medical facility for examination and treatment.

12.3.3 First Aid - Ingestion

Call 911 and consult a poison control center for advice. If known and available, refer to the SDS for treatment information, if recommended. If unconscious, keep the victim on his side and clear the airway if vomiting occurs.

12.3.4 First Aid - Skin Contact

Project personnel, who have had skin contact with contaminants will, unless the contact is severe, proceed through the decontamination zone, 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 requests a medical examination.

12.3.5 First Aid - Eye Contact

Project personnel who have had contaminants splashed in their eyes or who have experienced eye irritation while in the contaminated zone must immediately proceed to the eyewash station, set up in the decontamination zone. 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.

12.4 Reporting Injuries and Illnesses

All injuries and illnesses, however minor, will be reported to the GHD Incident Reporting Hotline (1-866-529-4886), the SS and SHO immediately. The SS will complete an Incident Report and submit it to the Project Manager and RSHM within 24 hours.

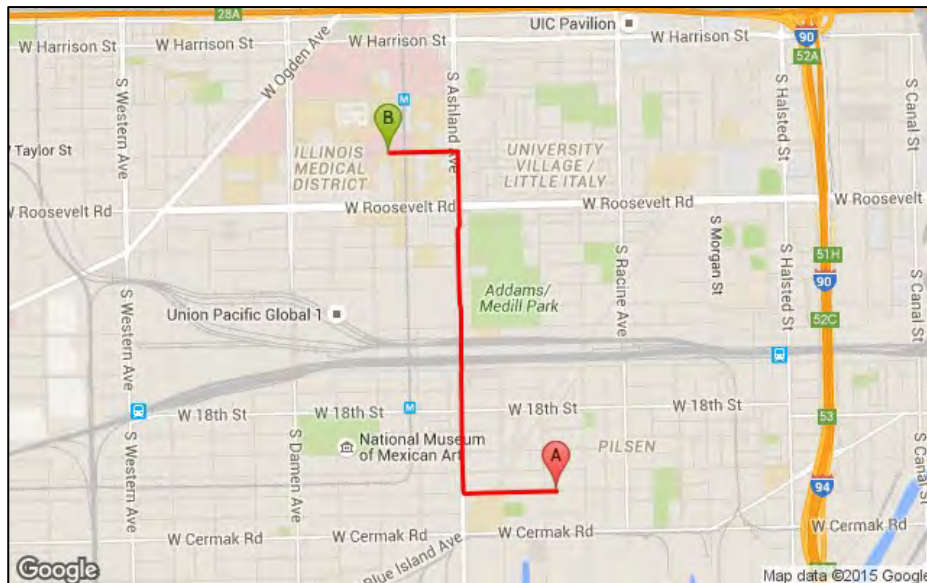
12.5 Emergency Information

The means to summon local public response agencies such as police, fire, and ambulance will be reviewed in the Daily Safety Meeting. Agencies include:

Police Department	911
Fire Department	911
Hospital (University of Illinois Medical Center)	312-355-4000
Poison Control Center	800-888-7655
GHD Project Manager (Walter Pochron)	708-805-0029
GHD Regional Safety and Health Manager (William Doyle)	734-536-1282
GHD Project Coordinator (Matthew Lazaric)	312-636-8503
USEPA (Hotline)	800-424-9346
National Response Center	800-424-8802
GHD Incident Reporting Hotline	866-529-4886

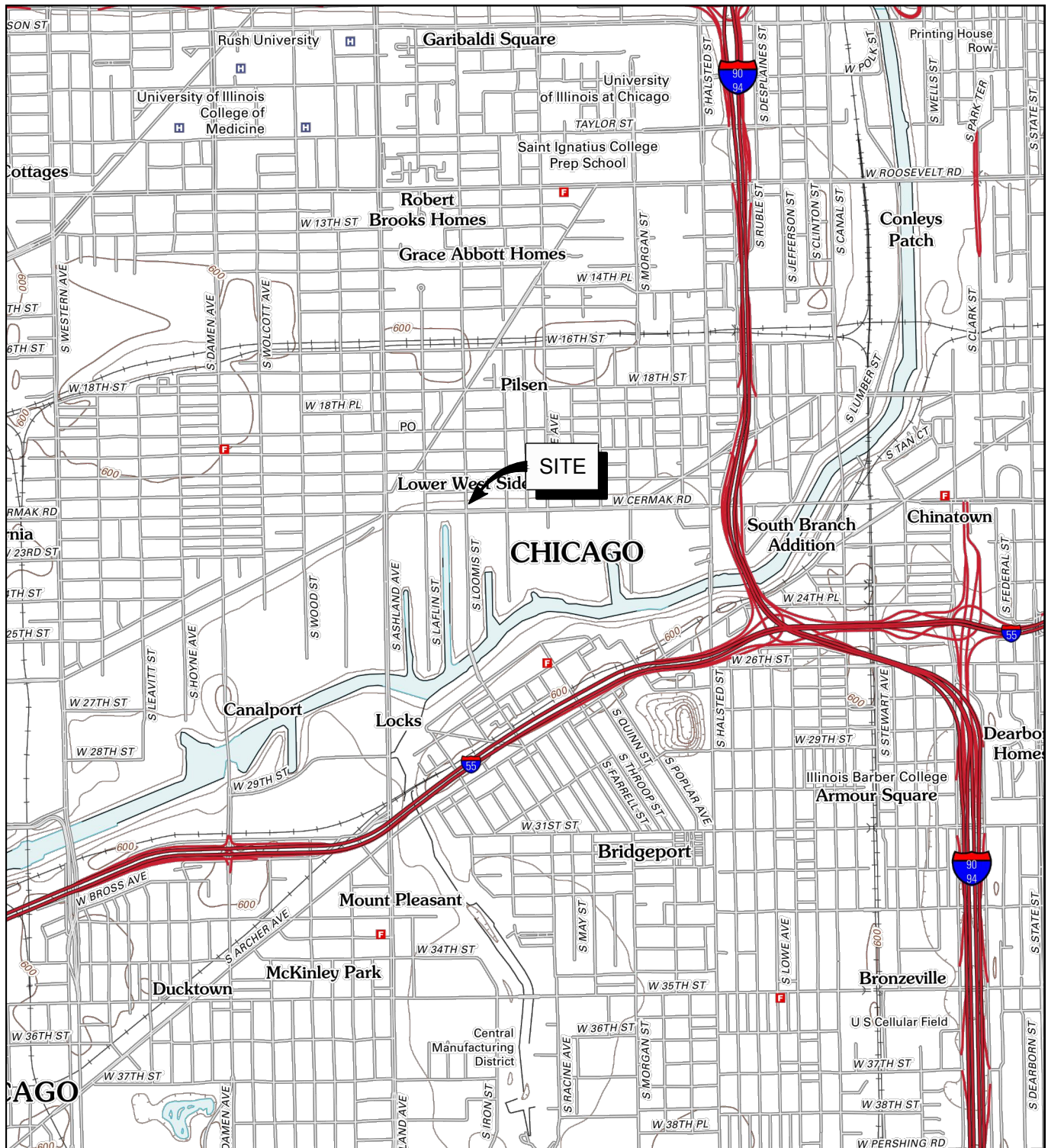
Hospital (University of Illinois Medical Center)

Emergency Route to the Hospital.



1. Head **west** on **W 21st St** toward **S Loomis St**
2. Turn **right** onto **S Ashland Ave**
3. Turn **left** onto **W Taylor St**

Destination will be on the right



BASE SOURCE: USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE;
ENGLEWOOD, ILLINOIS 2012

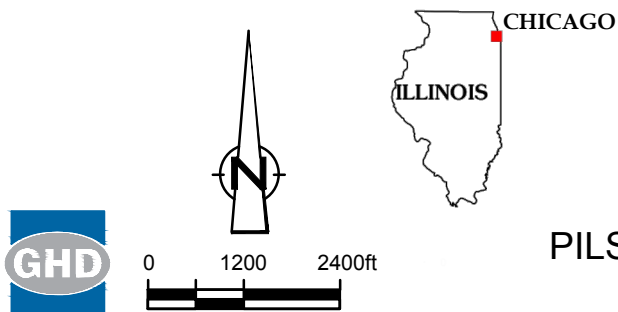
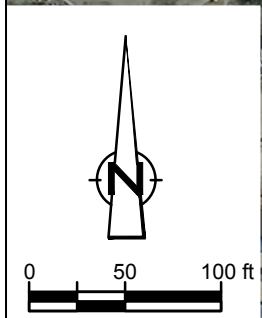
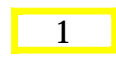


figure 2.1
SITE LOCATION
OU1 REMEDIATION AREAS
PILSEN RAILROAD SPUR AND ALLEY SITE
Chicago, Illinois



LEGEND:



REMEDIATION AREA



EPA SAMPLE LOCATION AND IDENTIFIER



PAVED DRIVEWAY IS NOT INCLUDED IN THE OUI REMEDIATION AREA



figure 2.2
SITE LAYOUT
OU1 REMEDIATION AREAS
PILSEN RAILROAD SPUR AND ALLEY SITE
Chicago, Illinois

Table 2.1

**Chemical Compounds of Concern
Pilsen Soil Operable Unit 1 Railroad Spur and Alley Site
Chicago, Illinois**

Metals	Detected in Site Soils (yes/no)
Antimony	yes
Arsenic	yes
Cadmium	yes
Copper	yes
Lead	yes
Tin	yes
Zinc	yes

Table 2.2

**Exposure Routes and Exposure Levels for the Chemical Compounds of Concern
Pilsen Soil Operable Unit 1 Railroad Spur and Alley Site
Chicago, Illinois**

Chemical Compound	Exposure Routes	Acceptable Exposure Levels in Air
Antimony	Inhalation, Ingestion	0.5 mg/m ³ (1) 0.5 mg/m ³ (2)
Arsenic	Inhalation, Ingestion	0.01 mg/m ³ (1) 0.01 mg/m ³ (2)
Cadmium	Inhalation, Ingestion	0.01 mg/m ³ (1) 0.002 mg/m ³ (R)(1) 0.005 mg/m ³ (2)
Copper	Inhalation, Ingestion	1 mg/m ³ (1) 1 mg/m ³ (2)
Lead	Inhalation, Ingestion	0.05 mg/m ³ (1) 0.05 mg/m ³ (2)
Tin	Inhalation, Ingestion	2 mg/m ³ (1) 2 mg/m ³ (2)
Zinc	Inhalation, Ingestion	2 mg/m ³ (1) 5 mg/m ³ (2) 10 mg/m ³ (3)

All Exposure Levels are 8-hour Time Weighted Averages

Notes:

- (1) 2014 Values, American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs) (8-hr Time Weighted Average).
 - (R) Respirable Fraction
 - (2) Federal Occupational Safety and Health Administration (OSHA) Permissible Exposure Limit (PEL) (8-hr Time Weighted Average).
 - (3) Short Term Exposure Limit (STEL)
- mg/m³ Milligrams per Cubic Meter.

Appendices

Appendix A

Project Safety Forms

ACCIDENT REPORTING FORM

Report all accidents immediately to the Safety and Health Officer

Instructions: For Personal Injuries, Property Damage, and Near Miss Reports, Complete Sections 1 and 2.
For Vehicle Accidents, Complete Sections 1, 2, and 4. Form must be completed within 24 hours.

SECTION 1

A. Employee Identification										<input type="checkbox"/> Employee		<input type="checkbox"/> Temporary Employee		<input type="checkbox"/> Subcontractor	
Employee No.		Last Name			First Name			Middle Name/Initial		M or F					
Area Code ()		Telephone Number		Address (Street, City, State, Province, Zip Code)											
Date of Hire / /		Position/Title			Supervisor			Employee's Company/Office Location							
B. General Information															
Where did the accident occur? () Office () Project Site				Type of Occurrence () Near Miss () Employee Injury () Vehicle Accident () Property Damage Only											
Date and Hour of Accident				Date and Hour Reported to Employer			Date and Hour Last Worked			Time Employee Began Work					
Month	Day	Year	a.m. p.m.	Month	Day	Year	a.m. p.m.	Month	Day	Year	a.m. p.m.	a.m. p.m.			
Normal Work Hours on Last Day Worked				Witnesses? () Yes () No		Witness Name and Telephone Number									
From:		a.m. p.m.													
C. Project Information (Project Related Accidents/Near Misses Only)															
Project #		Project Name		Project Manager			Site Telephone Number ()			Employee Cell Number ()					
Was the Client Advised of the Accident? () Yes () No				Project Address (Street, City, State, Province, Zip Code)											
Name:				Specific Location of Accident											

SECTION 2

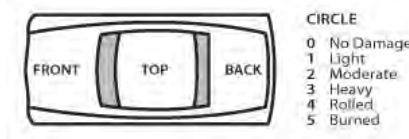
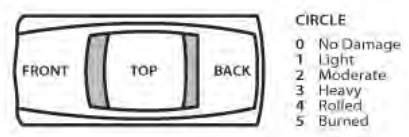
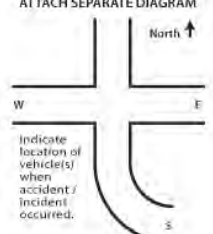
A. Details of the Accident/Near Miss	
1. What job/task was being performed when the accident occurred?	
2. Describe the employee's specific activities at the time of the accident. Include details of equipment/materials being used, including the size and weights of objects being handled.	
3. For injuries, identify the part of body injured, and specify left or right side.	
4. Identify the object or substance that directly injured employee and how.	
5. Identify Property Damaged (include owner of property, nature and source of damage, model and serial number, if appropriate).	
B. Health Care/Medical Treatment	
Employee received health care? () Yes () No	Identify the type of health care provided and where it was performed. (Check all that apply). () First Aid () Medical treatment other than first aid (sutures, etc.) () Hospitalized () Clinic () Hospital emergency room () On location by self or co-worker () On site by EMT
Name of Health Care Provider, Physician's Name, Address (Street, City, Province/State, and Postal/Zip Code)	

Section 2 (Continued)

C. Accident Investigation		
H&S plan prepared and on site? () Yes () Not applicable		Did the safety plan identify and provide safety procedures for the specific tasks the employee was conducting when injured? () Yes () No If no, why not? (Explain).
Did the employee have the proper safety training to conduct these tasks or use the equipment? () Yes () No If not, why not?		
Identify all of the potential contributing factors and how they led to the occurrence of the accident. (Lack of attention, wrong use of equipment, lack of training, etc.)		
What contributing factor above was the underlying root cause of the accident.		
Is any training or retraining recommended? If yes, describe.		
What actions have been or will be taken to correct this accident from reoccurring?		
Additional information: Attach photos, accident diagrams, as applicable.		
Report Date Month Day Year	Report Prepared by: (please print)	Report Prepared by: (signature)

VEHICLE ACCIDENT SECTION
(Complete this Section for all Vehicle Accidents)

SECTION 4

A. Vehicle					
License Plate No.		State		Police Department	City State
Vehicle Year/Make/Model		Odometer Reading at Time of Accident		Police Report Number	Weather Conditions
Name of Person Operating Vehicle			<div style="text-align: center;"> "X" IN AREA OF VEHICLE DAMAGE  </div>		
Address					
City	State/Province	Zip Code			
Telephone: Area Code ()					
Vehicle Type: () Personal () Rental () CRA-Own					
Description of Vehicle Damage:					
B. Other Vehicles Involved					
Name of Owner		Address		City/State/Zip	Area Code and Telephone Number ()
Operator's Name (if different from above)		Address		City/State/Zip	Area Code and Telephone Number ()
Year/Make/Model	Description of Property Damage:			<div style="text-align: center;"> "x" IN AREA OF VEHICLE DAMAGE  </div>	
Insurance Co. Name & Telephone					
License Plate No./State/Province					
C. Injured Persons					
Name	Address Street, City, State/Zip Code		Phone Number	Nature of Injury	Indicate if Injured was a Vehicle Driver/ Passenger, Employee, Other, or Pedestrian
1.					
2.					
3.					
D. Witnesses					
Name		Address Street, City, State/Prov./Zip Code			Area Code and Telephone Number
1.					()
2.					()
E. Description of Accident					
<div style="border: 1px solid black; padding: 5px;"> <small>PLEASE COMPLETE OR ATTACH SEPARATE DIAGRAM</small>  </div>					
Was Ticket Issued: Other Operator <input type="checkbox"/> Company Operator <input type="checkbox"/>		Reason: _____ _____ _____			
Report Date Month Day Year	Report Prepared by: (please print)		Report Prepared by: (signature)		

Note: If Additional Space is Required to Complete this Report, Use Separate Sheet of Paper and Attach.

DAILY SAFETY MEETING FORM

PROJECT: Pilsen Soil Operable Unit 1 (OU1) Railroad Spur and Alley Site

LOCATION: Chicago, Illinois

DATE/TIME: _____

1. Safety Issues or Topics Discussed:	
2. Work Summary and Physical/Chemical Hazards of Concern:	
Planned Activities:	
Physical hazards:	
Biological hazards:	
Chemicals onsite:	
3. Protective Equipment/Procedures:	
4. Emergency Procedure:	
MUSTERING POINT: Across the street from the main gate	
In event of an emergency gather/proceed to mustering point(s). Review Contingency Plan	
Emergency Procedures for Area(s) of activity.	
5. Signatures of Attendees (Handwriting must be legible):	

HASP ACKNOWLEDGMENT FORM

This is to certify that I have received a pre-entry briefing regarding this HASP for the Solvent Savers Site in Lincklaen, New York and I understand its contents. My failure to follow and comply with the requirements contained in this plan may result in disciplinary action and/or removal from the Site.

Print Name	Signature	Company	Date

**SAFETY INSPECTION CHECKLIST FOR EXCAVATIONS
REFERENCED BY OSHA STANDARDS**

This checklist is to be completed by the competent person at the start of work and as needed throughout the shift (i.e., after rain events, etc.). *(A competent person has been trained in the current OSHA excavation standard, is knowledgeable about soil analysis and protective systems, and has the authority to shut down the job.)*

Site Location: _____	Project #: _____
Date: _____ Time: _____	Competent Person: _____
Were visual soil tests made? If Yes, what type? _____	YES NO <input type="checkbox"/> Type: _____
Were manual soil tests made? If yes, what type? _____	YES NO <input type="checkbox"/> Type: _____
Soil Type: _____	Signature: _____
Soil Classification: _____	
Excavation Depth: _____	Excavation Width: _____
Protective System Used: _____	

In the following table, please place a Y for Yes, N for No, or N/A for Not Applicable in the right hand column for each item. If No, place the date of correction.

Subject		Y, N, or NA	Date Corrected
GENERAL INSPECTION OF THE JOB SITE			
1.	Does the competent person have the authority to remove employees from the excavation immediately?		
2.	ARE SURFACE OBSTRUCTIONS REMOVED OR SUPPORTED?		
3.	Are employees protected from loose rock or soil that could pose a hazard by falling or rolling into the excavation?		
4.	Are hard hats worn by all employees?		
5.	Are excavated soil, materials, and equipment placed at least 2 feet from the edge of the excavation?		
6.	Are walkways and bridges over excavations 4 feet or more in depth equipped with standard guardrails and toe-boards?		
7.	Are warning vests or other highly visible clothing provided and worn by all employees exposed to public vehicular traffic?		
8.	Are employees required to stand away from vehicles being loaded or unloaded?		
9.	Is a warning system established and used when mobile equipment operates near the edge of the excavation?		
10.	Are employees prohibited from going beneath suspended loads?		
11.	Are employees prohibited from working on the faces of sloped or benched excavations above other employees?		
UTILITIES			
12.	Were utility companies contacted and/or utilities located?		
13.	Are the exact locations of the utilities marked?		
14.	Are underground installations protected, supported, or removed when excavation is opened?		
MEANS OF ENTERING AND EXITING THE TRENCH			
15.	Is the distance along the trench to an exit no greater than 25 feet in excavations 4 feet or more in depth?		
16.	IS A SUPPORT SYSTEM, SUCH AS UNDERPINNING, BEING USED?		
17.	Are ladders used in excavations secured and extended 3 feet above edge of the trench?		

Subject		Y, N, or NA	Date Corrected
18.	Are structural ramps used by employees designed by a competent person?		
19.	Are structural ramps used for equipment designed by a registered professional engineer?		
20.	Are employees protected from cave-ins when entering or exiting the excavation?		
WET CONDITIONS			
21.	Is water removal equipment monitored by a competent person?		
22.	Is surface water or run-off diverted or controlled to prevent accumulation in the excavation?		
23.	Are inspections made after every rainstorm or other hazard-increasing occurrence?		
HAZARDOUS ATMOSPHERE			
24.	Is the atmosphere within the excavation tested where there is a reasonable possibility of an oxygen deficiency, combustible, or other harmful contaminant exposing employees to a hazard?		
25.	Are adequate precautions taken to protect employees from exposure to an atmosphere containing less than 19.5% oxygen and/or other hazardous atmospheres?		
26.	Is ventilation provided to prevent employee exposure to an atmosphere containing flammable gas 10% above the lower explosive limit of a gas?		
27.	Is testing conducted often to ensure that the atmosphere remains safe?		
28.	Is emergency equipment, such as breathing apparatus, safety harness and lifeline, and/or basket stretcher readily available where hazardous atmospheres could or do exist?		
SUPPORT SYSTEMS			
29.	Are materials and/or equipment for support systems selected based on soil analysis, trench depth, and expected loads?		
30.	Are materials and equipment used for protective systems inspected and in good condition?		
31.	Are protective systems installed without exposing employees to the hazards of cave-ins (including end walls), collapses, or threat of being struck by materials or equipment?		
32.	Are excavations below the level of the base, or footing supported, approved by a registered professional engineer?		
33.	Does the removal of support systems progress from the bottom and members are released slowly? Note any indication of possible failure.		
34.	Is the excavation of material a level no greater than 2 feet below the bottom of the support system and only if the system is designed to support the loads calculated for the full depth?		
35.	Is there a shield system placed to prevent lateral movement?		

SAFETY INSPECTION CHECKLIST - MOBILE EQUIPMENT SAFETY

Week Ending: 		Job No.: 		Equipment: 					
(This form is to be completed daily by the operator. Deficiencies should be addressed immediately.)									
Superintendent: _____									
	Date:	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	Sun.	Comments
Equipment Hours:	Start:								
	Stop:								
Fluid Levels:									
<input type="checkbox"/>	Oil								
<input type="checkbox"/>	Hydraulic								
<input type="checkbox"/>	Transmission								
<input type="checkbox"/>	Radiator								
<input type="checkbox"/>	Grease Fittings								
<input type="checkbox"/>	Fuel								
Safety Checks:									
<input type="checkbox"/>	Fire Extinguisher								
<input type="checkbox"/>	Seat and Safety Belts								
<input type="checkbox"/>	Warning Devices (backup alarms, lights, etc.)								
<input type="checkbox"/>	Housekeeping								
<input type="checkbox"/>	Brakes								
<input type="checkbox"/>	Mirrors								
<input type="checkbox"/>	Windshield and Wipers								
<input type="checkbox"/>	Steering								
<input type="checkbox"/>	Horn								
<input type="checkbox"/>	Lights								
<input type="checkbox"/>	Tires								
<input type="checkbox"/>	Guards								
<input type="checkbox"/>	Instruments								
<input type="checkbox"/>	Exhaust System								
Accessories:									
<input type="checkbox"/>	Boom or Mast								
<input type="checkbox"/>	Controls								
<input type="checkbox"/>	Level Indicators								
<input type="checkbox"/>	Tracks								
<input type="checkbox"/>	Other								
Sign-Off:									
<input type="checkbox"/>	Operator's Initials								
<input type="checkbox"/>	Supervisor's Initials								

Additional Comments: (Please write any additional comments here. Use the back of this form if necessary.)

√ = OK

NR = Needs Repair

NA = Not Applicable

Safety Coordination Review

Page 1 of 5

SECTION A - JOB SCOPE

		Completed by:
<input type="checkbox"/>	Pre-Job Meeting/Prep HASP	
<input type="checkbox"/>	On-Site Orientation Meeting	
<input type="checkbox"/>	End of Job Evaluation	
<input type="checkbox"/>	Tailgate Safety Meeting Planning Tool	
<input type="checkbox"/>	Site Audit	

Date: _____ Project Name: _____ Project Number: _____

Project Location: _____

Project Description _____

GHD Project Team

PM: _____ Site Supervisor: _____ SHO: _____

Technician(s): _____ Others: _____

CLIENT INFORMATION

Company Name: _____

Address: _____

Primary Contact: _____

Phone: _____ Cell: _____ Fax: _____

SUBCONTRACTOR INFORMATION

Company Name: _____

Address: _____

Primary Contact: _____

Phone: _____ Cell: _____ Fax: _____

Additional subcontractors listed on last page

SECTION B - PROJECT SAFETY COORDINATION

1.1 High Risk Activities

Confirm activities to be conducted during project

Working at or above 6 feet (fall protection)

Aerial lift

Heavy equipment

Drilling

Excavation

Lock-Out Tag-Out permit(s) required

Hot work

Hot work permit(s) required

Confined space entry

Confined space entry permit required

Subsurface activities

ATV, Snowmobile, 4 wheeler

Access agreements in-hand and signed by property owner

Permit requirements communicated to affected employees

Resource	Yes	No
PM	<input type="checkbox"/>	<input type="checkbox"/>
PM	<input type="checkbox"/>	<input type="checkbox"/>
PM	<input type="checkbox"/>	<input type="checkbox"/>
PM	<input type="checkbox"/>	<input type="checkbox"/>
PM	<input type="checkbox"/>	<input type="checkbox"/>
PM	<input type="checkbox"/>	<input type="checkbox"/>
PM	<input type="checkbox"/>	<input type="checkbox"/>
PM	<input type="checkbox"/>	<input type="checkbox"/>
PM	<input type="checkbox"/>	<input type="checkbox"/>
PM	<input type="checkbox"/>	<input type="checkbox"/>
PM	<input type="checkbox"/>	<input type="checkbox"/>
PM	<input type="checkbox"/>	<input type="checkbox"/>

1.2	Guiding Principals <i>(All items identified, verified and discussed)</i> Safety Commitment Injury Free Operation (IFO) Stop Work Authority Lessons Learned Any unresolved safety concerns or issues	Resource SMART SMART SMART SMART SS	<table><tr><th>Yes</th><th>No</th></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr></table>	Yes	No																																								
Yes	No																																												
1.3	Personnel Requirements <i>(All items identified, verified and discussed)</i> Site personnel trained to execute the Scope of Work Verification of all personnel's training certifications Potential for language barrier issues for this project Potential technical understanding barriers for this project Number of SSE(s) on site concurrent with GHD/client policy Short Service Employee(s) identification Mentor assignment for each SSE(s) Employees trained to use the tools/equipment Verification of all personnel's: - Medical clearance & respirator fit test (as required) - Alcohol & drug clearance Daily personnel evaluation if they are fit to function and working safely Safety Health Officer required for the site	Resource PM PM PM PM PM PM PM PM PM HSE Admin HSE Admin SS PM	<table><tr><th>Yes</th><th>No</th><th>N/A</th></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr></table>	Yes	No	N/A																																							
Yes	No	N/A																																											
1.4	Behavior Based Safety - SMART Tools <i>(All items identified, verified and discussed)</i> STAR (Stop Think Act Review) Process Near miss/incident reporting procedure STEP (Safe Task Evaluation Process) At-risk behaviors and observation trends	Resource SMART SMART SMART SMART	<table><tr><th>Yes</th><th>No</th><th>N/A</th></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr></table>	Yes	No	N/A																																							
Yes	No	N/A																																											
1.5	HASP Development & Review <i>(All items identified, verified and discussed)</i> Site-specific Health & Safety Plan developed Site-specific Health & Safety Plan approval by GHD HSE professional System to modify the Health & Safety Plan in the field (ie., "dirty JSA")	Resource HASP HASP HASP	<table><tr><th>Yes</th><th>No</th><th>N/A</th></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr></table>	Yes	No	N/A																																							
Yes	No	N/A																																											
1.6	JSA (Job Safety Analysis) <i>(All items identified, verified and discussed)</i> On-site hazard assessment JSA available for all tasks including those performed by subcontractors Requirement to have JSA modified in the field daily (ie., "dirty JSA") SDSs obtained, reviewed, and hazards incorporated into JSA	Resource PM HASP SS HASP	<table><tr><th>Yes</th><th>No</th><th>N/A</th></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr></table>	Yes	No	N/A																																							
Yes	No	N/A																																											

1.7 PPE <i>(All items identified, verified and discussed)</i>	Confirm task-specific PPE per JSA System to inspect PPE before start of work	Resource HASP SS	<table border="1"> <thead> <tr> <th>Yes</th> <th>No</th> <th>N/A</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Yes	No	N/A																																							
Yes	No	N/A																																											
1.8 Site Emergency Response <i>(All items identified, verified and discussed)</i>	First-aid requirements Minimum - one first-aid trained person on-site First-aid equipment within 50 feet of risk Eye wash/shower within 50 feet of risk Spill response equipment inspected and available within 50 feet of risk Emergency Action Plan (EAP) - specific personnel identified for key incident command roles - discussed role responsibilities and actions with all site personnel, mustering/meeting location set Site emergency evacuation alarm confirmed EAP drill schedule Nearest hospital confirmation Nearest hardwired telephone confirmation Emergency shut-off switch/valve locations confirmation Emergency contact confirmation - coordinate with facility and client	Resource HASP HASP HASP HASP HASP HASP SS HASP HASP Site Drawing Site Drawing HASP	<table border="1"> <thead> <tr> <th>Yes</th> <th>No</th> <th>N/A</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Yes	No	N/A																																							
Yes	No	N/A																																											
1.9 Utility Locates <i>(All items identified, verified and discussed)</i>	GHD and/or client-specific Subsurface Utility Clearance Protocol reviewed and adhered to QSF-019 Property Access Form completed Client-specific requirements communicated to all affected employees One-call responses verified	Resource PM PM PM PM	<table border="1"> <thead> <tr> <th>Yes</th> <th>No</th> <th>N/A</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Yes	No	N/A																																							
Yes	No	N/A																																											
1.10 Traffic Control Program <i>(All items identified, verified and discussed)</i>	Temporary Traffic Control Plan (TTCP) required TTCP provided TTCP approval by the client, if required	Resource PM PM PM	<table border="1"> <thead> <tr> <th>Yes</th> <th>No</th> <th>N/A</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Yes	No	N/A																																							
Yes	No	N/A																																											
1.11 Site Control <i>(All items identified, verified and discussed)</i>	Have the following areas been considered for site control: Fencing, barricades or other identifiers Signage to control pedestrian traffic Safety perimeter around equipment and work zone Swing radius barricades and/or signage struck-by (crush zones) reviewed and controlled.	Resource SS SS SS SS	<table border="1"> <thead> <tr> <th>Yes</th> <th>No</th> <th>N/A</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Yes	No	N/A																																							
Yes	No	N/A																																											
1.12 Equipment <i>(All items identified, verified and discussed)</i>	Proper lifting/transport of heavy objects (drums, augers) Equipment inspected and documented where required GFCI used and tested	Resource SS SS SS	<table border="1"> <thead> <tr> <th>Yes</th> <th>No</th> <th>N/A</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Yes	No	N/A																																							
Yes	No	N/A																																											

Safety Coordination Review

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1.13	Weather	<i>(All items identified, verified and discussed)</i>	Resource	Yes No N/A
		Weather condition changes discussed - how to handle during work	HASP	
		Weather monitoring- who is responsible	HASP	
		Weather related hazards (heat/cold accommodations)	HASP	
		Hold time after lightning and thunder	SS	
1.14	Crew Commitment	<i>(All items identified, verified and discussed)</i>	Resource	Yes No N/A
		Crew is aware of Safety Commitment that they are making	TBD	
1.15	Materials	<i>(All items identified, verified and discussed)</i>	Resource	Yes No N/A
		SDSs availability for all HAZCOM/WHMIS regulated materials on the job site	HASP	
		Affected employees aware of special handling instructions for hazardous materials	HASP	
		Hazardous materials stored appropriately	HASP	
		Plan for dealing with leftover and/or waste materials	WP	
1.16	Sub-Contractors	<i>(All items identified, verified and discussed)</i>	Resource	Yes No N/A
		Approval through the QSF 12, 22, 30, 31	PM	
		GHD Safety Coordination Review Form completed with the subcontractor as applicable	PM	
1.17	Documentation	All required QS Forms are available and attached to the project file	PM	Yes No N/A
		- QSF-12	PM	
		- QSF-13	PM	
		- QSF-16	PM	
		- QSF-19	PM	
		- QSF-22	PM	
		- QSF-30/31	PM	
		- Meeting attendance sign in sheets	PM	
		Daily Tailgate sign in sheets	PM	
		Permits/air monitoring records	PM	
		STEP observation form	PM	
		Equipment inspection forms	PM	
		Client specific forms	PM	

Safety Coordination Review

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SECTION C - ACTION ITEMS

Action Items:	Responsible	Due Date

HASP Health and Safety Plan

PM Project Manager

SS Site Supervisor

SHO HSE Officer

SUBCONTRACTOR INFORMATION

Company Name: _____

Address: _____

Primary Contact: _____

Phone: _____ Cell: _____ FAX: _____

SUBCONTRACTOR INFORMATION

Company Name: _____

Address: _____

Primary Contact: _____

Phone: _____ Cell: _____ FAX: _____

Copies of the forms for Pre-Job Meeting and On-Site Orientation shall be maintained in the Project File



Driving Skills Evaluation Worksheet

Driver:		Date:	
Completed By:			
Vehicle Class: (cargo van, truck, etc.)			
Towing or Trailering Evaluation:	<input type="checkbox"/> Yes	<input type="checkbox"/> No	

Pass (✓)	Fail (✓)	Needs Improvement (✓)	N/A (✓)	
				Pre-driving checks and adjustments
				Making accurate turns (left and right)
				Backing up
				Parking:
				- Perpendicular
				- Angle
				- Parallel
				Driving through intersections
				Recognizing danger signs/conditions
				Driving under adverse conditions (weather, congested traffic, and road construction)
				Driving in peak times on interstate highways
				Starting, moving, and stopping smoothly
				Yielding the right-of-way
				Railroad crossing
				Changing lanes (checking blind spots)
				Following safely behind other vehicles
				Communicating with other drivers (turn signals and appropriate use of horn)
				Adjusting speed, position, and passing on highways
				Traffic signal responses



First Aid Kit and Eyewash Inspection Form

First Aid Kit /Eyewash Inspection Form (Weekly)		
Date/month of inspection:	First aid kit number:	
Signature of inspector:	Eyewash ID Number:	
Week of:		
1 st week:	3 rd week:	
2 nd week:	4 th week:	
First Aid Kit /Eyewash Inspection Form (Weekly)		
Date/month of inspection:	First aid kit number:	
Signature of inspector:	Eyewash ID Number:	
Week of:		
1 st week:	3 rd week:	
2 nd week:	4 th week:	
First Aid Kit /Eyewash Inspection Form (Weekly)		
Date/month of inspection:	First aid kit number:	
Signature of inspector:	Eyewash ID Number:	
Week of:		
1 st week:	3 rd week:	
2 nd week:	4 th week:	
First Aid Kit /Eyewash Inspection Form (Weekly)		
Date/month of inspection:	First aid kit number:	
Signature of inspector:	Eyewash ID Number:	
Week of:		
1 st week:	3 rd week:	
2 nd week:	4 th week:	
Contents of Kit		
100 Adhesive strips (Band-aids)	1 Cold Pack	CPR: 1 Way Valve (MicroShield – Clear Barrier)
6 First Aid & Burn Cream Packets	1 Triangular Bandage, 40"	30 Antiseptic Wipes
1 Large Gauze Bandage, 4"	5 Gauze Pads, 4" x 4"	1 Pair Scissors
1 Adhesive tape (roll) (5 yards)	1 Large Wound Dressing, 5" x 9"	4 Pairs Latex Gloves
1 Forceps		



First Aid Kit and Eyewash Inspection Form

Fire Extinguisher (FE) Inspection Form (Monthly)	
Date of Inspection:	Number of FE Inspected
Signature of Inspector:	
Location of FE and Expiration Date:	
1)	6)
2)	7)
3)	8)
4)	9)
5)	10)
Fire Extinguisher (FE) Inspection Form (Monthly)	
Date of Inspection:	Number of FE Inspected
Signature of Inspector:	
Location of FE and Expiration Date:	
1)	6)
2)	7)
3)	8)
4)	9)
5)	10)
Fire Extinguisher (FE) Inspection Form (Monthly)	
Date of Inspection:	Number of FE Inspected
Signature of Inspector:	
Location of FE and Expiration Date:	
1)	6)
2)	7)
3)	8)
4)	9)
5)	10)

Indoor Utility Locate Checklist and Decision Tree

Job Location:		Project No.:	
Completed By:		Date:	
Signature		Date Locate Conducted:	

Subject		NA	Yes	No	Date Inspected
1	Reliable and accurate as-built drawings available for review?				
2	Electrical conduit, BX cable on walls or ceiling supplying equipment?				
3	Evidence of conduit/gas line or other protruding from floor supplying equipment?				
4	Conduit running through floor from electrical panels?				
5	Line voltage clearly marked on panels and equipment?				
6	Are electrical panels energized when tracing with Radio Induction (electromagnetic) testing? See decision tree below				
7	Abandoned conduit cut off at floor and/or ceiling level?				
8	Multiple/oversize equipment present in vicinity and no evidence of power supply lines present?				
9	Is GPR (Ground Penetration Radar) Mandatory? See decision tree below				
10	Client/Landowner knowledgeable representative reviewed, approved approach, and signed off on QSF-019?				
11	Client/Landowner representative confirmed there have been no changes in conditions between the time of the utility locate and the drilling activities (if > or = 7 days)?				
12	Date of drilling is > 30 days since private utility locate was performed?.				

DECISION TREE

1 → 2 → 3 → 4 → 5 → 6 →

if 1 (as-built drawings) are available and match utility locates → **END**

if 1 (as-built drawings) do not match utility locates or are not available → continue →

→ 7 → 8 →

if 1 (as-built drawings) are available and match utility locates → **END → 10 → 11 →**

If any changes occurred over 7 days re-do utility locate and checklist → 12 → If date of drilling is > 30 days since private utility locate was performed re-do utility locate and checklist

if 1 (as-built drawings) do not match utility locates or are not available → **9 → GPR MANDATORY → 10 → 11 →**

If any changes occurred over 7 days re-do utility locate and checklist → 12 → If date of drilling is > 30 days since private utility locate was performed re-do utility locate and checklist

Note: If GPR is performed and the utility locates do not match the as-built drawings (if available) relocate proposed borehole(s) location(s) or no drilling to be performed at the proposed location.

Underground Utilities Checklist

(QSF-019)

Pre-Drilling/Excavation Checklist and Utility Clearance Log

Project number:	Project name:
Date:	Project location:
Public utility locator:	Public utility locator phone number:
Date of public utility locator request:	Public locator call reference number:
Private utility locator (If applicable):	Private utility locator phone number:

Utilities (indicate that location/utility presence was checked)												
Borehole/ Excavation location	Date (mm/dd/yyyy)	Telephone	Water	Storm sewer	Sanitary sewer	Process sewer	Gas	Electrical	Cable	Overhead utilities	Other	Comments/Warnings
Utility owner												

Instructions: This checklist is to be completed by GHD personnel prior to initiation of field activities as a safety measure, to ensure that all underground utility lines, other underground structures, and above-ground power lines are clearly marked in the area selected for boring or excavation.

Notes: _____

Client: _____ **Client representative:** _____ **Phone number:** _____

Client or property owner acknowledgement of utility clearance: _____ (Client, property owner, or authorized agent signature)

Subcontractor acknowledgement of utility clearance: _____ (Subcontractor or subcontractor representative signature)

GHD field representative name: _____ **Signature:** _____

GHD project manager's review/confirmation of locate completion: _____

In the event that client or property owner acknowledgement cannot be obtained, all boreholes shall be hydro vacuumed and the costs passed on to the client. Attach any clearance documentation from utility owner/operator to this document.

Underground Utilities Checklist for GHD Personnel

Pre-Drilling/Excavation Checklist and Utility Clearance Log

Drilling or excavation work may not proceed if any of the questions answered below are answered "No." Implement stop work authority and contact the GHD project manager to discuss and resolve any concerns or issues. Document the reason for a "No" answer in the comments section below.

Yes	No	N/A	
			Pre-Mobilization
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1. Has a utility locator request been completed within the last 30 days (verify time limit with state or provincial law)? If no, stop work and comment below.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2. Is a scaled site plan, map or drawing showing the proposed borehole locations attached to this form?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3. Does each borehole and excavation location allow for clear entry and exit, adequate workspace, and a clear path for raising the mast (or boom) and operating the drill rig and all support equipment? Ensure that the minimum OSHA/state/provincial utility clearance requirements between the mast or boom and the power line(s) are met. For instance, OSHA requires a minimum approach distance of 10 feet for systems below 50 kV and an increase of 4" for every 10 kV over 50 kV. Confirm if additional permits are required if the boom or mast will be working 5 meters (15 feet) or less from the electrical lines.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4. Are all of the proposed borehole and excavation locations at least 1.0 meters (3 feet) from any subsurface or above-ground utilities shown on client's building plans? Check here <input type="checkbox"/> if plans not provided by client (therefore not applicable to this job).
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5. Are all of the proposed borehole and excavation locations at least 1.0 meters (3 feet) from any subsurface or above-ground utilities shown on public right-of-way street improvement or other public property plan or site map?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	6. Has the site representative, familiar with the site, indicated no knowledge of any subsurface or above-ground utilities within 3 metres (10 feet) of the proposed borehole and excavation locations? (Review locations with site representative)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	7. Are all of the proposed borehole and excavation locations at least 1.0 meters (3 feet) from any subsurface utilities identified during a geophysical survey? Check here <input type="checkbox"/> if no geophysical survey has been completed (therefore not applicable to this job).
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	8. Have all utility locating service providers, notified by the public line locator, marked out their facilities in the vicinity of the borehole and excavation locations or otherwise notified us that they do not have any facilities near the proposed locations? (Attached confirmation and utility locate sheets from public locator)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	9. Are all proposed borehole and excavation locations at least 1.5 meters (5 feet) from a visual line connecting two similar looking manhole covers?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10. Are all proposed borehole and excavation locations at least 1.5 meters (5 feet) from a visual line perpendicular to the street from the water, gas, and electrical meters?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	11. Are all proposed boring and excavation locations clear of pavement joints, curbs, crash posts, or other engineered structures?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	12. Does the ground surface/pavement lack signs of previous excavation (e.g., no pavement subsidence, no differences in pavement texture or relief, no pavement patching)?
			Pre-Drilling and Excavation
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	13. Has it been verified that the proposed drilling or excavation work will not affect any work currently in progress?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	14. Has the drill rig or heavy equipment been inspected prior to use and documented? (See Drill Rig Inspection Checklist or Mobile Equipment Safety Inspection Checklist)
			15. Have barricades been erected to prevent unauthorized access, where applicable?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	16. Have all known live electrical or product lines within 3 meters (10 feet) of the dig path been visually verified? If no, comment below.
			17. For boreholes that have not been cleared or are within 3 meters of a utility:
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	a. Before drilling have you cleared a hole to 2.4 meters (8 feet) below grade using an air-knife, or equivalent, before drilling and is the diameter of this hole greater than the final outside diameter of the boring? If not required comment below.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	b. Does the soil you encountered in the hand-dug hole appear to be native material (i.e., free of clean gravel, clean sand, aggregate base [gravelly sand ~ 10% fines] or other non-native looking material)? If not required comment below.

Have the above concerns been discussed with the GHD project manager?

☐ Yes

☐ No

☐ Not Applicable

Has the start of subsurface work been communicated to the GHD project manager?

☐ Yes

☐ No

☐ Not Applicable

Have the above concerns been discussed with the client?

☐ Yes

☐ No

☐ Not Applicable

Has the scope of work been approved by the client?

☐ Yes

☐ No

☐ Not Applicable

Comments: _____

GHD field representative name: _____

Date: _____

Appendix B

Job Safety Analysis Forms

Job Safety Analysis (JSA) EQUIPMENT FUELING

field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. All project personnel have the authority and responsibility to use **Stop Work Authority**.

Date Issued/Revised	October 12, 2015	JSA Type:	Excavation
Work Type	Construction	Client:	Respondents
Work Activity	Pumping fuel into equipment		
Work Site	Pilsen Soil Operable Unit 1 (OU1) Railroad Spur and Alley Site		
Key Equipment	Pickup Truck w/ Fuel Tank and Temporary fuel storage tank w/ secondary containment		
Task-specific Training	HAZCOM, PPE, Mobile Equipment Operations		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (SEE JOB STEPS FOR TASK-SPECIFIC REQUIREMENTS)			
<input checked="" type="checkbox"/> REFLECTIVE VEST*	<input type="checkbox"/> GOGGLES	<input type="checkbox"/> APR: _____*	<input checked="" type="checkbox"/> GLOVES*
<input checked="" type="checkbox"/> HARD HAT	<input type="checkbox"/> FACE SHIELD*	<input type="checkbox"/> SUPPLIED AIR RESPIRATOR*	<input type="checkbox"/> COVERALLS*
<input type="checkbox"/> LIFELINE / HARNESS*	<input type="checkbox"/> HEARING PROTECTION*	<input type="checkbox"/> PPE CLOTHING*	<input type="checkbox"/> OTHER*
<input checked="" type="checkbox"/> SAFETY GLASSES	<input checked="" type="checkbox"/> STEEL TOED BOOTS	<input type="checkbox"/> OTHER* _____	<input type="checkbox"/> OTHER*
ADDITIONAL PPE: * Provide specific type(s) or descriptions of this item below			
Reflective Vest - Class II			

Reviewed By	Position/Title	Date	Reviewed By	Position/Title	Date

Job Safety Analysis (JSA)

EQUIPMENT FUELING

JOB STEPS (1)	TASK ACTIVITY	POTENTIAL HAZARD(S) (2)	CORRECTIVE MEASURE(S)(3)	Person Responsible
1	Perform the STAR Process (Stop Think Act Review) and discuss Stop Work Authority (SWA) -	<ul style="list-style-type: none"> Slips, trips, falls; Situational risks - use STAR; 	<ul style="list-style-type: none"> Verify that personnel training is sufficient for scheduled task(s). Is Job Instruction (hands-on) Training necessary? 	Fueling Technician
2	Refer to the equipment manufacturer's operating manual before using any machinery. Place Nozzle in tank	<ul style="list-style-type: none"> Property damage and personal injury from fire; Fire potential from static/contact spark 	<ul style="list-style-type: none"> No cell phones allowed on site. No cell phones in fueling areas. No smoking. No fueling during storm events. Determine appropriate area for fueling. Have two 20lb fire extinguishers within 25 feet of the fueling area. Use a bonding wire to establish a connection between the two tanks. 	Fueling Technician
3	Turn on pump and dispense fuel into equipment	<ul style="list-style-type: none"> Property damage and personal injury from fire; Fire potential from static/contact spark; Personal injury due to skin /eye contact with fuel due to splash/ spills of fuel 	<ul style="list-style-type: none"> No cell phones allowed on site. No cell phones in fueling areas. No smoking. No fueling during storm events. Determine appropriate area for fueling. Have two 20lb fire extinguishers within 25 feet of the fueling area. Ensure the end of the nozzle is secured in the tank before turning on the pump and dispensing fuel. Wear the proper PPE. Stay upwind when fueling equipment. Remain in attendance of the nozzle at all times during fueling. Avoid overfilling of the equipment. Use a bonding wire to establish a connection between the two tanks. 	Fueling Technician
4	Turn off pump and return nozzle to the fuel tank	<ul style="list-style-type: none"> Property damage and personal injury from fire; Fire potential from static/contact spark; Slips/ trips/ falls; pinch points 	<ul style="list-style-type: none"> No cell phones allowed on site. No cell phones in fueling areas. No smoking. No fueling during storm events. Determine appropriate area for fueling. Have two 20lb fire extinguishers within 25 feet of the fueling area. Ensure the end of the nozzle is secured in the tank before turning on the pump and dispensing fuel. Wear the proper PPE. Stay upwind when fueling equipment. Remain in attendance of the nozzle at all times during fueling. Avoid overfilling of the equipment. Pay Attention to surroundings. Pick up tools, equipment, and trash in the fueling area. Pay attention to the surroundings. Wear gloves. Do not rush. 	Fueling Technician

- (1) Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.
- (2) A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress / ergonomics / lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught"
- (3) Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable and quantified terms. Avoid subjective general statements such as, "be careful" or "use as appropriate".

Job Safety Analysis (JSA) EXCAVATION ACTIVITIES

Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. All project personnel have the authority and responsibility to use **Stop Work Authority**.

Date Issued/Revised	April 2012	JSA Type:	Excavation Activities
Work Type	Construction	Client:	The PPs for the Solvent Savers Site
Work Activity	Excavation Activities		
Work Site	The Solvent Savers Site Lincklaen, New York		
Key Equipment	Excavator; air monitoring equipment (PID and 4-gas); Excavation Safety Checklist		
Task-specific Training	40 HR and 8 HR HAZWOPER, PPE, Mobile Equipment Operations, Excavation Safety Training; Excavation Competent Person (for supervisors); Heavy Equipment Safety		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (SEE JOB STEPS FOR TASK-SPECIFIC REQUIREMENTS)			
<input checked="" type="checkbox"/> REFLECTIVE VEST*	<input type="checkbox"/> GOGGLES	<input type="checkbox"/> APR: Full-Facepiece*	<input checked="" type="checkbox"/> GLOVES*
<input checked="" type="checkbox"/> HARD HAT	<input type="checkbox"/> FACE SHIELD*	<input type="checkbox"/> SUPPLIED AIR RESPIRATOR*	<input type="checkbox"/> COVERALLS*
<input type="checkbox"/> LIFELINE / HARNESS*	<input type="checkbox"/> HEARING PROTECTION*	<input type="checkbox"/> PPE CLOTHING*	<input type="checkbox"/> OTHER*
<input checked="" type="checkbox"/> SAFETY GLASSES	<input checked="" type="checkbox"/> STEEL TOED BOOTS	<input type="checkbox"/> OTHER* _____	<input type="checkbox"/> OTHER* _____
ADDITIONAL PPE: * Provide specific type(s) or descriptions of this item below			
Reflective Vest- Class II Gloves - Leather			
APR –Full-Facepiece equipped with organic vapor and particulate cartridges			

Reviewed By	Position/Title	Date	Reviewed By	Position/Title	Date

Job Safety Analysis (JSA)

EXCAVATION ACTIVITIES

JOB STEPS ⁽¹⁾	TASK ACTIVITY	POTENTIAL HAZARD(S) ⁽²⁾	CORRECTIVE MEASURE(S) ⁽³⁾	Person Responsible
1	Perform the STAR Process (Stop Think Act Review) and discuss Stop Work Authority (SWA) -	<ul style="list-style-type: none"> Slips, trips, falls; situational risks - use STAR; 	<ul style="list-style-type: none"> Verify personnel training is sufficient for scheduled task(s). Is Job Instruction (hands-on) Training necessary? 	All Affected Personnel
2	Verify Utility Clearance procedures completed (overhead and underground); verify excavation trench layout	<ul style="list-style-type: none"> Underground utility strike Overhead utilities 	<ul style="list-style-type: none"> Clear all underground utilities Utility Locate Ticket number on file within 10 days of excavation startup? Mark work area and safe distances for overhead lines use spotter as necessary 	Site Supervisor Project Manager
3	Setup necessary work area and traffic controls	<ul style="list-style-type: none"> Fall-in Caught-between and struck-by hazards 	<ul style="list-style-type: none"> Demarcate site and work areas to ensure that personnel and truck/equipment traffic is maintained safely and smoothly Stockpile and laydown area are setup properly 	Site Supervisor Laborers
4	Hand digging and pot holing activities conducted (where/if necessary based on utility locates)	<ul style="list-style-type: none"> Underground utility strike 	<ul style="list-style-type: none"> Use preventive techniques Maintain proper utility clearances with heavy equipment and use hand digging/pot holing when necessary 	Site Supervisor Laborers Operator
5	Heavy equipment operations to excavate and handle soils and spoils	<ul style="list-style-type: none"> Caught-between and struck-by hazards Underground/overhead utilities 	<ul style="list-style-type: none"> Stay out of swing radius Use spotters to verify clear route of travel and work area; maintain eye contact with operator and/or signal operator; keep soil 2 feet from edges Inspect heavy equipment – document inspection Ensure above utility clearances and safe work protocols are followed 	All Affected Personnel
6	Excavation Activities	<ul style="list-style-type: none"> Soil cave-in; noise Struck-by/against Encountering impacted soils 	<ul style="list-style-type: none"> Keep proper distances from edge of excavation Limit equipment operations in trench area Keep work area free of trip hazards Perform necessary soil classification Use hearing protection as necessary Follow air monitoring protocols Contact site supervisor if odors and/or discolored soils are encountered 	Operator Laborers Site Supervisor
7	Entry into an Excavation	<ul style="list-style-type: none"> Soil cave-in Struck-by/against Encountering slag Hazardous atmospheres Slip/trip/fall hazards Emergency egress 	<ul style="list-style-type: none"> Keep proper distances from edge of excavation Limit equipment operations in trench area Keep work area free of trip hazards Perform necessary soil classification Use daily inspection form to document/meet competent person inspection requirements Inspect trench after any change in conditions (rain, equipment vibrations, etc.) Utilize trench box properly; ensure that tabulated data sheet is on site (as required) Use 4-gas monitor and PID to screen excavation air prior to and during entry Ladder safety and proper slope of ladder If necessary based on air monitoring and/or other site conditions use harness and lifeline when entering trenches over 5 feet deep 	Site Supervisor Operators Laborers

Job Safety Analysis (JSA) EXCAVATION ACTIVITIES

- (1) Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.
- (2) A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress / ergonomics / lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught"
- (3) Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable and quantified terms. Avoid subjective general statements such as, "be careful" or "use as appropriate".

Job Safety Analysis (JSA) MOBILE EQUIPMENT OPERATION

Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. All project personnel have the authority and responsibility to use **Stop Work Authority**.

Date Issued/Revised	October 12, 2015	JSA Type:	Construction
Work Type	Construction	Client:	Respondents
Work Activity	Mobile Equipment Operation		
Work Site	Pilsen Soil Operable Unit 1 (OU1) Railroad Spur and Alley Site		
Key Equipment	Excavator; Dozer, Loader, Skidsteer, Compactor, Grader, Off-road Dump Truck, Pickup Trucks		
Task-specific Training	40 HR and 8 HR HAZWOPER, PPE, Mobile Equipment Operations and Hazard Communication		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (SEE JOB STEPS FOR TASK-SPECIFIC REQUIREMENTS)			
<input checked="" type="checkbox"/> REFLECTIVE VEST*	<input type="checkbox"/> GOGGLES	<input type="checkbox"/> APR: _with organic vapor and P-100 cartridges for stabilization activities_*	<input checked="" type="checkbox"/> GLOVES*
<input checked="" type="checkbox"/> HARD HAT	<input type="checkbox"/> FACE SHIELD*	<input type="checkbox"/> SUPPLIED AIR RESPIRATOR*	<input type="checkbox"/> COVERALLS*
<input type="checkbox"/> LIFELINE / HARNESS*	<input type="checkbox"/> HEARING PROTECTION*	<input type="checkbox"/> PPE CLOTHING*	<input type="checkbox"/> OTHER*
<input checked="" type="checkbox"/> SAFETY GLASSES	<input checked="" type="checkbox"/> STEEL TOED BOOTS	<input type="checkbox"/> OTHER* _____	<input type="checkbox"/> OTHER* _____
ADDITIONAL PPE: * Provide specific type(s) or descriptions of this item below			
Reflective Vest- Class II Gloves – Outer Nitrile			

Reviewed By	Position/Title	Date	Reviewed By	Position/Title	Date

Job Safety Analysis (JSA)

MOBILE EQUIPMENT OPERATION

JOB STEPS (1)	TASK ACTIVITY	POTENTIAL HAZARD(S) (2)	CORRECTIVE MEASURE(S)(3)	Person Responsible
1	Perform the STAR Process (Stop Think Act Review) and discuss Stop Work Authority (SWA) -	<ul style="list-style-type: none"> Slips, trips, falls; Situational risks 	<ul style="list-style-type: none"> Verify personnel training is sufficient for scheduled task(s). Is Job Instruction (hands-on) Training necessary? 	Operator
2	Perform daily (pre-shift) equipment inspection include area around the equipment and PPE and perform a complete walk around inspection	<ul style="list-style-type: none"> Equipment failure PPE failure 	<ul style="list-style-type: none"> Don all necessary PPE Provide training to personnel on inspection procedures Document daily inspection Defects must be corrected before operating unit 	Operator
3	Mount/dismount the equipment	<ul style="list-style-type: none"> Slip/trip/fall hazards Sprains/Strains Potential injury 	<ul style="list-style-type: none"> Use three points of contact Never jump from the machine Clear tracks and personnel access points of debris and mud as necessary Only a trained operator will be allowed on equipment Never carry riders unless unit is so designed 	Operator
4	Starting heavy/mobile equipment	<ul style="list-style-type: none"> Struck-by Caught between Equipment failure 	<ul style="list-style-type: none"> Perform inspection (see Task 2) Check to be certain all workers and equipment are a safe distance from unit All operators manuals should be available for each piece of equipment and used in employee training Allow proper warm-up and wait for gauges to register properly Raise the blade, cable and chokers, boom, grapple, or other attachments before moving the unit 	Operator
5	Operation of heavy/mobile equipment including soil stabilization activities	<ul style="list-style-type: none"> Struck-by/Caught In Overhead/underground utilities Flying debris Rollover Fire Winch failure Particulate emissions from stabilization activities 	<ul style="list-style-type: none"> Appropriate guarding (according to machine type and use) shall be in place at all times unit is in operation Backup alarms shall be functional Seat belts shall be provided and their use enforced Fire extinguishers and first aid kits shall be provided on each unit Fire extinguishers shall be inspected for functionality on a daily basis Do not operate equipment unless you have been trained to safely operate the equipment Wear a full-face air purifying respirator when performing soil stabilization activities. 	Operator
6	Perform equipment maintenance	<ul style="list-style-type: none"> Equipment failure/loss Sharp objects Pinch points 	<ul style="list-style-type: none"> Use STAR process Follow equipment manufacturer's preventive maintenance procedures and instructions Only qualified individuals should perform maintenance activities on equipment 	Operator
7	Cleaning and housekeeping of equipment	<ul style="list-style-type: none"> Fire Slip/trip/fall hazards Equipment failure 	<ul style="list-style-type: none"> Remove loose items and all trash from the operator's compartment Clean equipment as necessary to prevent buildup of debris, wood chips, etc. that may cause fire 	Operator

- (1) Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.
- (2) A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress / ergonomics / lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught"
- (3) Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable and quantified terms. Avoid subjective general statements such as, "be careful" or "use as appropriate".

Job Safety Analysis (JSA)

MOBILIZATION AND DEMOBILIZATION ACTIVITIES

Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. All project personnel have the authority and responsibility to use **Stop Work Authority**.

Date Issued/Revised	October 12, 2015	JSA Type	Mobilization and Demobilization Activities
Work Type	Construction	Client	Respondents
Work Activity	Mobilization of Equipment and Supplies to and from the job site		
Work Site	Pilsen Soil Operable Unit 1 (OU1) Railroad Spur and Alley Site		
Key Equipment	Pickup trucks and trailers		
Task-specific Training	PPE, HAZCOM, Motor Vehicle Safety, Mobile Equipment Operations		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (SEE JOB STEPS FOR TASK-SPECIFIC REQUIREMENTS)			
<input checked="" type="checkbox"/> REFLECTIVE VEST*	<input type="checkbox"/> GOGGLES	<input type="checkbox"/> APR: _____*	<input checked="" type="checkbox"/> GLOVES*
<input checked="" type="checkbox"/> HARD HAT	<input type="checkbox"/> FACE SHIELD*	<input type="checkbox"/> SUPPLIED AIR RESPIRATOR*	<input type="checkbox"/> COVERALLS*
<input type="checkbox"/> LIFELINE / HARNESS*	<input type="checkbox"/> HEARING PROTECTION*	<input type="checkbox"/> PPE CLOTHING*	<input type="checkbox"/> OTHER* _____
<input checked="" type="checkbox"/> SAFETY GLASSES	<input checked="" type="checkbox"/> STEEL TOED BOOTS	<input type="checkbox"/> OTHER* _____	<input type="checkbox"/> OTHER* _____
ADDITIONAL PPE: * Provide specific type(s) or descriptions of this item below			
Reflective Vest - Class II			
Gloves - Leather			

Reviewed By	Position/Title	Date	Reviewed By	Position/Title	Date

Job Safety Analysis (JSA)

MOBILIZATION AND DEMOBILIZATION ACTIVITIES

JOB STEPS ⁽¹⁾	TASK ACTIVITY	POTENTIAL HAZARD(S) ⁽²⁾	CORRECTIVE MEASURE(S) ⁽³⁾	Person Responsible
1	Discuss STAR (Stop Think Assess & Review) and Stop Work Authority (SWA)	<ul style="list-style-type: none"> Site personnel not aware of STAR & SWA 	<ul style="list-style-type: none"> Project team discusses importance of and documentation procedures for SWA during pre-job safety meeting. Use SWA to stop any work that is unsafe. 	Personnel Taking Part in this Activity
2	Check weather	<ul style="list-style-type: none"> Unexpected storm; Fog; Rain; Snow; Lightening/Thunder; Heat/Cold stress 	<ul style="list-style-type: none"> Check local weather forecast. Discuss weather issues and precautions to take while driving and on-site during the pre-job safety meeting. If weather conditions (e.g., fog, rain, snow, etc.) impair the ability/vision of the driver, exit at nearest safe location and assess the situation. While on-site, at first sign of lightening/thunder utilize SWA and assess weather conditions. In extreme temperatures, ensure all personnel have proper clothing, hydration, and heat/cold protection (e.g., canopy, fan, and glove warmers). 	Personnel Taking Part in this Activity
3	Load equipment into vehicle	<ul style="list-style-type: none"> Back strain; Cuts; Pinch points; Hand/Foot injury; Forgotten equipment; Damaged equipment 	<ul style="list-style-type: none"> Use proper lifting techniques and buddy system if needed. Wear leather/cotton gloves and avoid placing hands/fingers in pinch point locations. Wear steel toe boots. Verify requested equipment against warehouse form. Load equipment in an organized manner to prevent shifting during transport or use cargo netting. 	Personnel Taking Part in this Activity
4	Complete Daily Operator Vehicle Checklist	<ul style="list-style-type: none"> Damaged vehicle lights, tires, windows, mirrors, horn; Inadequate vehicle documents and/or safety items 	<ul style="list-style-type: none"> Check for fluid leaks under vehicle. Test operation of headlights, front/rear turn signals, backup lights, brake lights, and emergency flashers. Visually check the pressure/wear of tires. Ensure the vehicle has a spare tire. Assure windshield and window glass is clean and free from obstructions. Test the windshield wipers and horn. Verify vehicle registration, insurance card, and inspection sticker is present and valid. Ensure the vehicle contains a first aid kit, fire extinguisher, and road hazard kit. 	Personnel Taking Part in this Activity
5	Check and adjust seat, steering wheel, headrest, and mirrors	<ul style="list-style-type: none"> Back/body strain; Blind spots; Impaired vision. 	<ul style="list-style-type: none"> Adjust seat, headrest, and steering wheel height so body is fully supported/comfortable and pedals are within easy reach. Ensure mirrors are properly adjusted. 	Personnel Taking Part in this Activity
6	Fasten seat belt(s) and ensure passenger(s) seat belts are fastened	<ul style="list-style-type: none"> Serious injury, ejection, or death from collision and/or traffic citation 	<ul style="list-style-type: none"> Verify driver and passenger(s) seat belts are in good condition and properly latched. 	Personnel Taking Part in this Activity
7	Ensure vehicle doors are locked	<ul style="list-style-type: none"> Serious injury, ejection, or death from collision; Unwanted intrusion; Lost equipment 	<ul style="list-style-type: none"> Manually lock all doors to vehicle. 	Personnel Taking Part in this Activity
8	Start engine and check gauges and warning lights	<ul style="list-style-type: none"> Vehicle breakdown 	<ul style="list-style-type: none"> Verify sufficient fuel and other hazard lamps (e.g., battery, oil, and temperature) are not lit. 	Personnel Taking Part in this Activity

Job Safety Analysis (JSA)

MOBILIZATION AND DEMOBILIZATION ACTIVITIES

JOB STEPS ⁽¹⁾	TASK ACTIVITY	POTENTIAL HAZARD(S) ⁽²⁾	CORRECTIVE MEASURE(S) ⁽³⁾	Person Responsible
9	Mobilize to site	<ul style="list-style-type: none"> Arriving late; Collision; Injury or Death to occupants or other parties 	<ul style="list-style-type: none"> Do not use cell phones or perform other distracting activities while vehicle is in motion. Constantly scan intersections, move eyes, check mirrors, and assess traffic lights (fresh vs. stale). Maintain safety cushion around vehicle (front, sides, and rear) and 4 second following distance. Utilize all driving defensive techniques. 	Personnel Taking Part in this Activity
10	Arrive at site	<ul style="list-style-type: none"> Pedestrian injury; Collision 	<ul style="list-style-type: none"> Maintain awareness of pedestrian/vehicular traffic when entering site and traveling to work zone. 	Personnel Taking Part in this Activity
11	Park vehicle	<ul style="list-style-type: none"> Pedestrian injury; Collision; Property damage 	<ul style="list-style-type: none"> Maintain awareness of pedestrian/vehicular traffic. Park vehicle in pull-through parking space or facing the exit. Use caution and mirrors/spotter when backing vehicle. 	Personnel Taking Part in this Activity
12	Demobilization	<ul style="list-style-type: none"> Collision; Injury or Death to occupants or other parties 	<ul style="list-style-type: none"> Perform perimeter vehicle check. Maintain awareness of pedestrian/vehicular traffic when exiting site. Utilize defensive driving techniques. Complete post-departure checklist and report vehicle problems to company vehicle maintenance manager or rental car agency. 	Personnel Taking Part in this Activity

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- (3) Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable and quantified terms. Avoid subjective general statements such as, "be careful" or "use as appropriate".

JOB SAFETY ANALYSIS (JSA)

Industrial Hygiene Air Sampling

Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority (SWA)**.

Date Issued/Revised:	10/09/15	JSA Type:	Air Group
Work Type:	Environmental	Client:	Respondents
Work Activity:	Air Monitoring/sampling		
Work Site:	Pilsen Soil Operable Unit 1 (OU1) Railroad Spur and Alley Site		
Key Equipment:	personnel air filter sampling equipment. particulate monitoring equipment		
Task-specific Training:	WHMIS/HAZCOM, PPE, Back Safety		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (see job steps for task-specific requirements)					
<input checked="" type="checkbox"/> Reflective Vest	<input type="checkbox"/> Goggles	<input type="checkbox"/> Gloves*	Supplied Air	APR	
<input checked="" type="checkbox"/> Hard Hat	<input type="checkbox"/> Face Shield*	<input type="checkbox"/> Coveralls*	<input type="checkbox"/> SCBA	<input checked="" type="checkbox"/> Full Face APR	<input checked="" type="checkbox"/> Particulate <input type="checkbox"/> Organic Vapor
<input type="checkbox"/> Lifeline/Harness*	<input type="checkbox"/> Hearing Protection*	<input type="checkbox"/> PPE Clothing*	<input type="checkbox"/> Airline Respirator (attach description)	<input type="checkbox"/> Half Mask APR	<input type="checkbox"/> Particulate/Organic Vapor Combined
<input checked="" type="checkbox"/> Safety Glasses	<input checked="" type="checkbox"/> Safety-toed Boots				<input type="checkbox"/> P100 cartridges
<input type="checkbox"/> Other*		<input type="checkbox"/> Other*		<input checked="" type="checkbox"/> Other* N95 rated disposable mask	
ADDITIONAL PPE (*provide specific type(s) or descriptions of this item below)					
Work in exclusion zones will begin in Level C PPE until air sampling data supports a downgrade in PPE					

Project Development Team		Position/Title	Modified By	Reviewed By	Position/Title	Date
Name	Signature					
Walt Pochron		PM				10/08/15
Matt Lazaric		SSO				10/08/15

JOB SAFETY ANALYSIS (JSA)

Industrial Hygiene Air Sampling

Job Steps ⁽¹⁾	Task Activity	Potential Hazard(s) ⁽²⁾	Corrective Measure(s) ⁽³⁾	Person Responsible
1	Review STAR and SWA	<ul style="list-style-type: none"> Personnel not aware of STAR and SWA 	<ul style="list-style-type: none"> Reminder of importance of and documentation procedures for SWA; use SWA to stop any unsafe or illegal work practices Review JSA and identify any additional hazards to be mitigated prior to work commencing (site-specific hazards, overhead hazards, doorways, proper equipment selected for the task, etc.) Perform a tool box talk; review with subcontractors and employees any additional requirements (PPE, material handling, etc.) Turn off cell-phone to avoid distractions when working at heights 	
2	Traversing the site, accessing work area(s)	<ul style="list-style-type: none"> Lifting hazards Back safety Slip/trip/fall hazards Manual material handling Legionnaire Disease 	<ul style="list-style-type: none"> Use SMART and STAR Assess temperatures, warmer weather promotes bacteria and fungus growth. Wear appropriate respiratory protection listed above Reduce travel distance when there is a need to carry/lift materials Make sure grip is adequate; wear leather/cotton gloves Wear the appropriate PPE and clothing based on task, weather, and site requirements (refer to HASP and SOPs) Be aware of surroundings at all times, wear PPE, and inspect work areas for slip, trip, fall, and traffic hazards; follow HASP and SOP Keep footwear free of excessive mud/snow to maintain traction 	Operators
3	Set up IH sampling equipment and sampling activities	<ul style="list-style-type: none"> Dangerous weather conditions Thermal stress Pinch points Vehicle traffic Slip/trip/fall hazards Noise 	<ul style="list-style-type: none"> Consult local weather reports daily set up particulate monitoring equipment based on wind direction and relocate during the day if wind direction changes and watch for signs of inclement weather Set particulate monitoring equipment on tripod at least four feet above grade Set-up personnel air sampling pump on a location such as a belt which does not interfere with the employees ability to move, locate air sampling filter at least shoulder height. Wear appropriate PPE and clothing based on task, weather, and site requirements (refer to HASP and SOPs) Keep hands, feet, and clothing away from moving parts/devices Be aware of surroundings at all times, wear PPE, and inspect work areas for slip, trip, fall, and traffic hazards; follow HASP and SOP Yield the right of way to vehicles Utilize barricades/cones/caution tape to define work zone if required Wear appropriate hearing protection if noise levels exceed 85 dBA Refer to step 1 and the HASP for additional lifting information Inspect route to be traveled Use SMART and STAR 	Operators

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Job Safety Analysis (JSA)

Clearing Operations – Oversight

Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA)**.

Date issued/revised:	10/8/15	Client:	Respondent			
Project Number:	039826	Created By	Walt Pochron	Sim OPS	Yes/No	SSE on site? Yes/No
Project Address:	Pilsen Soil Operable Unit 1 (OU1) Railroad Spur and Alley Site					
Specific Task	Construction management of heavy equipment clearing vegetation					
Key equipment:	Heavy equipment (bull dozer, excavator, skid steer, etc.), mobile equipment safety checklist, blow horn for communication					
Task-specific training:	Heavy Equipment Oversight					

Hard Hat	Gloves (ANSI/EN 388)	Eye protections	Fall protection	APR	Vest	PPE clothing
<input checked="" type="checkbox"/> Type I (Top Impact)	<input type="checkbox"/> Chemical Protective (i.e. Nitrile)	<input checked="" type="checkbox"/> ANSI/CSA safety glasses	<input type="checkbox"/> Harness	<input type="checkbox"/> Full Face Mask	<input type="checkbox"/> Class II	<input type="checkbox"/> Coveralls
<input type="checkbox"/> Type II (Side Impact)	<input checked="" type="checkbox"/> Level 1 Light duty	<input type="checkbox"/> Goggles/spoggles	<input type="checkbox"/> Shock absorb lanyard	<input type="checkbox"/> Half Face Mask	<input type="checkbox"/> Class III	<input type="checkbox"/> Fire retardant clothing (FRC)
<input type="checkbox"/> Class E (standard)	<input type="checkbox"/> Level 2 Light duty with protection	<input type="checkbox"/> Face shield	<input type="checkbox"/> Lifeline		<input type="checkbox"/> Anti-Static	<input checked="" type="checkbox"/> High viz clothing
<input type="checkbox"/> Class G	<input type="checkbox"/> Level 3 Medium duty	<input type="checkbox"/> Other*		Cartridges	<input type="checkbox"/> FRC	<input checked="" type="checkbox"/> Long pants
	<input type="checkbox"/> Level 4 Heavy duty			<input type="checkbox"/> N95		<input type="checkbox"/> Long sleeve shirts
Foot Protection	<input type="checkbox"/> High viz	Hearing protection	Arc flash	<input type="checkbox"/> P100		<input type="checkbox"/> Paper tyvek
<input checked="" type="checkbox"/> Industrial grade safety boot	<input type="checkbox"/> Other*	<input checked="" type="checkbox"/> NOT Required	<input type="checkbox"/> Haz.Cat 2	<input type="checkbox"/> P95		<input type="checkbox"/> Polyethylene tyvek
<input type="checkbox"/> Rubber boots (industrial grade)		<input type="checkbox"/> Required	<input type="checkbox"/> Haz Cat 4	<input type="checkbox"/> R95		<input type="checkbox"/> Other *
<input type="checkbox"/> Hip waders				<input type="checkbox"/> Organic vapor		
	see key equipment			<input type="checkbox"/> Specialty/other		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
Walter Pochron				10/8/15

Job steps ⁽¹⁾	Task activity	Potential hazard(s) ⁽²⁾ Include energy sources from hazard wheel -	Corrective measure(s) ⁽³⁾	Person responsible (Print first and last names)	Verified by (Print first and last names)
1	Tailgate safety meeting; perform STAR; mobile equipment inspection of heavy equipment, review communication procedure using blow horn Modify this "seed" template JSA to address site conditions and task-specific situations (in conjunction with heavy equipment operator)	<ul style="list-style-type: none"> Miscommunication Insufficient information for all personnel to work safely Slip/trips/falls Situational risks Short service employees 	<ul style="list-style-type: none"> Discuss work steps, SWA, perform STAR process, and the proper course of action along with evacuation routes Discuss the scope prior to start of work Ensure proper documentation is in place Verify all personnel training is sufficient for task 	Site supervisor	
2	Establish approved travel route/site preparation; inspect the ground and work surface	<ul style="list-style-type: none"> Obstructions: low hanging areas, overhead utilities Traffic Underground utilities Ground instability 	<ul style="list-style-type: none"> Plan movement of heavy equipment and any supporting equipment Check the site to ensure no overhead; if any overhead obstructions exist, re-route path of travel to avoid contact Ensure all site personnel are aware of the work processes/hazards 	Site supervisor	
3	Begin clearing operations	<ul style="list-style-type: none"> Heavy equipment line of fire Falling trees, limbs or vines Poor communication Heat/cold stress Dehydration Biological hazards such as snakes, stinging insects, etc. 	<ul style="list-style-type: none"> Maintain communication with operator Maintain 50 ft. buffer between equipment and personnel Maintain appropriate buffer between falling trees and personnel Take frequent rest and water breaks Review communication protocol with blow horn. Wear proper PPE to protect against stinging insects Leave any area where stinging biologicals are identified 	Site supervisor	
4	Clean up/Shutdown	<ul style="list-style-type: none"> Removing heavy equipment from site Damage to on-site utilities (overhead and underground) 	<ul style="list-style-type: none"> Check with Site Supervisor to make sure that equipment is properly stowed and any equipment damaged during loading/unloading is taken out of service Ensure each piece of heavy equipment has a clear path of travel while exiting the work site 	Site supervisor	

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- (3) Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

Site personnel participating in JSA review:

I have participated in the review and discussion of the Job Safety Analysis (JSA) listed on this document and understand the duties I am responsible to fulfill. As part of my work, I know I have the responsibility and obligation to STOP work with a **Stop Work Authority (SWA)** if conditions change and/or potential hazards have been identified.

Name/Company	Sign	Date
Walter Pochron		

SSE(s) on job: _____ Assigned mentor: _____

Presenter signature: _____ Date/time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.

Supervisor Signature: _____ Date/time: _____

Location of mustering point: _____ Wind direction (current): _____

GHD emergency contact (Name and verified phone number): _____

Supervisor signature documenting daily debrief has been completed: _____

JOB SAFETY ANALYSIS (JSA)

Concrete Breaking - Excavator with Hydraulic Hammer

Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority (SWA)**.

Date Issued/Revised:	[10/08/15]	JSA Type:	Construction
Work Type:	Remedial Construction	Client:	Respondents
Work Activity:	Concrete breaking		
Work Site:	Pilsen Soil Operable Unit 1 (OU1) Railroad Spur and Alley Site		
Key Equipment:	Excavator and hydraulic hammer		
Task-specific Training:	Mobile/heavy equipment training, HASP, hydraulic hammer operation and limitations		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (see job steps for task-specific requirements)

<input checked="" type="checkbox"/> Reflective Vest	<input type="checkbox"/> Goggles	<input checked="" type="checkbox"/> Gloves*	Supplied Air	APR	
<input checked="" type="checkbox"/> Hard Hat	<input type="checkbox"/> Face Shield*	<input type="checkbox"/> Coveralls*	<input type="checkbox"/> SCBA	<input type="checkbox"/> Full Face APR	<input type="checkbox"/> Particulate <input type="checkbox"/> Organic Vapor
<input type="checkbox"/> Lifeline/Harness*	<input checked="" type="checkbox"/> Hearing Protection*	<input type="checkbox"/> PPE Clothing*	<input type="checkbox"/> Airline Respirator (attach description)	<input type="checkbox"/> Half Mask APR	<input type="checkbox"/> Particulate/Organic Vapor Combined
<input checked="" type="checkbox"/> Safety Glasses	<input checked="" type="checkbox"/> Safety-toed Boots				<input type="checkbox"/> Acid Gas
<input type="checkbox"/> Other*		<input type="checkbox"/> Other*		<input type="checkbox"/> Other*	

ADDITIONAL PPE (*provide specific type(s) or descriptions of this item below)

Project Development Team		Position/Title	Modified By	Reviewed By	Position/Title	Date
Name	Signature					
Walter Pochron		PM				

JOB SAFETY ANALYSIS (JSA)

Concrete Breaking - Excavator with Hydraulic Hammer

Job Steps ⁽¹⁾	Task Activity	Potential Hazard(s) ⁽²⁾	Corrective Measure(s) ⁽³⁾	Person Responsible
1	Use the STAR Process and discuss SWA – modify JSA as necessary A. Inspect work area B. Determine the hazards of performing the task and survey the work area	<ul style="list-style-type: none"> Slip/trip/fall hazards Situational risks Failing to identify hazardous conditions resulting in losses or near losses Utility clearance Miscommunications 	<ul style="list-style-type: none"> Verify personnel's training is sufficient for the scheduled task(s) Is job instruction training (hands-on) training necessary? Consider weather conditions Always consider the worst-case scenario Analyze the hazards determined Discuss task and determine best plan of action towards safety and property Confirm utilities within the work area(s) For every hour of continuous operation the operator shall exit the equipment and refocus on the task at hand. This micro break shall consist of (i.e., walk around the equipment, kick the tires, obtain a drink of water, etc.). 	PM, Supervisor, Operator
2	Inspect equipment A. Mobile equipment checklist B. Preventive maintenance C. Housekeeping procedures	<ul style="list-style-type: none"> Equipment failure/malfunction Property damage Release of stored energy Slip/trip/fall hazards Pinch points Visibility Poor housekeeping 	<ul style="list-style-type: none"> Inspect equipment using daily equipment checklist Report all damaged, missing, or broken components to your site supervisor immediately Follow manufacturer's recommended daily inspections. Wear appropriate hand protection; identify pinch point areas and keep hands and fingers clear Make sure equipment is in "Zero" energy mode and off during the inspection Clean windshield and side windows as necessary Keep cab of machine clean and free of all debris especially around the foot controls and levers 	Operator, Supervisor
3	Entering and exiting the equipment	<ul style="list-style-type: none"> Slips and Falls Muddy Conditions Worn/dirty/muddy soles on boots 	<ul style="list-style-type: none"> Mount/dismount equipment using three points of contact Use manufacturer designed steps and handrails Keep steps and work boots free of debris (i.e., mud, clay) Keep work boots in good condition; replace as necessary to prevent slips and loss of traction 	Operator
4	Moving equipment A. Start the machine B. Review travel path prior to moving C. Tracking, travel, and swing	<ul style="list-style-type: none"> Ground personnel Inclement weather Dust Poor visibility Property damage Overhead utilities Distractions 	<ul style="list-style-type: none"> Pre plan your route; use the STAR process and consult with your supervisor Wear the appropriate PPE Always look up when mobilizing to the work area Be aware of your surroundings and ground personnel; use SWA if unsafe acts or conditions exist Do not operate during electrical storms; SWA in effect No eating, drinking, or cell phone use while operating machinery Keep lines of communication open via hand signals, two-way radios or both. 	Operator

JOB SAFETY ANALYSIS (JSA)

Concrete Breaking - Excavator with Hydraulic Hammer

Job Steps ⁽¹⁾	Task Activity	Potential Hazard(s) ⁽²⁾	Corrective Measure(s) ⁽³⁾	Person Responsible
5	Breaking concrete A. Block B. Foundations C. Platforms	<ul style="list-style-type: none"> Flying debris Ground personnel Equipment damage Uneven surfaces Noisy environment Sprains Utilities 	<ul style="list-style-type: none"> Wear hearing protection Keep all personnel out of the "line of fire" and set up safe zone around work area – use SWA if personnel enter "line of fire" Set up controlled/demarcated work zone in high traffic areas Position machinery on solid, even surfaces; use the STAR process and discuss with your supervisor Understand the equipment's limitations Watch for sharp objects protruding out from the concrete (i.e., rebar, steel, etc.) Never walk into the pile. Clear and area if necessary. Watch for any known utilities 	Operator
6	End of task A. Breaks B. Fueling C. Parking – set equipment to a "zero energy state"	<ul style="list-style-type: none"> Slip/trip hazards Spills Obstructions Equipment damage Vandalism Unauthorized personnel 	<ul style="list-style-type: none"> Be aware of your surrounding conditions (footing, weather conditions, etc.) Restore equipment to "Zero" energy mode Use three points of contact when dismounting equipment Refer to JSA on "Fueling of Equipment" Remove key from equipment, close all windows and lock the cab Secure the work zone Stage equipment appropriately Park on solid, level surface 	Operator

- (1) Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.
- (2) A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".
- (3) Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

JOB SAFETY ANALYSIS (JSA)

Excavation Oversight

Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority (SWA)**.

Date Issued/Revised:	10/08/15	JSA Type:	Excavation
Work Type:	Construction	Client:	Respondents
Work Activity:	Excavation oversight		
Work Site:	Pilsen Soil Operable Unit 1 (OU1) Railroad Spur and Alley Site		
Key Equipment:	Excavator; shoring with tabulated data sheet(s); ladder; air monitoring equipment (PID and 4-gas); Excavation Safety Checklist		
Task-specific Training:	40-Hour and 8-Hour HAZWOPER; PPE; Mobile Equipment Operations; Excavation Safety Training; Excavation Competent Person; Confined Space Entry		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (see job steps for task-specific requirements)

<input checked="" type="checkbox"/> Reflective Vest	<input type="checkbox"/> Goggles	<input checked="" type="checkbox"/> Gloves*	Supplied Air	APR	
<input checked="" type="checkbox"/> Hard Hat	<input type="checkbox"/> Face Shield*	<input type="checkbox"/> Coveralls*	<input type="checkbox"/> SCBA	<input checked="" type="checkbox"/> Full Face APR	<input checked="" type="checkbox"/> Particulate <input type="checkbox"/> Organic Vapor
<input type="checkbox"/> Lifeline/Harness*	<input checked="" type="checkbox"/> Hearing Protection*	<input type="checkbox"/> PPE Clothing*	<input type="checkbox"/> Airline Respirator (attach description)	<input type="checkbox"/> Half Mask APR	<input type="checkbox"/> Particulate/Organic Vapor Combined
<input checked="" type="checkbox"/> Safety Glasses	<input checked="" type="checkbox"/> Safety-toed Boots				<input type="checkbox"/> Acid Gas
<input type="checkbox"/> Other*		<input type="checkbox"/> Other*		<input type="checkbox"/> Other*	

ADDITIONAL PPE (*provide specific type(s) or descriptions of this item below)

Class II vest; leather gloves; Noise Reduction Rating (NRR) 20 hearing protection

Work in Exclusion zone will begin in Level C PPE until air monitoring data supports a downgrade in PPE level

Project Development Team		Position/Title	Modified By	Reviewed By	Position/Title	Date
Name	Signature					
Walter Pochron		PM				

JOB SAFETY ANALYSIS (JSA)

Excavation Oversight

Job Steps ⁽¹⁾	Task Activity	Potential Hazard(s) ⁽²⁾	Corrective Measure(s) ⁽³⁾	Person Responsible
1	Perform the STAR process; discuss SWA; verify Permit to Excavate and Utility Clearance Form is completed (overhead and underground); verify excavation layout	<ul style="list-style-type: none"> Underground utility strike Overhead utilities 	<ul style="list-style-type: none"> QSF-019 and Permit to Excavate Forms completed and signed off Utility Locate Ticket number on file within 10 days of excavation startup? Mark work area and safe distances for overhead lines; use spotter as necessary 	CRA Construction Oversight Person
2	Set up necessary work area and traffic controls	<ul style="list-style-type: none"> Fall-in Caught-between struck-by Lifting hazards Manual material handling Back injury 	<ul style="list-style-type: none"> Demarcate site and work areas to ensure that personnel and truck/equipment traffic is maintained safely and smoothly Stockpile and laydown area are set up properly Perform a pre-start meeting, inform subcontractor of safe lifting practices Reduce travel distance when there is a need to carry/lift materials Make sure grip is adequate; wear leather/cotton gloves when setting up barricades Size up the load; if the object is too large or odd shaped OR is in excess of 50 pounds (23 kg) then assistance (mechanical or a buddy lift) will be required Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and keep lower back in a neutral position Avoid one-handed carrying if possible; maintain awareness of footing 	CRA Construction Oversight Person
3	Hand digging and potholing activities (where/if necessary based on utility locates)	<ul style="list-style-type: none"> Underground utility strike 	<ul style="list-style-type: none"> Use preventive techniques Maintain proper utility clearances with heavy equipment and use hand digging/potholing when necessary Refer to step 2 and the HASP for additional lifting information 	CRA Construction Oversight Person
1	Heavy equipment operations to excavate and handle soils and waste materials	<ul style="list-style-type: none"> Caught-between and struck-by hazards Underground/overhead utilities 	<ul style="list-style-type: none"> Stay out of swing radius Use spotters to verify clear route of travel and work area Maintain eye contact with operator and/or signal operator Keep soil 2 feet from edges Inspect heavy equipment and document inspection Ensure the above utility clearances and safe work protocols are followed 	CRA Construction Oversight Person
2	Excavating activities	<ul style="list-style-type: none"> Soil cave-in Noise hazard Struck-by/against hazards Potential contact with chemical waste material, organic vapors, and particulate 	<ul style="list-style-type: none"> Keep proper distances from edge of excavation Limit equipment operations in trench area Keep work area free of trip hazards Perform necessary soil classification Use hearing protection as necessary Wear designated PPE and conduct air monitoring 	CRA Construction Oversight Person

JOB SAFETY ANALYSIS (JSA)

Excavation Oversight

Job Steps ⁽¹⁾	Task Activity	Potential Hazard(s) ⁽²⁾	Corrective Measure(s) ⁽³⁾	Person Responsible
3	Excavation entry activities (if required)	<ul style="list-style-type: none"> • Soil cave-in • Struck-by/against hazards • Hazardous atmospheres • Slip/trip/fall hazards • Emergency egress 	<ul style="list-style-type: none"> • Keep proper distances from edge of excavation • Limit equipment operations in trench area • Keep work area free of trip hazards • Perform necessary soil classification • Use daily inspection form to document/meet competent person inspection requirements • Inspect trench after any change in conditions (e.g., rain, equipment vibrations) • Provide fall protection measures • Utilize shoring equipment properly – ensure that tabulated data sheet is on site • Ladder safety and proper slope of ladder • Use harness and lifeline when entering trenches over 5 feet deep 	CRA Construction Oversight Person

- (1) Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.
- (2) A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".
- (3) Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

JOB SAFETY ANALYSIS (JSA)

Hand Tools (Non-Powered)

Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority (SWA)**.

Date Issued/Revised:	[10/08/15]	JSA Type:	Construction
Work Type:	Construction - general	Client:	Respondents
Work Activity:	Multiple tasks involving hand tools (all types and sizes)		
Work Site:	Pilsen Soil Operable Unit 1 (OU1) Railroad Spur and Alley Site		
Key Equipment:	Hand Tools (Non-Powered): Wrenches, screwdrivers, hammers, cold and wood chisels, shovels, utility knives, metal files (square or round), sockets, saws, post hole digger, T-post driver, wire cutters, come-a-long, pickaxe, racks, grease guns, bottle/floor jack, tire wrench, first aid kit, etc.		
Task-specific Training:	Basic Hand Tools (Non-Powered) Principals and Common Sense,		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (see job steps for task-specific requirements)					
<input checked="" type="checkbox"/> Reflective Vest	<input type="checkbox"/> Goggles	<input checked="" type="checkbox"/> Gloves*	Supplied Air	APR	
<input checked="" type="checkbox"/> Hard Hat	<input type="checkbox"/> Face Shield*	<input checked="" type="checkbox"/> Coveralls*		<input type="checkbox"/> SCBA	<input checked="" type="checkbox"/> Full Face APR
<input type="checkbox"/> Lifeline/Harness*	<input checked="" type="checkbox"/> Hearing Protection*	<input type="checkbox"/> PPE Clothing*	<input type="checkbox"/> Airline Respirator (attach description)	<input type="checkbox"/> Half Mask APR	<input type="checkbox"/> Particulate/Organic Vapor Combined
<input checked="" type="checkbox"/> Safety Glasses	<input checked="" type="checkbox"/> Safety-toed Boots				<input type="checkbox"/> Acid Gas
<input type="checkbox"/> Other* Fire Retardant Coveralls		<input type="checkbox"/> Other*		<input type="checkbox"/> Other*	
ADDITIONAL PPE (*provide specific type(s) or descriptions of this item below)					
Leather gloves and/or cut resistant (Kevlar)					

Project Development Team		Position/Title	Modified By	Reviewed By	Position/Title	Date
Name	Signature					
Walter Pochron		PM				

JOB SAFETY ANALYSIS (JSA)

Hand Tools (Non-Powered)

Job Steps ⁽¹⁾	Task Activity	Potential Hazard(s) ⁽²⁾	Corrective Measure(s) ⁽³⁾	Person Responsible
1	Perform STAR process	<ul style="list-style-type: none"> • Unsafe acts • Property damage • Personal injury • Utilities • Electrical components 	<ul style="list-style-type: none"> • Stop, Think, Act, and Review • Identify hazards; change JSA accordingly and discuss task and expectations of the task with supervisor • Select appropriate PPE requirements (at minimum safety glasses and hand protection) • Identify all utilities if conducting work using tools for dirt work (e.g., construction fence, silt fence, trenching, tree planting) • Personnel must be trained on "Control of Hazardous Energy (Lockout/Tagout)" 	Supervisor All Personnel
2	Hand tool selection	<ul style="list-style-type: none"> • Injury to body, hands, face • Lacerations • Lack of knowledge • Taking short cuts • Missing, cracked, or broken • Chemicals 	<ul style="list-style-type: none"> • Use the appropriate tool for the task; do not take shortcuts by using one tool to perform another tool's effective and safe capabilities • Ensure you understand the tool usage and purpose for each one selected • Understand the dangers associated with the tools (e.g., spark producers) • Ensure the tool(s) selected are of solid integrity • If proper tool(s), for the task is not available, utilize the STAR process and discuss obtaining the proper tool with your Supervisor 	All Personnel
3	Inspect tool(s)	<ul style="list-style-type: none"> • Flying objects/projectile • Pinch Points • Cuts • Cracked, chipped, or broken • Fatigue or stress • Grease/oil • Dull blades (utility, wood, metal) 	<ul style="list-style-type: none"> • Wear appropriate hand and eye protection • Wear Kevlar gloves when working with cutting/saw tools • Check tools for missing, broken, cracked, chipped, spilt, knurled, beveled, bent, mushroomed, condition; remove unsafe tool(s) from service immediately by tagging out and/or properly disposing of • Check all wood handled tools; do not use if cracked, split, or severely gouged; replace handle as needed or applicable • Ensure tool(s) are clean and free of oil, grease, adhesives (Silicone) for sure gripping capabilities • Check cutting type tools for dullness; replace or have sharpened by qualified person 	All Personnel
4	Use of tool(s)	<ul style="list-style-type: none"> • Tool loss/damage • Smashed fingers • Pinch points • Blisters • Cuts/scrapes • Bruises • Flying debris • Ergonomics • Strains • Repetitive motions • Slip/trip hazards • Utilities 	<ul style="list-style-type: none"> • Wear appropriate hand and eye protection • Keep hands and fingers out of "line of fire" • Use proper body positioning and solid footing • Use hearing protection; refer to HASP "Hearing Conservation Program" • Take frequent breaks to avoid joint and muscle numbness/fatigue; stretch and circulate as necessary • Don't force or exceed the tools limitations • Confirm with your supervisor that utilities have been cleared (Note: Shovels, post hole diggers, pickaxe, and T-posts). A QSF-019 must be completed as due diligence. • If task is requiring additional tools, use the STAR process and determine proper tool selection and use the tool designed for the task • Never use a tool near, in, or against "live" electrical components 	Supervisor All Personnel

JOB SAFETY ANALYSIS (JSA)

Hand Tools (Non-Powered)

Job Steps ⁽¹⁾	Task Activity	Potential Hazard(s) ⁽²⁾	Corrective Measure(s) ⁽³⁾	Person Responsible
5	End of tool usage	<ul style="list-style-type: none"> • Overhead • Damaged • Theft • Poor housekeeping • Cuts/punctures 	<ul style="list-style-type: none"> • Place tools on firm solid surfaces or in tool box when not in use • Do not create an overhead or trip hazard with the tools • Return tools back to their proper storage (e.g., shop, warehouse, tool box, tool crib, cabinet) • Be courteous! Ensure all tools are wiped clean of grease, oil, adhesives, etc.) • Tools must be of good working condition for the next person to use • Damage tools must be taken out of service and tagged; report this to your Field Equipment Manager, Supervisor, or both • Be responsible!. Secure all tools to prevent theft • Properly dispose of disposal blades that are no longer useful 	All Personnel

- (1) Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.
- (2) A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".
- (3) Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

JOB SAFETY ANALYSIS (JSA)

Heavy Equipment Decontamination - Pressure Washing (Cold Water Only)

Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority (SWA)**.

Date Issued/Revised:	10/08/15	JSA Type:	Construction
Work Type:	Environmental/Construction	Client:	Respondents
Work Activity:	Pressure washing - portable (cold water only)		
Work Site:	Pilsen Soil Operable Unit 1 (OU1) Railroad Spur and Alley Site		
Key Equipment:	2,000 to 4,000 psi pressure washer - portable (gasoline) powered		
Task-specific Training:	40-Hour HAZWOPER, 8-Hour Refresher, Hand and Power Tool Training		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (see job steps for task-specific requirements)					
<input type="checkbox"/> Reflective Vest	<input type="checkbox"/> Goggles	<input checked="" type="checkbox"/> Gloves*	Supplied Air	APR	
<input checked="" type="checkbox"/> Hard Hat	<input checked="" type="checkbox"/> Face Shield*	<input type="checkbox"/> Coveralls*	<input type="checkbox"/> SCBA	<input type="checkbox"/> Full Face APR	<input type="checkbox"/> Particulate <input type="checkbox"/> Organic Vapor
<input type="checkbox"/> Lifeline/Harness*	<input checked="" type="checkbox"/> Hearing Protection*	<input type="checkbox"/> PPE Clothing*	<input type="checkbox"/> Airline Respirator (attach description)	<input type="checkbox"/> Half Mask APR	<input type="checkbox"/> Particulate/Organic Vapor Combined
<input checked="" type="checkbox"/> Safety Glasses	<input checked="" type="checkbox"/> Safety-toed Boots				<input type="checkbox"/> Acid Gas
<input type="checkbox"/> Other*			<input type="checkbox"/> Other*	<input type="checkbox"/> Other*	
ADDITIONAL PPE (*provide specific type(s) or descriptions of this item below)					
Use of splash shield. Use of Nitrile gloves.					

Project Development Team Name	Signature	Position/Title	Modified By	Reviewed By	Position/Title	Date
Walter Pochron		PM				

JOB SAFETY ANALYSIS (JSA)

Heavy Equipment Decontamination - Pressure Washing (Cold Water Only)

Job Steps ⁽¹⁾	Task Activity	Potential Hazard(s) ⁽²⁾	Corrective Measure(s) ⁽³⁾	Person Responsible
1	Discuss STAR and SWA	<ul style="list-style-type: none"> Site personnel not aware of STAR and SWA Property damage Personal injury Cross contamination 	<ul style="list-style-type: none"> Project team (CRA) discusses importance of and documentation procedures for SWA during pre-job safety meeting Use SWA if unsafe conditions exist Discuss all potential hazards based on location, utilities, terrain, and waste water disposal 	Site Supervisor and all personnel involved with the task
2 2A	Review Manufacturer's Operation and Maintenance Manual (prior to initial operations of pressure washer) Rental Units	<ul style="list-style-type: none"> Improper inspection procedures Lack of recognition/ knowledge of specific manufactured model High pressure (>2,000 psi) 	<ul style="list-style-type: none"> Review manufacturer's Operation and Maintenance Manual Utilize the STAR process and discuss with site supervisor on the operations of the washer Make sure rental company provides a copy of the manual or have them illustrate proper operating procedures including daily checks Important: Read manufacturer's warning labels on the pressure unit itself for step by step operations (DOs and DON'Ts) 	Site Supervisor and Operator
3	Inspect equipment	<ul style="list-style-type: none"> Equipment malfunction Leaks Missing/broken components Personal injury Property damage Spills 	<ul style="list-style-type: none"> Complete a daily equipment checklist <ul style="list-style-type: none"> Report all NR (Needs Repair) or items in question to your site supervisor Do not use until repairs/parts have been completed Thoroughly check hose, hose fitting, pressure wand, o-rings, leaks, pressure tips, engine oil, fuel type, etc. Reference Manufacturer's Operation and Maintenance Manual for specific daily checks Wear hand protection (leather) Fuel unit using gasoline only; review site JSA on Fueling Operations Avoid overfilling and immediately clean up spills using absorbent pads, towels, and shovel or combination of all three and dispose of properly Review MSDS for use of gasoline (i.e., Flammable and Health risks) Use an approved OSHA safety can (red) for dispensing needs; remove can from service if severely dented or having missing or broken components; tag out of service immediately Keep gasoline can away from heat sources; label and place in OSHA- approved storage cabinet or in a fenced-off secondary spill containment area 	Operator
4	Mobilize washer into position	<ul style="list-style-type: none"> Slip/trip/fall hazards Back strain Property damage Unsecured Uneven terrain Heavy lifting 	<ul style="list-style-type: none"> Get assistance (buddy system) when moving washer either physically or means of powered equipment Use proper lifting techniques; keep back straight and knees slightly bent when placing unit into the decon area Keep hose(s) and wand securely on unit Place washer on solid, level ground Determine your route of travel to work area; avoid uneven ground, slopes, and inclines Secure washer if transporting by truck, trailer, or loader using nylon ratchet straps; DO NOT use chains or bungee cords Determine best place to position washer to account for length of hose to reach all points of washing 	Operator and Spotter

JOB SAFETY ANALYSIS (JSA)

Heavy Equipment Decontamination - Pressure Washing (Cold Water Only)

Job Steps ⁽¹⁾	Task Activity	Potential Hazard(s) ⁽²⁾	Corrective Measure(s) ⁽³⁾	Person Responsible
4	Connect water source to pressure washer	<ul style="list-style-type: none"> Splashing Slip hazard Pinch points Improper fittings Water pressure Property damage Personal injury Electrical - electrocution 	<ul style="list-style-type: none"> Don appropriate PPE, splash shield, hard hat, hearing protection, etc.) Check water hose condition and connections Install one end of hose to unit first and then to water source Slowly release water into pressure washer unit; avoid excessive splashing and don't leave unit unattended Keep hands and fingers clear of pinch points Minimize water pooling; tighten connections as necessary to avoid slip hazards Keep water away from electrical panels, outlets, and power cords 	Operator
5	Operate pressure washer In this Order: 1. Select proper wash tip 2. Start the washer unit 3. Move into position 4. Hold pressure wand and handle firmly with both hands 5. Point wand in area to begin wash 6. Pull trigger and begin washing	<ul style="list-style-type: none"> High pressure (>2,600 psi) Infections - bacteria Eye, hand, foot Injury Flying debris Slip/trip hazards Hose whipping Kink in hose Equipment malfunction Property damage Hand and wrist fatigue/numb Noise Poor visibility Windy conditions Clogged pressure tips Poor communications 	<ul style="list-style-type: none"> Wear splash shield and hearing protection! Determine wind direction and place back to the wind to avoid over spray of water back into the operator's face Install proper washing tip on the end of wand; turn unit off, relieve pressure from unit, and let it cool down before changing tips Keep both hands on the wand at all times to avoid excessive fatigue and numbness in hand and wrists Keep hands off metal section of wand to avoid a burn to the hand Do not point the spray towards others, ground, or hose Position your body off to one side during washing to prevent deflection of material debris back in your direction; keep a safe distance between surface to be washed and the spray Keep hoses free and clear to avoid trips; be aware of your surroundings Keep face shield clear as best as you can; stop washing and wipe off as needed Never unclog a tip while the unit is running; shut off unit, depressurize hose and wand, then remove tip for cleaning Keep hands, feet, and eyes out of the "line of fire" of the spray <ul style="list-style-type: none"> High pressure can cut through gloves, boots, and severely and cause bodily injury; infections can occur if cut into the skin 	Operator
6	End of task 1. Relieve pressure 2. Turn off water supply to unit and disconnect 3. Shut off pressure washer 4. Allow to cool down 5. Storage	<ul style="list-style-type: none"> Burns (muffler) Hose damage Equipment damage Theft Slips Back strain 	<ul style="list-style-type: none"> Doff PPE and dispose of properly Relieve pressure on hose and drain the water from hose and unit Avoid placing hands on muffler section of washer unit; allow unit to cool down before handling and or filling with gasoline Drain hose and wrap up to unit; inspect hose for excessive wear or blistering During cold temperatures, winterize unit using environmentally safe anti-freeze Secure unit inside connex trailer or use chain and padlock to prevent theft Check unit over and make sure all components (tips, wand, hose) are in good condition Turn gasoline valve to off/close when not in use or in storage Use proper lifting techniques when moving unit and get assistance (buddy system) 	Operator and Spotter
7	Collect a wipe sample (if necessary)	<ul style="list-style-type: none"> Cross contamination Liability 	<ul style="list-style-type: none"> Confirm with site supervisor if a wipe sample is needed prior to demobilization of equipment from the site (rental and CRA owned equipment) 	Project Manager and Site Supervisor

JOB SAFETY ANALYSIS (JSA)

Heavy Equipment Decontamination - Pressure Washing (Cold Water Only)

- (1) Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.
- (2) A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".
- (3) Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

JOB SAFETY ANALYSIS (JSA)

Heavy Equipment Operation – Hydraulic Track Excavator

Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority (SWA)**.

Date Issued/Revised:	10/08/15	JSA Type:	Construction
Work Type:	Construction	Client:	Respondents
Work Activity:	Hydraulic Track Excavator		
Work Site:	Pilsen Soil Operable Unit 1 (OU1) Railroad Spur and Alley Site		
Key Equipment:	Hydraulic excavator (appropriately sized);		
Task-specific Training:	Heavy Equipment Operation; HASP; OQ training		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (see job steps for task-specific requirements)

<input checked="" type="checkbox"/> Reflective Vest	<input type="checkbox"/> Goggles	<input checked="" type="checkbox"/> Gloves*	Supplied Air	APR	
<input checked="" type="checkbox"/> Hard Hat	<input type="checkbox"/> Face Shield*	<input type="checkbox"/> Coveralls*	<input type="checkbox"/> SCBA	<input checked="" type="checkbox"/> Full Face APR	<input checked="" type="checkbox"/> Particulate <input type="checkbox"/> Organic Vapor
<input type="checkbox"/> Lifeline/Harness*	<input checked="" type="checkbox"/> Hearing Protection*	<input type="checkbox"/> PPE Clothing*	<input type="checkbox"/> Airline Respirator (attach description)	<input type="checkbox"/> Half Mask APR	<input type="checkbox"/> Particulate/Organic Vapor Combined
<input checked="" type="checkbox"/> Safety Glasses	<input checked="" type="checkbox"/> Safety-toed Boots				<input type="checkbox"/> Acid Gas
<input checked="" type="checkbox"/> Other* Fire Extinguisher		<input type="checkbox"/> Other*		<input type="checkbox"/> Other*	

ADDITIONAL PPE (*provide specific type(s) or descriptions of this item below)

Level C until air monitoring data supports PPE downgrade

Project Development Team		Position/Title	Modified By	Reviewed By	Position/Title	Date
Name	Signature					
Walter Pochron		PM				

JOB SAFETY ANALYSIS (JSA)

Heavy Equipment Operation – Hydraulic Track Excavator

Job Steps ⁽¹⁾	Task Activity	Potential Hazard(s) ⁽²⁾	Corrective Measure(s) ⁽³⁾	Person Responsible
1	Discuss STAR and SWA	<ul style="list-style-type: none"> Failing to identify hazardous conditions resulting in losses or near losses 	<ul style="list-style-type: none"> Determine the hazards of performing the task and survey the work area Consider weather conditions such as fog that could reduce visibility Always consider the worst-case scenario Analyze the hazards determined Decide a plan of action to eliminate or reduce the hazards and act on it For every hour of continuous operation the operator shall exit the equipment and refocus on the task at hand. This micro break shall consist of (i.e., walk around the equipment, kick the tires, obtain a drink of water, etc.). 	Site Supervisor on all
2	Inspect equipment	<ul style="list-style-type: none"> Equipment malfunction or damage Hydraulic fluid, fuel, oil leaks/spills Loss of steering, loss of brakes, etc.; accidents, decreased visibility Fire Slip/trip/fall hazards Unexpected operation of equipment Swing radius signage missing 	<ul style="list-style-type: none"> Follow CRA Equipment Inspection Form/Tag Out if malfunction found Grease moving parts Check all fluids Ensure that fluids are not too low or too full Walk around equipment and look for leaking fluids Ensure that tracks are acceptable (no unacceptable wear and no objects present) Ensure that windows and mirrors are clean. Adjust mirrors! Remove trash or other debris from cab Ensure that back up alarm and horn are operational Correct any problems immediately and inform supervisor If equipment appears as though it has been tampered with or vandalized, do not start it Ensure that fire extinguisher is in place and functioning Inspect the fire extinguisher monthly Use three point mount/dismount at all times Be cautious of where you step and be aware of your surroundings Ensure that ignition key is in your pocket, equipment is in neutral and parking brake is engaged Use interlock safety mechanism any time equipment is not conducting a productive and/or controlled activity 	Site Supervisor and Operator
3	Entering equipment	<ul style="list-style-type: none"> Reduced visibility Uncomfortable seating - back strain Debris on floor getting stuck under pedals Unexpected movement of excavator 	<ul style="list-style-type: none"> Adjust seat and mirrors so that you are able to see where traveling Adjust controls and seat to your comfort and safety Ensure that all materials inside cab are secured Be cautious of where you step and be aware of your surroundings Ensure steps are clear of water, mud, and other debris Ensure parking brake is engaged and gear is in neutral Use interlock safety mechanism any time equipment is not conducting a productive and/or controlled activity 	Site Supervisor and Operator
4	Configure controls and seating	<ul style="list-style-type: none"> Ergonomics/unnecessary physical stress/back injury Incapable of reaching controls Visual blocks 	<ul style="list-style-type: none"> Upon sitting, adjust seat fully to accommodate reach and comfort zone Fasten seat belt Make certain all controls are set in neutral positions Adjust mirrors 	Site Supervisor and Operator

JOB SAFETY ANALYSIS (JSA)

Heavy Equipment Operation – Hydraulic Track Excavator

Job Steps ⁽¹⁾	Task Activity	Potential Hazard(s) ⁽²⁾	Corrective Measure(s) ⁽³⁾	Person Responsible
5	Starting and warming up	<ul style="list-style-type: none"> Unanticipated rolling or movement, engine fire, or mechanical/electrical faults 	<ul style="list-style-type: none"> Review operator's manual if new to this particular machine Start engine and check controls to ensure all are in working conditions Allow a minimum of 2 minutes to warm up 	Site Supervisor and Operator
6	Moving equipment work area	<ul style="list-style-type: none"> Other equipment, personnel, or objects in work area Uneven terrain 	<ul style="list-style-type: none"> Perform STAR – be aware of surroundings Know the daily task and other people and equipment in the area Make eye contact with other operators and site personnel in the immediate vicinity Inspect pathway prior to moving equipment to ensure clear pathway 	Site Supervisor and Operator
7	Performing tasks	<ul style="list-style-type: none"> Other equipment (collision) Slopes, ground conditions possible injuries to personnel and equipment, buried obstacles, underground and overhead utilities Dust 	<ul style="list-style-type: none"> Perform STAR Know where utilities are located – know where your bucket is in relation to any underground utilities at all times Be aware of the scope of work to be performed Use a spotter Know the paths of other equipment or persons entering and leaving your work area Communicate with supervisors and other operators throughout the day with any questions Stop work immediately and contact a supervisor if you are uncertain of your task, experience equipment failure, or personal injury or near loss Wear dust mask if conditions warrant 	Site Supervisor and Operator
8	Stopping at end of day	<ul style="list-style-type: none"> Slip/trip/fall hazards Overnight parking of equipment 	<ul style="list-style-type: none"> Be cautious of where you step and be aware of your surroundings Park in designated area Set brake/control locks Idle for 2 minutes if engine is hot Lower bucket to ground – zero energy state Turn equipment off; remove keys Use three-point dismount Secure inside instruments (i.e., fire extinguisher) 	Site Supervisor and Operator

- (1) Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.
- (2) A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".
- (3) Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

JOB SAFETY ANALYSIS (JSA)

Heavy Equipment Spotting

Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority (SWA)**.

Date Issued/Revised:	10/08/15	JSA Type:	Construction
Work Type:	Vehicle - Equipment Operation	Client:	Respondents
Work Activity:	Spotting Heavy Equipment and Delivering Trucks		
Work Site:	Pilsen Soil Operable Unit 1 (OU1) Railroad Spur and Alley Site		
Key Equipment:	Air horn, high visibility Type 2 shirt/vest		
Task-specific Training:	Heavy and/or Mobile Equipment Safety Training		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (see job steps for task-specific requirements)						
<input checked="" type="checkbox"/> Reflective Vest	<input type="checkbox"/> Goggles	<input type="checkbox"/> Gloves*	APR:		<input checked="" type="checkbox"/> Particulate	
<input checked="" type="checkbox"/> Hard Hat	<input type="checkbox"/> Face Shield*	<input type="checkbox"/> Coveralls*	<input type="checkbox"/> Half Mask APR	<input checked="" type="checkbox"/> Full Face APR	<input type="checkbox"/> Organic Vapor	
<input type="checkbox"/> Lifeline/Harness*	<input type="checkbox"/> Hearing Protection*	<input checked="" type="checkbox"/> PPE Clothing*	<input type="checkbox"/> Supplied Air	<input type="checkbox"/> SCBA	<input type="checkbox"/> Airline Respirator	<input type="checkbox"/> Particulate/Organic Vapor Combined
<input checked="" type="checkbox"/> Safety Glasses	<input checked="" type="checkbox"/> Safety-toed Boots		(attach description)			<input type="checkbox"/> Acid Gas
<input type="checkbox"/> Other*			<input type="checkbox"/> Other*			<input type="checkbox"/> Other*
ADDITIONAL PPE (*provide specific type(s) or descriptions of this item below)						
Level C PPE until air monitoring data supports a down grade of PPE						

Project Development Team		Position/Title	Modified By	Reviewed By	Position/Title	Date
Name	Signature					
Walter Pochron		PM				9/19/2008

JOB SAFETY ANALYSIS (JSA)

Heavy Equipment Spotting

Job Steps ⁽¹⁾	Task Activity	Potential Hazard(s) ⁽²⁾	Corrective Measure(s) ⁽³⁾	Person Responsible
1	Perform STAR Process and discuss SWA with operators, delivery drivers and spotters	<ul style="list-style-type: none"> Site personnel not aware of STAR and SWA Personnel not aware of blind spots 	<ul style="list-style-type: none"> Conduct a pre-task meeting to establish and address any safety concerns Inform subcontractors and delivery drivers of SWA and discuss emergency STOP signal(s) - a clenched/closed fist will dictate that all activity is to cease immediately 	Equipment Operators Spotters Truck Drivers
2	Discuss any hand signals to be used – assign one spotter to each activity. Operator will not take signals from multiple sources.	<ul style="list-style-type: none"> Struck by - crushing Property damage Inappropriate/unknown signals 	<ul style="list-style-type: none"> Do not stand between equipment and immovable objects Always stay within operator's line of sight – if operator loses view of spotter, implement SWA immediately Do not permit equipment operation within 2 feet of immovable objects/walls Review/use signals that operator is familiar with and understands No cell phone use while driving, operating, or spotting Spotters will have no other assigned duties while spotting 	Equipment Operators Spotters Truck Drivers
3	Determine accepted path of travel and walk prior to use – note all hazards. Determine safe loading/unloading zones – do not setup under/near/over utility lines.	<ul style="list-style-type: none"> Slip/trip/fall hazards Property damage Uneven ground Stuck equipment or trucks 	<ul style="list-style-type: none"> Use STAR process and watch where you walk Note any obstructions to be avoided If necessary set up traffic signage/delineators to indicate safe paths of travel 	Equipment Operators Spotters Truck Drivers
4	Know height restrictions of any overhead utilities. A) Spotters will not locate equipment and/or trucks under overhead utilities during material handling (loading/unloading) activities. B) Operators will not work within utility clearance limits.	<ul style="list-style-type: none"> Property damage Electrocution Contact with/against 	<ul style="list-style-type: none"> Know the height of the vehicle as to avoid overhead utilities If vehicle will not clear utilize proper stopping hand signal or air horn to get driver's attention – know emergency stop signal Spotter should stay within viewing distance of equipment and utilities but far enough away to avoid danger from shock, tip over, falling loads Ensure vehicle has adequate clearance of utility 	Equipment Operators Spotters Truck Drivers
5	Make/maintain eye contact with driver/operator using side-view mirrors while backing up.	<ul style="list-style-type: none"> Struck by Slip/trip/fall hazards Property damage Loss of communication 	<ul style="list-style-type: none"> Once communication and eye contact are initiated, maintain throughout process Do not stand next to a truck while its dumping - tip over Maintain a safe, but reasonable, distance away from moving vehicle (in order to maintain eye contact) 	Equipment Operators Spotters Truck Drivers

- (1) Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.
- (2) A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".
- (3) Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

JOB SAFETY ANALYSIS (JSA)

Loading Soil with Excavator

Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority (SWA)**.

Date Issued/Revised:	10/08/15	JSA Type:	[Construction/ Demolition/Decommissioning]
Work Type:	[Environmental/Remediation/Construction/General Industry]	Client:	Respondents
Work Activity:	Loading soil with excavator		
Work Site:	Pilsen Soil Operable Unit 1 (OU1) Railroad Spur and Alley Site		
Key Equipment:	Excavator, loader dump truck		
Task-specific Training:	[Identify any special/additional training necessary to safely complete this task]		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (see job steps for task-specific requirements)					
<input checked="" type="checkbox"/> Reflective Vest	<input type="checkbox"/> Goggles	<input checked="" type="checkbox"/> Gloves*	Supplied Air	APR	
<input checked="" type="checkbox"/> Hard Hat	<input checked="" type="checkbox"/> Face Shield*	<input type="checkbox"/> Coveralls*	<input type="checkbox"/> SCBA	<input checked="" type="checkbox"/> Full Face APR	<input checked="" type="checkbox"/> Particulate <input type="checkbox"/> Organic Vapor
<input type="checkbox"/> Lifeline/Harness*	<input checked="" type="checkbox"/> Hearing Protection*	<input type="checkbox"/> PPE Clothing*	<input type="checkbox"/> Airline Respirator (attach description)	<input type="checkbox"/> Half Mask APR	<input type="checkbox"/> Particulate/Organic Vapor Combined
<input checked="" type="checkbox"/> Safety Glasses	<input checked="" type="checkbox"/> Safety-toed Boots				<input type="checkbox"/> Acid Gas
<input checked="" type="checkbox"/> Other* Photoionization detector (PID)		<input type="checkbox"/> Other*		<input type="checkbox"/> Other*	
ADDITIONAL PPE (*provide specific type(s) or descriptions of this item below)					
Level C PPE until air monitoring data supports PPE downgrade. Truck driver in level d if they do not exit truck					

Project Development Team		Position/Title	Modified By	Reviewed By	Position/Title	Date
Name	Signature					
Walter Pochron		PM				

JOB SAFETY ANALYSIS (JSA)

Loading Soil with Excavator

Job Steps ⁽¹⁾	Task Activity	Potential Hazard(s) ⁽²⁾	Corrective Measure(s) ⁽³⁾	Person Responsible
1	Inspect work area	<ul style="list-style-type: none"> Slip/trip/fall hazards Biological hazards 	<ul style="list-style-type: none"> Clear any hazards that are clearable Mark major obstructions with orange tape Exercise caution Pay close attention to the ground surface Inspect immediate surroundings Walk cautiously 	
2	Inspect equipment	<ul style="list-style-type: none"> Slip/trip/fall hazards damage to equipment or self if there is undetected equipment damage 	<ul style="list-style-type: none"> Use three points of contact Follow intact equipment inspection form Parking brake should be engaged and key in pocket Maintain a three-point mount/dismount Correct any matters immediately and/or report to supervisor 	
3	Establish communication	<ul style="list-style-type: none"> Know response for emergencies and accidents 	<ul style="list-style-type: none"> Hand and horn signals established Emergency signal established 	
4	Begin excavation	<ul style="list-style-type: none"> Equipment damage People/hazards in swing radius slides Cave-ins 	<ul style="list-style-type: none"> All operators must be trained, skilled, and experienced Operator must look around area and be aware of surroundings at all times Use proper sloping/shoring techniques Keep excavator on even or undisturbed surfaces 	
5	Excavator loads soil into truck	<ul style="list-style-type: none"> Truck running into excavator Tipping over 	<ul style="list-style-type: none"> Operators have stopping signal (two honks) Awareness of surroundings Do not overload truck or bucket to avoid spillage Spread the soil in the truck bed to avoid having one side heavier than the other Trucks need to remain on level ground 	

- (1) Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.
- (2) A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".
- (3) Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

JOB SAFETY ANALYSIS (JSA)

Removal and Installation of Railroad Ties

Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority (SWA)**.

Date Issued/Revised:	10/08/15	JSA Type:	Construction
Work Type:	Construction	Client:	Respondents
Work Activity:	Removal/ Installation of Railroad Ties		
Work Site:	Pilsen Soil Operable Unit 1 (OU1) Railroad Spur and Alley Site		
Key Equipment:	Rubber tired Backhoe, hand shovels (spaded or square face), pick axe, Pry Bar		
Task-specific Training:	Certified operator, material handling, hand and power tool		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (see job steps for task-specific requirements)					
<input checked="" type="checkbox"/> Reflective Vest	<input type="checkbox"/> Goggles	<input checked="" type="checkbox"/> Gloves*	Supplied Air	APR	
<input checked="" type="checkbox"/> Hard Hat	<input type="checkbox"/> Face Shield*	<input type="checkbox"/> Coveralls*	<input type="checkbox"/> SCBA	<input checked="" type="checkbox"/> Full Face APR	<input checked="" type="checkbox"/> Particulate <input type="checkbox"/> Organic Vapor
<input type="checkbox"/> Lifeline/Harness*	<input type="checkbox"/> Hearing Protection*	<input checked="" type="checkbox"/> PPE Clothing*	<input type="checkbox"/> Airline Respirator (attach description)	<input type="checkbox"/> Half Mask APR	<input type="checkbox"/> Particulate/Organic Vapor Combined
<input checked="" type="checkbox"/> Safety Glasses	<input checked="" type="checkbox"/> Safety-toed Boots				<input type="checkbox"/> Acid Gas
<input type="checkbox"/> Other*		<input type="checkbox"/> Other*		<input type="checkbox"/> Other*	
ADDITIONAL PPE (*provide specific type(s) or descriptions of this item below)					
Begin work in Level C PPE until air monitoring data supports a downgrade in PPE					

Project Development Team Name	Signature	Position/Title	Modified By	Reviewed By	Position/Title	Date
Walter Pochron		PM				

JOB SAFETY ANALYSIS (JSA)

Removal and Installation of Railroad Ties

Job Steps ⁽¹⁾	Task Activity	Potential Hazard(s) ⁽²⁾	Corrective Measure(s) ⁽³⁾	Person Responsible
1	Conduct a Pre-task Meeting	<ul style="list-style-type: none"> Slip/Trip/Fall Hazards Pinch Points Muscle Strain Site Conditions/layout Terrain 	<ul style="list-style-type: none"> Determine personnel, equipment and site controls. Identify hazards and implement corrective actions Developing work zone demarcating and off loading of materials. Ensure all personnel involved in task understands scope of work and empower them authority to use SWA if unsafe acts/conditions exist. 	Site Personnel
2	Hand Digging-Shovels/Pick Axe	<ul style="list-style-type: none"> Muscle Strain Slip/Trip/ Fall Inclement weather Splinters Tool integrity Flying projectile (Axe Head) 	<ul style="list-style-type: none"> Use proper digging technique Be aware of surroundings and act accordingly Wear Proper PPE Select the proper tool for the task. Conduct thorough inspection of tools. Tag out of service if handles are chipped, cracked, broken or split. Shovel and Axe integrity must be in good condition. (No bends, cracks or chips and not loose). Axe head can potential slide off handle. Use proper body positioning and solid footing Understand the dangers associated with the tools. 	Site Personnel
3	Removing Old Railroad Spikes	<ul style="list-style-type: none"> Pinch Points Slip/Trip/Fall Muscle Strain 	<ul style="list-style-type: none"> Be Aware of surroundings and act accordingly Be aware and keep hands clear of pinch points Use the appropriate tool for the task; do not take shortcuts by using one tool to perform another tool's effective and safe capabilities Understand the dangers associated with the tools (e.g., spark producers) 	Site Personnel
4	Lifting Objects	<ul style="list-style-type: none"> Lifting hazards Back injury Slip/trip/fall hazards Pinch points 	<ul style="list-style-type: none"> Wear proper PPE Reduce travel distance when there is a need to carry/lift materials Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and keep lower back in a neutral position Size up the load; if the object is too large or odd shaped OR is in excess of 50 pounds (23 kg) then assistance (mechanical or a buddy lift) will be required Keep vision clear at all times, walk slowly to destination, and set object down slowly using proper lifting techniques 	Site Personnel
5	Loading/unloading of Railroad Ties w/ Backhoe	<ul style="list-style-type: none"> Inclines/Slopes Obstructed View Ground Workers Property Damage 	<ul style="list-style-type: none"> Review and Acknowledge JSA for Heavy Equipment Operations - Backhoe 	Site Personnel

JOB SAFETY ANALYSIS (JSA)

Removal and Installation of Railroad Ties

- (1) Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.
- (2) A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".
- (3) Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

JOB SAFETY ANALYSIS (JSA)

Oversight - Saw Cutting Asphalt or Concrete

Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority (SWA)**.

Date Issued/Revised:	10/08/15	JSA Type:	Construction
Work Type:	Construction	Client:	Respondents
Work Activity:	Saw cutting asphalt or concrete		
Work Site:	Pilsen Soil Operable Unit 1 (OU1) Railroad Spur and Alley Site		
Key Equipment:	Cut saw/hand held cut saw		
Task-specific Training:	Hand and Power Tools		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (see job steps for task-specific requirements)					
<input checked="" type="checkbox"/> Reflective Vest	<input checked="" type="checkbox"/> Goggles	<input checked="" type="checkbox"/> Gloves*	Supplied Air	APR	
<input checked="" type="checkbox"/> Hard Hat	<input checked="" type="checkbox"/> Face Shield*	<input type="checkbox"/> Coveralls*	<input type="checkbox"/> SCBA	<input type="checkbox"/> Full Face APR	<input type="checkbox"/> Particulate <input type="checkbox"/> Organic Vapor
<input type="checkbox"/> Lifeline/Harness*	<input checked="" type="checkbox"/> Hearing Protection*	<input type="checkbox"/> PPE Clothing*	<input type="checkbox"/> Airline Respirator (attach description)	<input type="checkbox"/> Half Mask APR	<input type="checkbox"/> Particulate/Organic Vapor Combined
<input type="checkbox"/> Safety Glasses	<input checked="" type="checkbox"/> Safety-toed Boots				<input type="checkbox"/> Acid Gas
<input checked="" type="checkbox"/> Other* Requires vibration resistant gloves			<input type="checkbox"/> Other*	<input type="checkbox"/> Other*	
ADDITIONAL PPE (*provide specific type(s) or descriptions of this item below)					
Anti vibration gloves; use a face shield or goggles to protect against flying debris					

Project Development Team Name	Signature	Position/Title	Modified By	Reviewed By	Position/Title	Date
Water Pochron		PM				

JOB SAFETY ANALYSIS (JSA)

Oversight - Saw Cutting Asphalt or Concrete

Job Steps ⁽¹⁾	Task Activity	Potential Hazard(s) ⁽²⁾	Corrective Measure(s) ⁽³⁾	Person Responsible
1	Use the Star Process; refer to the specific saw's operation manual before using equipment	<ul style="list-style-type: none"> Slip/trip/fall hazards Situational risks 	<ul style="list-style-type: none"> Verify personnel's training is sufficient for the scheduled task(s) Is job instruction training (hands-on) training necessary? Employees should remove finger rings, necklaces, or jewelry which may be hazardous in equipment operation 	All Affected Personnel
2	Equipment safety checklist	<ul style="list-style-type: none"> Faulty hose connections Damaged hoses and fittings 	<ul style="list-style-type: none"> Replace worn or damaged hoses and fittings Replace hose connections with operation connections Perform an overall inspection of the equipment for any defects or signs of damage 	All Affected Personnel
3	Verify Utility Clearance procedures completed; verify excavation trench layout	<ul style="list-style-type: none"> Property damage and personal injury from hitting buried utilities Fire potential from static/contact spark 	<ul style="list-style-type: none"> QSF-019 on file? Utility Locate Ticket number on file? Mark work area and safe distances 	All Affected Personnel
4	Saw and water hose setup	<ul style="list-style-type: none"> Slip/trip/fall hazards Uneven terrain Wet, icy, and muddy conditions Lifting hazards Manual material handling Back injury Struck-by and line of fire Pinch points 	<ul style="list-style-type: none"> Be aware of your surroundings (footing, weather conditions, etc.) Inspect route to be traveled Avoid moving objects that block field of vision Use the leg muscles to protect the lower back and keep lower back in a neutral position Use gloves to ensure a secure grip Grab the equipment only on the designated handles or if none are available, at location where the hands and fingers will not get caught in the equipment or smashed Test the weight of the equipment before lifting Use a two-person lift or mechanical assistance for handling objects in excess of 50 pounds (23 kg) Refer to HASP for additional lifting information Straighten out the hoses before connection and keep them out of high traffic areas Be aware of "stored energy" hazards presented by hoses 	All Affected Personnel
5	Equipment fueling/refueling	<ul style="list-style-type: none"> Fire Explosion Chemical hazard 	<ul style="list-style-type: none"> Turn off equipment before fueling No smoking while fueling Do not use cell phones while fueling Store fuel in proper safety containers only If transferring fuel from large vessels into portable cans, use proper grounding or bonding techniques Do not fuel the equipment when it is hot Wear gloves and wash hands after fueling 	All Affected Personnel
6	Starting the saw	<ul style="list-style-type: none"> Back strain Slippery conditions 	<ul style="list-style-type: none"> Make sure starting cord is free pulling; test the cord before pulling Maintain straight posture when pulling the recoil starter cord Do not over exert when pulling the cord Be aware of your surrounding conditions Make sure slip/trip/fall hazards were properly identified and corrected 	Assigned Laborer

JOB SAFETY ANALYSIS (JSA)

Oversight - Saw Cutting Asphalt or Concrete

Job Steps ⁽¹⁾	Task Activity	Potential Hazard(s) ⁽²⁾	Corrective Measure(s) ⁽³⁾	Person Responsible
7	Saw operation	<ul style="list-style-type: none"> Hot surfaces Noise Exposure to particles Property damage and personal injury from hitting buried utilities 	<ul style="list-style-type: none"> Inspect saw blade Remove worn, dull, or damaged blades and replace Keep hands away from the exhaust or hot components of the equipment Be aware of unguarded moving parts on the equipment Use dust mask/respirator to prevent breathing of particles Use wet methods as much as possible Wear required PPE (hearing protection, Tyvek, etc.) Complete a test cut to determine asphalt/concrete depth Adjust cutting blade to predetermined depth and only cut to the necessary depth Where cut lines intersect with known identified or suspect utilities, stop cutting at a minimum 24" from both sides of the utility markings Tunnel beneath uncut sections using hand tools Apply extra care if a jack hammer or heavy bar is required to break remaining asphalt or concrete. 	Assigned Laborer

- (1) Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.
- (2) A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".
- (3) Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

JOB SAFETY ANALYSIS (JSA)

Work Zone Delineation

Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority (SWA)**.

Date Issued/Revised:	[Date of review/revision]	JSA Type:	Environmental
Work Type:	Environmental	Client:	
Work Activity:	Work zone barricading		
Work Site:	Pilsen Soil Operable Unit 1 (OeU1) Railroad Spur and Alley Site		
Key Equipment:	Delineators (48-inch minimum), flags, caution tape		
Task-specific Training:	40-Hour HAZWOPER,		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (see job steps for task-specific requirements)					
<input checked="" type="checkbox"/> Reflective Vest	<input type="checkbox"/> Goggles	<input checked="" type="checkbox"/> Gloves*	Supplied Air	APR	
<input checked="" type="checkbox"/> Hard Hat	<input type="checkbox"/> Face Shield*	<input type="checkbox"/> Coveralls*	<input type="checkbox"/> SCBA	<input type="checkbox"/> Full Face APR	<input type="checkbox"/> Particulate <input type="checkbox"/> Organic Vapor
<input type="checkbox"/> Lifeline/Harness*	<input type="checkbox"/> Hearing Protection*	<input type="checkbox"/> PPE Clothing*	<input type="checkbox"/> Airline Respirator (attach description)	<input type="checkbox"/> Half Mask APR	<input type="checkbox"/> Particulate/Organic Vapor Combined
<input checked="" type="checkbox"/> Safety Glasses	<input checked="" type="checkbox"/> Safety-toed Boots				<input type="checkbox"/> Acid Gas
<input type="checkbox"/> Other*		<input type="checkbox"/> Other*		<input type="checkbox"/> Other*	
ADDITIONAL PPE (*provide specific type(s) or descriptions of this item below)					
Above ankle work boots, protective gloves (suitable for weather conditions). Gloves must be worn at all times when setting up work zone					

Project Development Team		Position/Title	Modified By	Reviewed By	Position/Title	Date
Name	Signature					

JOB SAFETY ANALYSIS (JSA)

Work Zone Delineation

Job Steps ⁽¹⁾	Task Activity	Potential Hazard(s) ⁽²⁾	Corrective Measure(s) ⁽³⁾	Person Responsible
1	Coordinate site access	<ul style="list-style-type: none"> Delays or added work 	<ul style="list-style-type: none"> Notify Station Manager of schedule Notify other required personnel if applicable (e.g., city, regulators, private property owners) Schedule work during hours of good natural light Try to plan activities during hours of lower traffic volume 	
2	Mobilize with proper equipment/supplies for sampling	<ul style="list-style-type: none"> Delay or improper/unsafe performance of work due to improper equipment on site Equipment failure Back injury 	<ul style="list-style-type: none"> Review work plan to determine equipment/supply needs Inspect equipment as you load it to the vehicle If work is scheduled for the hours of low light, will additional lighting be required Review the HASP and gather necessary PPE Size up the load; if the object is too large or is in excess of 50 pounds (23 kg) then assistance (mechanical or a buddy lift) will be required Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and keep lower back in a neutral position Avoid one-handed carrying if possible; maintain awareness of footing Avoid placing hands/fingers in pinch point locations Refer to HASP for additional lifting information 	
3	Site arrival	<ul style="list-style-type: none"> Unknown traffic or other work hazards 	<ul style="list-style-type: none"> Meet with station attendant or other site personnel and explain planned activities Review STAR and SWA Discuss importance of and documentation procedures for SWA; use SWA to stop unsafe or illegal work practices Discuss work zone set up activities with supervisor/employees using HASP and JSA, scan work area to determine best vehicle position and set up Check weather report for poor conditions that may effect work Don appropriate PPE (high visibility garment, gloves, hard hat, glasses, safety rated boots) 	
4	Incident free	<ul style="list-style-type: none"> Take one last look around for missed hazards 	<ul style="list-style-type: none"> Conduct LMRA before putting hands on work 	
5	Securing work zone/ setup	<ul style="list-style-type: none"> Vehicular traffic - struck-by hazards Slip/trip/fall hazards Lifting hazards Back injury Manual material handling 	<ul style="list-style-type: none"> Park vehicle in a blocking position; engage park brake, and hazard lights Perform LMRA, circle check the area for potential hazards (walking surfaces, dogs, construction) Check mirrors and look over shoulder before exiting the vehicle; open the door slowly to avoid potential collision with passing vehicle/pedestrians Refer to step 2 for back safety Work using buddy system and maintain constant checks for vehicles and pedestrians Determine 6-foot (2 m) perimeter, and place Delineators spaced at 3 to 6 feet (1 to 2 m) circling the work area Flag each Delineator (if required) Install caution tape a minimum 48 inches from the ground (top of Delineator), encircling the work zone. Cease operations if unsafe conditions are present that have not been addressed or cannot be corrected 	

JOB SAFETY ANALYSIS (JSA)

Work Zone Delineation

- (1) Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.
- (2) A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".
- (3) Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

Example of proper Work Zone Set-up



JOB SAFETY ANALYSIS (JSA)

Decontamination of Sampling Equipment and Personnel (PPE Level C)

Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority (SWA)**.

Date Issued/Revised:	10/08/15	JSA Type:	Decontamination
Work Type:	Environmental	Client:	Respondents
Work Activity:	Decontamination of sampling equipment and personnel (PPE Level C)		
Work Site:	Pilsen Soil Operable Unit 1 (OU1) Railroad Spur and Alley Site		
Key Equipment:	Alconox/Liquinox, brushes, [special chemicals or additional equipment?]		
Task-specific Training:	Decontamination/Site Control; Quality Control/Sampling Plan, 40 Hour HAZWOPER		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (see job steps for task-specific requirements)

<input checked="" type="checkbox"/> Reflective Vest	<input type="checkbox"/> Goggles	<input checked="" type="checkbox"/> Gloves*	Supplied Air	APR	
<input checked="" type="checkbox"/> Hard Hat	<input type="checkbox"/> Face Shield*	<input type="checkbox"/> Coveralls*	<input type="checkbox"/> SCBA	<input checked="" type="checkbox"/> Full Face APR	<input checked="" type="checkbox"/> Particulate <input type="checkbox"/> Organic Vapor
<input type="checkbox"/> Lifeline/Harness*	<input type="checkbox"/> Hearing Protection*	<input checked="" type="checkbox"/> PPE Clothing*	<input type="checkbox"/> Airline Respirator (attach description)	<input type="checkbox"/> Half Mask APR	<input type="checkbox"/> Particulate/Organic Vapor Combined
<input type="checkbox"/> Safety Glasses	<input checked="" type="checkbox"/> Safety-toed Boots or Rubber Safety Toed Boots				<input type="checkbox"/> Acid Gas
<input checked="" type="checkbox"/> Other* Boot Covers		<input type="checkbox"/> Other*		<input type="checkbox"/> Other*	

ADDITIONAL PPE (*provide specific type(s) or descriptions of this item below)

Nitrile inner and outer gloves to be worn when decontaminating reusable equipment

Project Development Team		Position/Title	Modified By	Reviewed By	Position/Title	Date
Name	Signature					
Walter Pochron		PM				

JOB SAFETY ANALYSIS (JSA)

Decontamination of Sampling Equipment and Personnel (PPE Level C)

Job Steps ⁽¹⁾	Task Activity	Potential Hazard(s) ⁽²⁾	Corrective Measure(s) ⁽³⁾	Person Responsible
1	Decontamination preparation	<ul style="list-style-type: none"> Slip/trip/fall hazards Heavy lifting Awareness 	<ul style="list-style-type: none"> Project team to discuss importance of and documentation procedures for SWA during pre-job safety meeting; use SWA to stop any work that is unsafe Project team to discuss documented procedures for decontamination procedures Inspect all equipment prior to donning, use buddy system to inspect after donning to ensure proper isolation from potential contaminants Use proper lifting techniques, buddy lift when appropriate Inspect decon station to ensure no egress of contaminant will occur 	Site personnel
2	Decontamination of sampling equipment to include pumps, bailers, tubing, etc.	<ul style="list-style-type: none"> Contaminant exposure Pinch points Slip/trip/hit/fall hazards Heavy lifting 	<ul style="list-style-type: none"> Wear appropriate PPE during decon activities (nitrile gloves, Tyvek, etc); use buddy system to re-inspect periodically to ensure proper isolation from potential contaminants Avoid putting hands in or near pinch points Maintain good housekeeping, be aware of surroundings, watch footing Use proper lifting techniques, buddy lift when appropriate 	Site personnel
3	Decontamination of heavy equipment, shovels, etc.	<ul style="list-style-type: none"> Contaminant exposure Pinch points Slip/trip/hit/fall hazards Heavy lifting 	<ul style="list-style-type: none"> Wear appropriate PPE during decon activities (nitrile gloves, Tyvek, etc); use buddy system to re-inspect periodically to ensure proper isolation from potential contaminants Avoid putting hands in or near pinch points Maintain good housekeeping, be aware of surroundings Use proper lifting techniques, buddy lift when appropriate 	Site personnel
4	Decontamination of personnel	<ul style="list-style-type: none"> Contaminant exposure Slip/trip/hit/fall hazards 	<ul style="list-style-type: none"> Wear appropriate PPE during decon activities (nitrile gloves, Tyvek, etc); use buddy system to re-inspect periodically to ensure proper isolation from potential contaminants Dispose of used PPE in accordance with site requirements Wash hands and face before eating, drinking, or using tobacco products Take care when removing PPE (boots, gloves, etc.); sit down to remove/change boots as necessary 	Site personnel
5	Management of waste derived from decontamination activities	<ul style="list-style-type: none"> Contaminant exposure Heavy lifting 	<ul style="list-style-type: none"> Containerize decon waste (water, decon pad, used PPE, etc) as required Use proper lifting techniques, use buddy lifting or mechanical means when necessary 	Site personnel

- (1) Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.
- (2) A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".
- (3) Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

JOB SAFETY ANALYSIS (JSA)

Decontamination of Sampling Equipment and Personnel (PPE Level D)

Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority (SWA)**.

Date Issued/Revised:	10/08/15	JSA Type:	Decontamination
Work Type:	Environmental	Client:	Respondents
Work Activity:	Decontamination of sampling equipment and personnel (PPE Level D)		
Work Site:	Pilsen Soil Operable Unit 1 (OU1) Railroad Spur and Alley Site		
Key Equipment:	Alconox/Liquinox, brushes, _____ [Add any task/site-specific decon chemicals, refer to their MSDSs, and 'dirty' the JSA.]		
Task-specific Training:	Decontamination/Site Control; Quality Control/Sampling Plan		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (see job steps for task-specific requirements)					
<input checked="" type="checkbox"/> Reflective Vest	<input type="checkbox"/> Goggles	<input checked="" type="checkbox"/> Gloves*	Supplied Air	APR	
<input checked="" type="checkbox"/> Hard Hat	<input type="checkbox"/> Face Shield*	<input type="checkbox"/> Coveralls*	<input type="checkbox"/> SCBA	<input type="checkbox"/> Full Face APR	<input type="checkbox"/> Particulate <input type="checkbox"/> Organic Vapor
<input type="checkbox"/> Lifeline/Harness*	<input type="checkbox"/> Hearing Protection*	<input type="checkbox"/> PPE Clothing*	<input type="checkbox"/> Airline Respirator (attach description)	<input type="checkbox"/> Half Mask APR	<input type="checkbox"/> Particulate/Organic Vapor Combined
<input checked="" type="checkbox"/> Safety Glasses	<input checked="" type="checkbox"/> Safety-toed Boots				<input type="checkbox"/> Acid Gas
<input type="checkbox"/> Other*		<input type="checkbox"/> Other*		<input type="checkbox"/> Other*	
ADDITIONAL PPE (*provide specific type(s) or descriptions of this item below)					
Nitrile gloves to be worn when decontaminating reusable equipment					

Project Development Team Name	Signature	Position/Title	Modified By	Reviewed By	Position/Title	Date
Walter Pochron		PM				

JOB SAFETY ANALYSIS (JSA)

Decontamination of Sampling Equipment and Personnel (PPE Level D)

Job Steps ⁽¹⁾	Task Activity	Potential Hazard(s) ⁽²⁾	Corrective Measure(s) ⁽³⁾	Person Responsible
1	Decontamination of sampling equipment (including pumps, bailers, tubing, etc.)	<ul style="list-style-type: none"> Contaminant exposure Pinch points Slip/trip/hit/fall hazards Lifting hazards Back injury Manual material handling 	<ul style="list-style-type: none"> Set up decon station to capture any spills to avoid cross-contamination and manage wastes Wear appropriate PPE Scrub equipment clean then rinse and verify it is clean and free of contamination Avoid putting hands in or near pinch points Maintain good housekeeping and be aware of surroundings Size up the load; if the object is too large or odd shaped OR is in excess of 50 pounds (23 kg) then assistance (mechanical means, such as a dolly, cart, or a buddy lift) will be required Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and keep lower back in a neutral position Refer to the HASP for additional lifting techniques 	Sampling personnel
2	Decontamination of personnel	<ul style="list-style-type: none"> Contaminant exposure Slip/trip/hit/fall hazards 	<ul style="list-style-type: none"> Refer to the HASP for specific procedures but in general start with most contaminated article and remove until inner gloves are the last item left Dispose of used PPE in accordance with site requirements Wash hands and face before eating, drinking, or using tobacco products Take care when removing PPE (boots, gloves, etc.); sit down to remove/change boots as necessary 	Sampling personnel
3	Management of waste derived from decontamination activities	<ul style="list-style-type: none"> Contaminant exposure Lifting hazards Back injury Manual material handling 	<ul style="list-style-type: none"> Containerize decon waste (e.g., water, used PPE) as required Properly dispose of decon fluids (e.g., sediments) Refer to step 1 and the HASP for additional lifting information 	Sampling personnel

- (1) Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.
- (2) A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".
- (3) Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

JOB SAFETY ANALYSIS (JSA)

Initial Site Recon and Walkthrough

Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority (SWA)**.

Date Issued/Revised:	10/08/15	JSA Type:	Hazard Assessment - Site Inspection
Work Type:	Environmental	Client:	Respondents
Work Activity:	Site walkthrough to assess and inventory hazards posed by site work activities		
Work Site:	Pilsen Soil Operable Unit 1 (OU1) Railroad Spur and Alley Site		
Key Equipment:	Basic PPE, hand/power tools based on site condition, site inspection checklist or notebook, JSA forms, pens		
Task-specific Training:	SMART Safety training (STAR), JSA development, Poison Plant Identification		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (see job steps for task-specific requirements)					
<input checked="" type="checkbox"/> Reflective Vest	<input type="checkbox"/> Goggles	<input checked="" type="checkbox"/> Gloves*	Supplied Air	APR	
<input checked="" type="checkbox"/> Hard Hat	<input type="checkbox"/> Face Shield*	<input type="checkbox"/> Coveralls*	<input type="checkbox"/> SCBA	<input type="checkbox"/> Full Face APR	<input type="checkbox"/> Particulate <input type="checkbox"/> Organic Vapor
<input type="checkbox"/> Lifeline/Harness*	<input type="checkbox"/> Hearing Protection*	<input type="checkbox"/> PPE Clothing*	<input type="checkbox"/> Airline Respirator (attach description)	<input type="checkbox"/> Half Mask APR	<input type="checkbox"/> Particulate/Organic Vapor Combined
<input checked="" type="checkbox"/> Safety Glasses	<input checked="" type="checkbox"/> Safety-toed Boots				<input type="checkbox"/> Acid Gas
<input checked="" type="checkbox"/> Other* Flashlight		<input type="checkbox"/> Other*		<input type="checkbox"/> Other*	
ADDITIONAL PPE (*provide specific type(s) or descriptions of this item below)					
Insect repellant. Coveralls may be necessary based on type of brush/plants/insects in work area(s) being inspected. Leather gloves if overgrown vegetation or rundown buildings.					

Project Development Team Name	Signature	Position/Title	Modified By	Reviewed By	Position/Title	Date
Walter Pochron		PM				

JOB SAFETY ANALYSIS (JSA)

Initial Site Recon and Walkthrough

Job Steps ⁽¹⁾	Task Activity	Potential Hazard(s) ⁽²⁾	Corrective Measure(s) ⁽³⁾	Person Responsible
1	Discuss STAR and SWA	<ul style="list-style-type: none"> Site personnel not aware of STAR and SWA 	<ul style="list-style-type: none"> Project team (CRA) discusses importance of and documentation procedures for SWA during pre-job safety meeting Use SWA to stop any work that is unsafe 	All persons on project team
2	Check weather	<ul style="list-style-type: none"> Unexpected storm, fog; rain; snow; lightening, thunder Heat/cold stress 	<ul style="list-style-type: none"> Check local weather forecast Discuss weather issues and precautions to take while driving and on site during the pre-job safety meeting If weather conditions (e.g., fog, rain, snow) impair the ability/vision of the driver, exit at nearest safe location and assess the situation While on site, at first sign of lightning/thunder utilize SWA and assess weather conditions In extreme temperatures, ensure all personnel have proper clothing, hydration, and heat/cold protection (e.g., canopy, fan, glove warmers) 	Assessor
3	Sign in	<ul style="list-style-type: none"> Site Manager and Operator not aware of CRA staff presence in facility or on grounds 	<ul style="list-style-type: none"> Sign in at front desk Ask to speak to Site Manager or alternate designate 	Assessor
4	Don necessary CRA and client required PPE	<ul style="list-style-type: none"> Contact with recyclable material or equipment 	<ul style="list-style-type: none"> Wear all required PPE (hard hat, vest, boots, and glasses) at all times while in the facility 	Assessor
5	Unload equipment from vehicle	<ul style="list-style-type: none"> Lifting hazards Back injury Manual material handling Cuts Pinch points Hand/foot injury Forgotten equipment Damaged equipment 	<ul style="list-style-type: none"> Reduce travel distance when there is a need to carry/lift materials Make sure grip is adequate; wear leather/cotton gloves Size up the load; if the object is too large or odd shaped OR is in excess of 50 pounds (23 kg) then assistance (mechanical or a buddy lift) will be required Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and keep lower back in a neutral position Avoid one-handed carrying if possible; maintain awareness of footing Wear leather/cotton gloves and avoid placing hands/fingers in pinch point locations Wear steel-toed boots Verify requested equipment against warehouse form Load equipment in an organized manner to prevent shifting during transport or use cargo netting 	Assessor
6	Complete site inspection and walkover of the property and work areas – Note any hazards that will impact site personnel and/or their operations	<ul style="list-style-type: none"> Slip/trip/fall hazards Insects/reptiles Pedestrian injury Poison plants 	<ul style="list-style-type: none"> Check in with site personnel and sign appropriate visitor or safety log (may require watching safety video [i.e., plant]) Check with site contact to determine safely accessible areas and areas where PPE are required Wear PPE as directed by site personnel or dependent upon your evaluation of conditions If building(s) looks dilapidated or in poor condition, do not enter Watch for vehicles or other mobile equipment moving around Make sure areas are well lit and you are accompanied by a site representative (if applicable) Watch where you step on pavement (potholes, dips, or obstructions) and in vegetated/wooded areas (dips, holes, branches, vines, etc.) Do not take photographs while walking Do not talk on cell phone while walking If in vegetated or wooded areas, watch for beehives, wear insect repellent (if area and season dictate) as needed, be mindful of gopher holes/tunnels, small animal dens, snakes, stray dogs/cats, transient/homeless individuals, poison ivy/oak/sumac, etc. 	Assessor

JOB SAFETY ANALYSIS (JSA)

Initial Site Recon and Walkthrough

Job Steps ⁽¹⁾	Task Activity	Potential Hazard(s) ⁽²⁾	Corrective Measure(s) ⁽³⁾	Person Responsible
7	Sign out	<ul style="list-style-type: none"> Site Manager and Operator not aware that CRA staff have left facility 	<ul style="list-style-type: none"> Sign out at front desk Ask to speak to Site Manager or alternate designate 	Assessor
8	Demobilization	<ul style="list-style-type: none"> Collision Injury or death to vehicle occupants or other parties 	<ul style="list-style-type: none"> Perform perimeter vehicle check Maintain awareness of pedestrian/vehicular traffic when exiting the site Utilize defensive driving techniques Complete post-departure checklist and report vehicle problems to company vehicle maintenance manager or rental car agency 	Assessor

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- (2) A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".
- (3) Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

JOB SAFETY ANALYSIS (JSA)

Soil Sampling

Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority (SWA)**.

Date Issued/Revised:	10/08/15	JSA Type:	Drilling, Soil Sampling
Work Type:	[Environmental/Remediation/Construction/General Industry]	Client:	
Work Activity:	Soil sampling		
Work Site:	Pilsen Soil Operable Unit 1 (OU1) Railroad Spur and Alley Site		
Key Equipment:	Air monitoring equipment, PPE		
Task-specific Training:	CRA Field Method Training on Soil Sampling Procedures,		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (see job steps for task-specific requirements)

<input checked="" type="checkbox"/> Reflective Vest	<input type="checkbox"/> Goggles	<input checked="" type="checkbox"/> Gloves*	Supplied Air	APR	
<input checked="" type="checkbox"/> Hard Hat	<input type="checkbox"/> Face Shield*	<input type="checkbox"/> Coveralls*	<input type="checkbox"/> SCBA	<input checked="" type="checkbox"/> Full Face APR	<input checked="" type="checkbox"/> Particulate <input type="checkbox"/> Organic Vapor
<input type="checkbox"/> Lifeline/Harness*	<input type="checkbox"/> Hearing Protection*	<input checked="" type="checkbox"/> PPE Clothing*	<input type="checkbox"/> Airline Respirator (attach description)	<input type="checkbox"/> Half Mask APR	<input type="checkbox"/> Particulate/Organic Vapor Combined
<input checked="" type="checkbox"/> Safety Glasses	<input checked="" type="checkbox"/> Safety-toed Boots				<input type="checkbox"/> Acid Gas
<input type="checkbox"/> Other*		<input type="checkbox"/> Other*		<input type="checkbox"/> Other*	

ADDITIONAL PPE (*provide specific type(s) or descriptions of this item below)

Level C PPE until air monitoring data supports a PPE level downgrade

Project Development Team		Position/Title	Modified By	Reviewed By	Position/Title	Date
Name	Signature					
Walter Pochron		PM				

JOB SAFETY ANALYSIS (JSA)

Soil Sampling

Job Steps ⁽¹⁾	Task Activity	Potential Hazard(s) ⁽²⁾	Corrective Measure(s) ⁽³⁾	Person Responsible
1	Discuss STAR and SWA	<ul style="list-style-type: none"> Site personnel not aware of STAR and SWA 	<ul style="list-style-type: none"> Project team (CRA) discusses importance of and documentation procedures for SWA during pre-job safety meeting Use SWA to stop any work that is unsafe 	Site Personnel
2	Inspect and calibrate sampling and monitoring equipment	<ul style="list-style-type: none"> Lost time from improperly functioning equipment Incorrect sampling procedures/ collection due to malfunctioning equipment 	<ul style="list-style-type: none"> Ensure all equipment is functioning properly Complete Quality Control documents 	Sampling Technician
3	Prepare to collect soil samples	<ul style="list-style-type: none"> Lifting hazards Back injury Manual material handling Pinch points Cuts Punctures Sample misidentification 	<ul style="list-style-type: none"> Size up the load; if the object is too large or odd shaped OR is in excess of 50 pounds (23 kg) then assistance (mechanical or a buddy lift) will be required Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and keep lower back in a neutral position Avoid one-handed carrying if possible; maintain awareness of footing No bending or twisting while under load Refer to the HASP for additional lifting information Avoid placing hands/fingers in pinch point locations Use proper tools when opening container packaging Do not use fixed open blade knives when opening boxes or containers Ensure the sample id label matches sample location with site plan/CRA site supervisor/subcontractor 	Sampling Technician
4	Opening the sample sleeve (if applicable)	<ul style="list-style-type: none"> Cuts due to sharp edges of sample sleeve Contaminant exposure 	<ul style="list-style-type: none"> Use sleeve cutter for opening the sample sleeves Keep hands clear of the sleeve when cutting Wear nitrile gloves Maintain awareness of sharp edges of sample sleeve 	Sampling Technician
5	Sample collection	<ul style="list-style-type: none"> Contaminant exposure Cuts from container breakage Sample misidentification 	<ul style="list-style-type: none"> Wear nitrile gloves and replace between soil samples Inspect glass bottles for breaks/cracks Do not attempt to use any suspect containers Close glass sample containers carefully to avoid breakage Check sample labels for accuracy prior to placing in cooler 	Sampling Technician
6	Headspace screening of samples	<ul style="list-style-type: none"> Contaminant exposure Incorrect headspace readings 	<ul style="list-style-type: none"> Wear nitrile gloves Ensure proper calibration of equipment 	Sampling Technician
7	Sample selection	<ul style="list-style-type: none"> Bottle breakage Contaminant exposure Pinch points Lost time due to incorrect sample selection 	<ul style="list-style-type: none"> Wear nitrile gloves when handling sample containers Confirm selected samples are correct based on work plan selection criteria, PID readings, and soil boring logs Avoid placing hands/fingers in pinch point locations (e.g., between cooler and lid) 	Sampling Technician

JOB SAFETY ANALYSIS (JSA)

Soil Sampling

Job Steps ⁽¹⁾	Task Activity	Potential Hazard(s) ⁽²⁾	Corrective Measure(s) ⁽³⁾	Person Responsible
8	Packing samples in cooler(s)	<ul style="list-style-type: none"> • Bottle breakage • Contaminant exposure • Cuts • Pinch points • Lifting hazards • Back injury • Manual material handling • Lost time due to incorrect sample packaging or hold time exceedances 	<ul style="list-style-type: none"> • Wear nitrile gloves when handling sample containers • Pack glass containers in bubble wrap • Check COC against sample labels and SSOW for accuracy before shipping • Avoid placing hands/fingers in pinch point locations (e.g., between cooler and lid) • Use proper lifting techniques as discussed in step 3 • If possible use a dolly or cart if cooler is heavy or has to be moved over a long distance • Ensure equipment and supplies are loaded correctly and do not shift during transport 	Sampling Technician
9	Investigation derived waste (IDW) management	<ul style="list-style-type: none"> • Contaminant exposure • Lifting hazards • Back injury • Manual material handling • Pinch points • Slips/trips/fall hazards • Misabeled waste 	<ul style="list-style-type: none"> • Wear nitrile gloves when handling IDW • Use proper lifting techniques as discussed in step 3 • Avoid placing hands/fingers in pinch point locations • Maintain awareness of walking surfaces • Label IDW with generator, a contact number, identification of contents, and site location • Specify IDW as either hazardous or non-hazardous material 	Sampling Technician

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JOB SAFETY ANALYSIS (JSA)

Land Surveying

Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority (SWA)**.

Date Issued/Revised:	10/08/15	JSA Type:	Surveying
Work Type:	[Environmental/Remediation/Construction/General Industry]	Client:	Respondents
Work Activity:	Surveying		
Work Site:	Pilsen Soil Operable Unit 1 (OU1) Railroad Spur and Alley Site		
Key Equipment:	Flag or paddle		
Task-specific Training:	Flagger Safety; Traffic Control Devices; Personal Protective Equipment		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (see job steps for task-specific requirements)

<input checked="" type="checkbox"/> Reflective Vest	<input type="checkbox"/> Goggles	<input checked="" type="checkbox"/> Gloves*	Supplied Air	APR	
<input checked="" type="checkbox"/> Hard Hat	<input type="checkbox"/> Face Shield*	<input type="checkbox"/> Coveralls*		<input type="checkbox"/> SCBA	<input type="checkbox"/> Full Face APR
<input type="checkbox"/> Lifeline/Harness*	<input checked="" type="checkbox"/> Hearing Protection*	<input type="checkbox"/> PPE Clothing*	<input type="checkbox"/> Airline Respirator (attach description)	<input type="checkbox"/> Half Mask APR	<input type="checkbox"/> Particulate/Organic Vapor Combined
<input checked="" type="checkbox"/> Safety Glasses	<input checked="" type="checkbox"/> Safety-toed Boots				<input type="checkbox"/> Acid Gas
<input type="checkbox"/> Other*		<input type="checkbox"/> Other*		<input type="checkbox"/> Other*	

ADDITIONAL PPE (*provide specific type(s) or descriptions of this item below)

Class II vest; leather gloves to mob/demob equipment

Project Development Team		Position/Title	Modified By	Reviewed By	Position/Title	Date
Name	Signature					
Walter Pochron		PM				

JOB SAFETY ANALYSIS (JSA)

Land Surveying

Job Steps ⁽¹⁾	Task Activity	Potential Hazard(s) ⁽²⁾	Corrective Measure(s) ⁽³⁾	Person Responsible
1	Mob equipment to surveying area with CRA vehicle	<ul style="list-style-type: none"> Lifting hazards Manual material handling Back injury Pinch points Moving or flying projectiles inside vehicle while transporting equipment Slip/trip/fall hazards Biological hazards 	<ul style="list-style-type: none"> Reduce travel distance when there is a need to carry/lift materials Make sure grip is adequate; wear leather/cotton gloves Size up the load; if the object is too large or odd shaped OR is in excess of 50 pounds (23 kg) then assistance (mechanical or a buddy lift) will be required Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and keep lower back in a neutral position Avoid one-handed carrying if possible; maintain awareness of footing Review JSA and HASP Practice STAR Properly secure all equipment inside the vehicle 	Survey Team
2	Note traffic flow	<ul style="list-style-type: none"> Struck by oncoming traffic Slip/trip/fall Biological hazards Threatening dogs 	<ul style="list-style-type: none"> Stage the CRA vehicle to aid in the protection of the survey crew if they need to set up a Temporary Traffic Control Zone (TTCZ) Review JSA and HASP Practice STAR 	Survey Team
3	Develop the Temporary Traffic Control Plan (TTCP) and set up the Temporary Traffic Control Zone (TTCZ)	<ul style="list-style-type: none"> Struck by oncoming traffic Slip/trip/fall Biological hazards Threatening dogs Lifting hazards Manual material handling Back injury Heat/cold stress 	<ul style="list-style-type: none"> Review the requirements of the TTCP ahead of time Make sure that all temporary traffic control equipment (signs/cones/etc.) is available Carefully set up TTCZ using the buddy system Refer to step 1 and HASP for additional lifting methods/information Position CRA's truck with flashers on for added protection Follow hot/cold stress procedures presented in the HASP Review JSA and HASP Practice STAR 	Survey Team
4	General use of tools	<ul style="list-style-type: none"> Struck by oncoming traffic Slip/trip/fall hazards Biological hazards Threatening dogs Potential injuries from misuse of tools or use of tools in disrepair 	<ul style="list-style-type: none"> Wear ANSI Class II reflective safety vest, safety-toed boots, and hard hat Do not use old or faded PPE Inspect tools Repair/replace tools as necessary Review JSA and HASP Practice STAR 	Survey Team
5	Conduct survey activities	<ul style="list-style-type: none"> Struck by oncoming traffic Slip/trip/fall hazards Biological hazards Threatening dogs 	<ul style="list-style-type: none"> Surveyor will enter roadway after clearance from flag person Surveyor will maintain contact with flag person during survey Make sure that proper PPE is being worn Review JSA and HASP Practice STAR 	Survey Team
6	Exit roadway	<ul style="list-style-type: none"> Struck by oncoming traffic Slip/trip/fall hazards Biological hazards Threatening dogs 	<ul style="list-style-type: none"> Surveyor should exit roadway first, followed by flag person nearest oncoming traffic (spotter) Review JSA and HASP Practice STAR 	Survey Team

JOB SAFETY ANALYSIS (JSA)

Land Surveying

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