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**TEMPORARY STORAGE,  
TRANSPORTATION, and DISPOSAL PLAN**

**ZONE 3**

**USS LEAD SUPERFUND SITE  
EAST CHICAGO, LAKE COUNTY, INDIANA**

Prepared for:

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Attn: Mr. Sathya V. Yalvigi

**September 12, 2016**

Prepared by:

**PARSONS**

10 S. Riverside Plaza, Suite 400  
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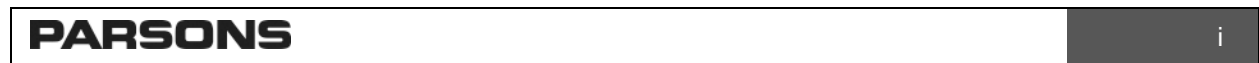
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## ACRONYMS

AOC	Administrative Order of Consent
bgs	Below ground surface
BMPs	Best management practice
Contractor	Chemours Contractor
CD	Consent Decree
CQAP	Construction Quality Assurance Plan
CSR	Chemours Safety Representative
cy	Cubic yards
EC	Chemour's East Chicago site
ECHA	East Chicago Housing Authority
EPA	U.S. Environmental Protection Agency
ft	Foot, feet
GIS	Graphic Information System
HASP	Health and Safety Plan
HEPA	High efficiency particulate arrestance
IC	Incident Commander
IDEM	Indiana Department of Environment Management
mg/kg	Milligrams per kilogram
NPDES	National Pollution Discharge Elimination System
O&M	Operation and maintenance
OU	Operable unit
Parsons	Parsons Corporation
ppm	Parts per million
RA	Remedial Action
RCRA	Resource Conservation and Recovery Act
RD	Remedial design
QAPP	Quality Assurance Project Plan
SD	Settling Defendants
SOW	Statement of Work

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SWPPP	Stormwater Pollution Prevention Plan
T&D	Transportation and disposal
TCLP	Toxicity Characteristic Leaching Procedure
TSD	Treatment, storage, and disposal facility
TSTD	Temporary Storage, Transportation, and Disposal Plan
USS Lead	U.S. Smelter and Lead Refinery
$\mu\text{g}/\text{m}^3$	Micrograms per cubic meter

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## 1.0 INTRODUCTION

### 1.1 GENERAL INFORMATION

In accordance with the scope of work defined by the United States Environmental Protection Agency (EPA) issued Consent Decree (CD) dated September 2014, the former USS Lead facility in East Chicago requires the removal of impacted soil from residential properties to a maximum depth of 2 feet. The soil removal will be conducted by the EPA Remedial Action Contractor based on the EPA prepared design documents and based on level of priority. The design documents will identify the areas of excavation and the depth of excavation.

For all properties, soil removal will extend to the specified depth interval of 24 inches or greater, based on the sampling data. The horizontal and vertical limits of removal have been established by EPA's remedial design documents. On behalf of the Settling Defendants (SDs) and in accordance with the CD and Statement of Work (SOW), Chemours Company will provide the temporary storage, transportation and disposal of soil.

All soil shall be transported to the Chemours East Chicago, Indiana site (EC) at 5215 Kennedy Avenue for temporary storage and offsite disposal at permitted facilities.

### 1.2 WORK PLAN ORGANIZATION

This Temporary Storage, Transportation, and Disposal Plan (TSTD) is organized as follows:

- **Section 1.0 – Introduction** provides general information on the TSTD.
- **Section 2.0 – Project Organization** provides information defining the scope of work and entity performing work.
- **Section 3.0 – Proposed Remedial Measures** summarizes the control measures necessary for site safety and protection of human health at the Chemours East Chicago site.

In addition to the sections described above, tables and figures are provided as well as appendices from US Ecology (Transportation and Disposal Company) for this report as noted below:

- **Appendix A – US Ecology Work Plan** – describes the means, methods and procedures for the transportation and disposal of impacted soils from the temporary storage area at EC site to the disposal facility.
- **Appendix B – US Ecology Health and Safety Plan (HASP)** describes all activities to be performed to protect personnel and the public from physical, chemical, and all other hazards posed by the transportation and disposal of impacted soils.
- **Appendix C – US Ecology Incident Management** describes the standard operating procedures for incident management of the transportation and disposal contractor's personnel.
- **Appendix D – Addendum to the East Chicago Health and Safety Plan** is included for the defined work activities associated with the temporary storage area at the EC site.

- **Appendix E – East Chicago Health and Safety Plan** is included for reference while performing work on the EC site.



## 2.0 PROJECT ORGANIZATION

### 2.1 OVERALL SITE MANAGEMENT COMPANY

Parsons will provide the overall management of the Chemours East Chicago site inclusive of daily safety oversight (CSR), transportation and logistics coordination with the EPA Remedial Action contractor, transportation and logistics coordination with the transportation and disposal company (US Ecology), logistics support of the soil stockpile management and load out operations by the Chemours Contractor (Contractor).

#### 2.1.1 Emergency Contact Information

Following are the emergency contact information for the EC site:

Name	Company	Title	Office #	Cell #
Sathya Yalvigi	Chemours	Project Director	(302) 773-4291	(484) 678-8984
Randy Palachek	Parsons	Technical Lead	(512) 719-6006	(512) 663-9590
Keith Thompson	Parsons	Onsite CSR	(312) 930-5130	(312) 810-5016
Everett Jones	Parsons	Project Manager	(518) 858-1834	(518) 858-1834
Sam Pantuso	US Ecology	Account Manager	(330) 607-7976	(330) 607-7976

### 2.2 REMEDIAL ACTION CONTRACTOR

The EPA Remedial Action Contractor will provide the transportation from the excavated Zone 3 USS Lead impacted soils to the EC temporary storage area. Impacted soils trucks will be lined to prevent accidental release of residual contamination during transport. Trucks will follow a direct route from the Zone 3 remedial areas along 151<sup>st</sup> Street to the EC site on Kennedy Avenue as shown on attached Figure 1. Once the trucks have entered the EC site they will travel along dirt roads to a concrete pad surrounded by a staked silt fenced area. The trucks shall unload within the silt fenced area and exit forward proceeding along the exit route shown on Figure 1 to Kennedy Avenue. The soil will be stockpiled at this location until transported offsite to approved disposal facilities.

### 2.3 SETTLING DEFENDANT CONTRACTOR

The hazardous and nonhazardous soil stockpiles will be maintained separately and managed by the Settling Defendant Contractor (Contractor). The hazardous and nonhazardous soil stockpiles will be managed so that the height does not exceed 20 feet and is contained on the concrete pad with the required erosion control procedures including silt fencing and straw bales. The hazardous soil stockpiles will be covered with plastic material when no transportation and disposal is occurring at the EC site. The Contractor will be responsible for loading the transportation and disposal firm trucks who will deliver the soil to a US Ecology facility for final

disposal. A waste manifest will be issued out of the Chemours East Chicago site on Kennedy Avenue for hazardous soil. Defined below are the disposal facilities for Zone 3 soils.

### Hazardous Soils

#### Primary Disposal Facility

1. US Ecology Chicago  
16435 Center Avenue  
Harvey, IL 60426-6078  
Phone: (708) 596-7040  
Fax: (708) 596-7045  
EPAID# ILD000666206

#### Secondary Disposal Facility

2. US Ecology Detroit South  
1923 Frederick St.  
Detroit, MI 48211  
Phone: (313) 347-1300  
Fax: (313) 923-0217  
EPAID# MID980991566

#### Third Disposal Facility if Primary and Secondary daily volume is exceeded

3. US Ecology Michigan  
49350 North I-94 Service Drive  
Belleville, MI 48111  
Phone: (800) 592-5489  
Fax: (800) 592-5329  
EPAID# MID000724831 (Treatment)  
EPAID# MID048090633 (Landfill)

### Non-Hazardous Soils

#### Primary Source Facility

1. Republic Newton County Landfill  
2266 E 500 S

Brook IN 47922  
State Permit ID 45-18

## 2.4 TRANSPORTATION AND DISPOSAL COMPANY

US Ecology will provide transportation and disposal of the loaded soil from the EC site to the approved disposal facilities in accordance with Appendix A. Soil disposal logs/manifests will be provided to the Agency via electronic transmission.

### **3.0 PROPOSED EC SITE REMEDIAL MEASURES**

The EPA Remedial Action Contractor will excavate the designated soil from properties located within the USS Lead site and transport to the Chemours East Chicago site on Kennedy Avenue. The soil will be placed in the designated area on a paved pad. The soil stockpile area will be maintained and managed by a Contractor.

#### **3.1 EROSION CONTROL AND STORMWATER POLLUTION PREVENTION**

Potential pollutant sources from project construction tasks include temporary storage of impacted soil and exposed soils, equipment maintenance fluids, leaking vehicles and equipment, or fuel refilling.

The Contractor will install silt fences and straw bales to contain any potential erosion of contaminated soils. This is detailed in the following sections and on figures included in this document. Site activities will be planned and performed in a manner to keep from releasing or spilling fuels, hydraulic fluids and greases for equipment, decontamination wastes and general rubbish. Due to soil stockpile and soil transport being the sole focus of this project, it will not include the use of most common construction materials.

Most activities and storage of materials or substances that could cause a hazard if spilled will be performed in the soil stockpile area. Whenever possible, equipment will be fueled and repairs made on the paved surface of the soil stockpile area.

In the event of a spill of fuel, hydraulic fluids or grease, spill response will entail the following:

- immediately stopping the source of the spill,
- setting up a containment barrier around the spill,
- prompt collection and cleanup of the spilled substance,
- prompt cleanup of the area effected,
- notify the East Chicago Fire Department immediately at 911, if necessary,
- notify the Federal Emergency Spill Hotline at 1-800-424-8802 within two hours if the amount is above reportable quantity or any amount enters a waterway,
- notify the Indiana Emergency Response Hotline at 1-888-233-7745, and
- perform appropriate disposal of spill cleanup material and waste.

In addition, the following will be implemented by the Contractor:

The Contractor shall be responsible for Spill and Emission Control in accordance with the requirements of 40 CFR 112. Spill and emission control shall be addressed in the Contractors Health and Safety Plan.

The Contractor shall immediately notify the Chemours Site Representative (CSR) in the event of a spill or release, regardless of the spill location or size/quantity.

The Contractor shall provide methods, means, and facilities required to prevent contamination of land, air, water, uncontaminated structures, equipment, or material by the discharge of wastes or residues due to Contractor's operations.

The Contractor shall provide material, equipment, and personnel to perform emergency measures required to contain any spillage and to manage spilled materials and soils or liquids that become contaminated due to spillage. The Contractor shall provide, at a minimum, the spill control and cleanup equipment and materials such as standard synthetic sorbent materials, mineral sorbents, drums, portable pumps complete with hoses, vapor resistant sheeting and tarps, shovels and rakes. All equipment and labor for spill cleanup shall be properly disposed of.

The Contractor shall provide equipment and personnel required to perform routine decontamination of site equipment as well as measures that may be required to remove spillage from previously uncontaminated structures, equipment, material, or soil. Decontamination residues resulting from spills shall be properly treated and / or disposed of.

The Contractor shall provide equipment and personnel to mitigate any spillage of material that might occur during transport of any materials offsite.

If a spill or discharge occurs outside the concrete area or temporary storage area, the Contractor shall immediately notify the Chemours Site Representative and implement the Contractor's spill and emission control measures detailed in their onsite Health and Safety Plan.

Figure 2 shows the sections and details for erosion control structures.

### 3.2 DUST SUPPRESSION

The largest potential source of dust and emissions during the work will be the storage and handling of the impacted soils during stockpile management and soil load-out. As discussed above, dry decontamination techniques will be used on transport trucks. Excavation equipment will be stored so that it does not generate fugitive dust immediately after completion of work. If necessary, after completion of the work and prior to exiting the property, soil staging equipment will be decontaminated by wet wash of the tires.

Appropriate dust control measures will be implemented during stockpile management and soil load-out activities. The planned staging area is expected to require simple control measures to mitigate fugitive dust. The following typical dust control measures may be considered:

- Mist spray of water
- Mist spray of water amended with environmentally safe additives (e.g., Simple Green, Envirotech Vapor Suppression, or equivalent)
- Coverage of hazardous soil piles with plastic material when no transportation and disposal is occurring at the EC site.
- Stop work if applicable

Onsite monitoring of dust levels is planned as noted in the EC HASP. Special considerations will be applied during soil moving operations (unloading of impacted soil and the load out of

impacted soil). Dust monitoring will be conducted with dust meters (i.e., Dust Trak model 8530 or model 8532 dust meters or equivalent) as a means of documenting concentrations of airborne dust. Dust readings will be recorded on site-specific dust monitoring forms or in the field logbook.

Dust levels will also be monitored during load-out activities at the EC site perimeter. If the monitoring data at the Site perimeters indicates that dust levels are 100 micrograms per cubic meter (ug/m<sup>3</sup>) above background for a 15 minute average and greater than 150 micrograms per cubic meter (ug/m<sup>3</sup>) in the downwind area, additional engineering control measures (listed below) will be implemented to reduce the dust level. The equipment proposed for the EC site will be maintained properly. If necessary, the tires of soil transport trucks will be washed in order to prevent tracking of soil that could increase fugitive dust levels outside the EC site perimeter.

The dust level air monitoring results will be provided to the Agency via electronic transmission.

### **3.2.1 Dust Suppression Techniques**

A rule of “no visible dust” will be applied to all aspects of the work that involve impacted soils. To control the possible generation and migration of dust during the handling of waste, the following procedures will be implemented:

- Apply water to loading operations upon any observance of dust.
- Control dust during operation of trucks by not allowing waste to be dropped from heights above the top rail of the truck body.
- For days on which wind speeds exceed 30 mph, cease stockpile management and loading operations work and provide water as necessary to avoid generating fugitive lead dust.
- Regularly inspect all rear gate seals and locking mechanisms on waste transport vehicles in order to prevent spillage and dust production.
- Clean up all spilled soil waste within the loading area and work areas. Following each day’s construction activities, the contractor will remove any residual soils from the loading area surfaces that could interfere with future unloading/load out operations.
- The transportation and disposal company will install secured, strapped-down covers to prevent fugitive lead dust during transport to the disposal facility.
- Coverage of hazardous soil piles with plastic material when no transportation and disposal is occurring at the EC site.
- Stop work if applicable

To ensure compliance with the project performance standards, air monitoring will be conducted as described below.

### 3.2.2 Air Monitoring Plan

Air monitoring will be performed during soil load-out activities to ensure that there is no fugitive dust from the impacted soils. Real-time particulate monitors and personal air monitors (PAMs) will be used during the operations as detailed below.

#### 3.2.2.1 Real-Time Particulate Monitors

Particulate dust monitors measure the total dust in the air. Two particulate dust monitors will be set up at the temporary soil staging area:

- One monitor will be placed downwind of the area to monitor the effects of the work.
- One monitor will be placed upwind of the soil storage area to monitor dust coming from sources unrelated to the work.

Dust Trak model 8530, model 8532 or comparable monitors will be used to measure total suspended particles (TSP) in the air. These monitors measure aerosol particulates corresponding to particulate matter up to 10 microns in diameter (PM<sub>10</sub>).

To establish a baseline the two monitors will be placed two days prior to the arrival of any impacted soils from the USS Lead site. After establishment of a baseline, the daily arrival of soils from USS Lead will create a soil staging area requiring stockpile management and load-out. The area-specific action level will be reviewed periodically during the work. The action level will be 100 micrograms per cubic meter (ug/m<sup>3</sup>) above background for a 15 minute average and greater than 150 micrograms per cubic meter (ug/m<sup>3</sup>) in the downwind area. This concentration will be greater than the upwind monitor reading that measures the ambient (i.e., nonwork-related) conditions. If the downwind or entryway monitor shows a level exceeding the action level, the upwind monitor will be checked to see if there is an upwind source for the increased dust level and the monitor will be checked again in 10 minutes to determine whether the level has dropped below the action level. If it has not, work will be decreased and the dust suppression techniques will be correspondingly increased as needed to lower the dust levels below the action level. Dust monitoring will not be conducted during a significant rain event and dust meters will be protected in place in the event of a sudden shower. Dust meters can be encapsulated in plastic, if necessary, ensuring no obstructions to the flow of the meter.

#### 3.2.2.2 Personal Air Monitors

In addition to the two dust monitors described above, during disturbance of lead-impacted soils, a Gilian GilAir-5 model (or comparable) Personal Air Monitor (PAM) will be co-located with a dust monitor at each location during the load out work. The PAM cassettes will be analyzed for lead content at an offsite laboratory after completion of the load out work. The findings will be reviewed and documented. The date, start time, end time, and air flow will be recorded on the cassette for analysis. These samples will be collected weekly during loading activities.

The PAM results will be provided to the Agency via electronic transmission.

### 3.3 HEALTH AND SAFETY REQUIREMENTS

The current EC HASP attached as Appendix E establishes prudent health and safety guidelines to minimize the risk of occupational accidents and exposure to hazardous substances associated with environmental sampling and removal of potentially impacted soil and construction debris materials. The EC HASP also provides emergency incidence response guidelines and contacts in the event of an accident or a hazardous exposure. This EC HASP includes the following:

- Addendum for planned site activities attached as Appendix E
- Site health and safety characterization
- Physical hazards
- Characterization of waste
- Hazard evaluation of waste
- Responsibilities of key personnel

The EC HASP was developed specifically for the EC project site and will be used to establish minimum onsite safety requirements, as well as policies and procedures adequate to protect Site workers, the public, and the environment from the predicted hazards. All remediation contractors involved in the transport, storage, and handling of impacted soil will be required to abide by these minimum requirements. As indicated in the HASP, if unanticipated conditions occur at the Site, the plan will be modified accordingly.

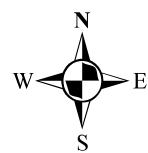
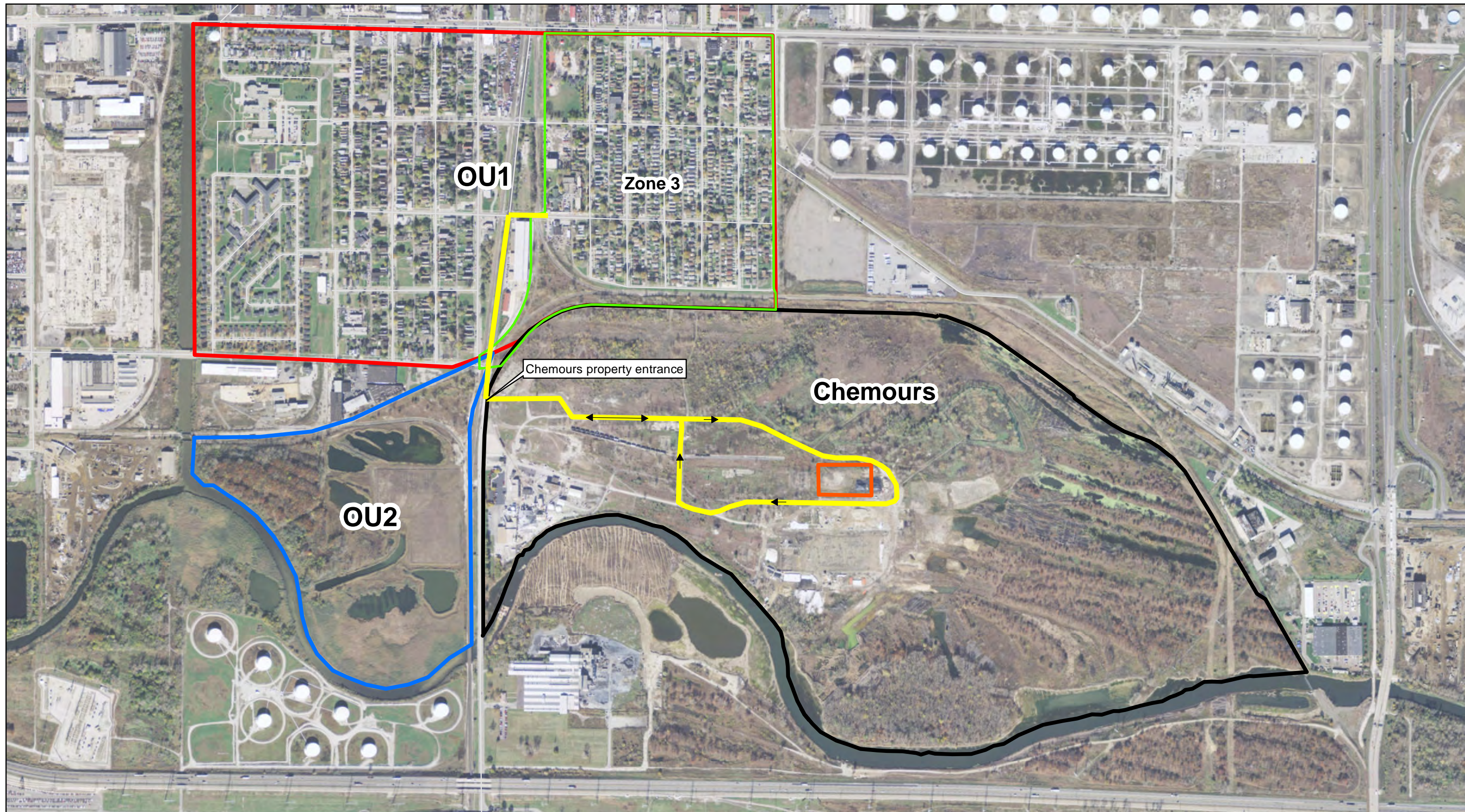
Modified Level D personal protective equipment will be required for project activities unless health and safety monitoring shows otherwise. If monitoring indicates a potential issue or exposure, then engineering controls or personal protective equipment may be necessary to protect workers and/or the surrounding community.

Exposure to lead in soil for site workers is anticipated to be of low risk for this project. Dust generation as part of the storage and loading activities will be prevented with proper dust control measure (i.e. wetting of soil, slow unloading/loading activities, etc.). Dust suppression and ambient and personnel air monitoring will be conducted as specified in Section 2 above. Exposure due to inhalation or ingestion may pose a risk, which can be easily mitigated by proper use of PPE. Hands and shoes may come in direct contact with potentially impacted soil. Therefore, workers will be required to wear steel toed work boots, protective gloves (work or latex/nitrile), high visibility vests, and hard hats as part of their Level D PPE. Handling of soil and soil samples or any work that worker comes in contact with soil is only allowed while wearing latex/nitrile gloves, or work gloves over latex/nitrile gloves. Whenever a task necessitating the use of PPE is completed, the latex/nitrile gloves will be discarded and hand washing will be required. Additionally, to prevent track-out off-site of the impacted soil, work boots will be decontaminated by brushing off any loose soil on site, and washing the boots with water.



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## **FIGURES**

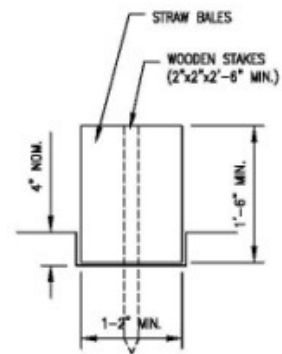


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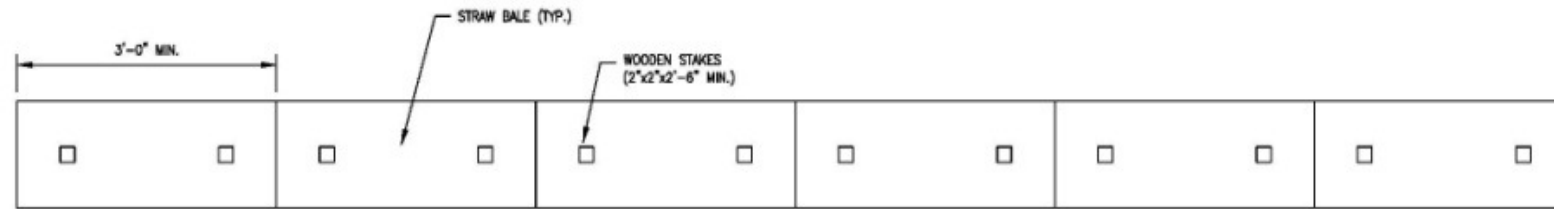
- Chemours Property
- Haul Route for Trucks Leaving Zone 3
- OU1
- OU2
- Zone 3
- Soil Storage Area

**Figure: 1**  
**Chemours Property**  
**in Relation to Site**

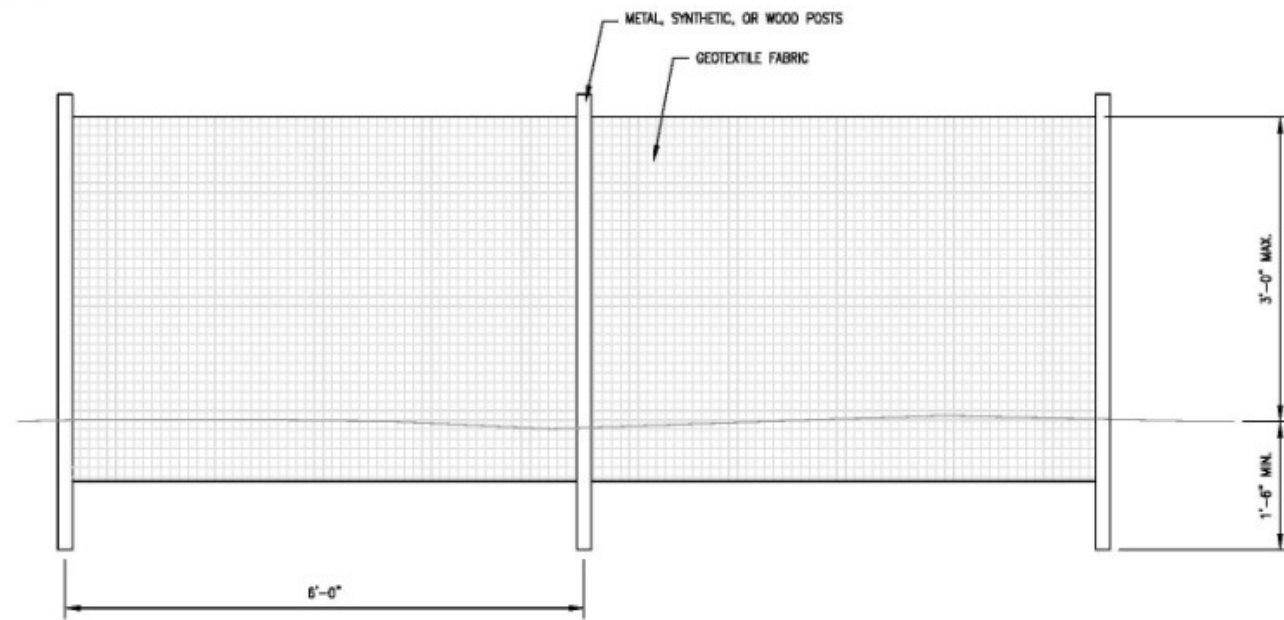
Chemours East Chicago Facility  
 East Chicago, Indiana



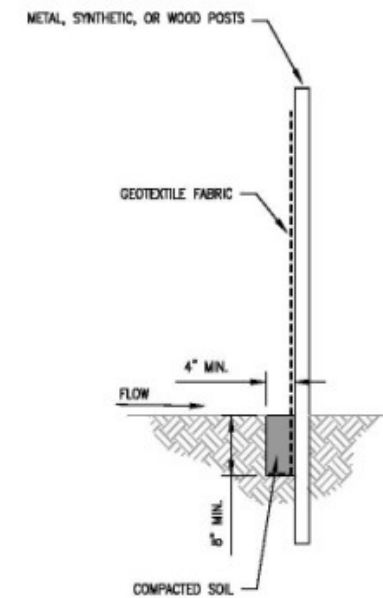
**STRAW BALES—SIDE ELEVATION**  
NOT TO SCALE



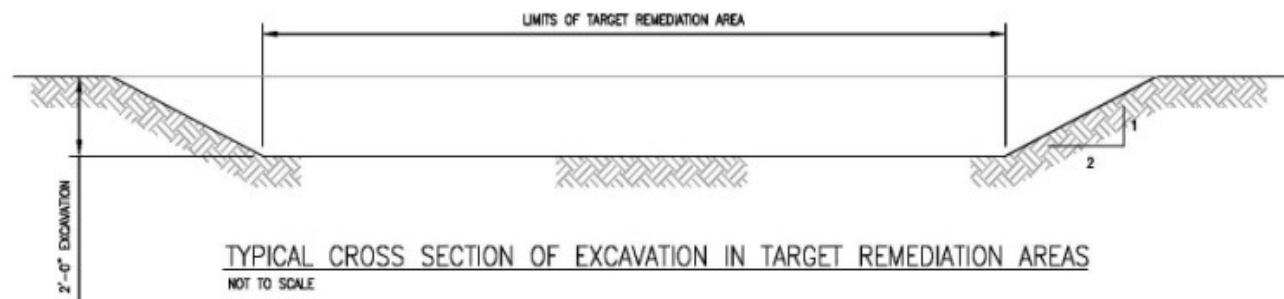
**STRAW BALES—PLAN VIEW**  
NOT TO SCALE



**SILT FENCE DETAIL**  
NOT TO SCALE



**EMBEDMENT DETAIL**  
NOT TO SCALE



**TYPICAL CROSS SECTION OF EXCAVATION IN TARGET REMEDIATION AREAS**  
NOT TO SCALE

**SECTIONS AND DETAILS FOR INTERIM REMEDIAL ACTION OF TARGET REMEDIATION AREAS**

DuPONT EAST CHICAGO FACILITY  
EAST CHICAGO, INDIANA

**PARSONS**  
PARSONS COMMERCIAL TECHNOLOGY GROUP  
10 S. RIVERSIDE PLAZA, CHICAGO, IN



05/14/2012

FIGURE

2

**APPENDIX A**  
**US ECOLOGY WORK PLAN**

# **APPENDIX A**

## **US ECOLOGY WORK PLAN**

### **ZONE 3**

**USS LEAD SUPERFUND SITE  
EAST CHICAGO, LAKE COUNTY, INDIANA**

**US ECOLOGY WORK PLAN**  
**USS LEAD SITE – EAST CHICAGO, IN**

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**1.0 SCOPE OF WORK**

US Ecology (USE) is proposing to provide the overall management of the transportation and disposal activities associated with the cleanup of heavy metal impacted soil from the USS Lead project in East Chicago.

**2.0 PROJECT PERSONNEL**

USE intends to assemble a team which will be responsible for the management of the transportation and disposal activities. USE's proposed team will consist of the following personnel:

A **Senior Project Manager** will be involved with the project to assist in the assignment of an on-site transportation/disposal coordinator as well as an on-site load spotter, both of whom will maintain a presence throughout the project. The senior project manager will be involved in the review and approval of the site health and safety plan, will direct USE's on-site personnel as to the objectives of the project, and will review project invoicing and other submittals.

USE will also assign a **Transportation Manager** to the project. The role of the transportation manager will be to handle logistics and work with the trucking companies involved with the project. The transportation manager will receive notifications as to the next day's production activities for both hazardous and non-hazardous soils. The transportation manager will ensure that loads are scheduled based upon the daily needs of the project.

An **On-Site Transportation & Disposal Coordinator** will oversee daily movements of boxes to the landfill(s) and/or treatment facilities associated with the project. This work will consist of managing daily container inventories, overseeing production activities, coordinating paperwork, and assisting with load preparation. In addition, the on-site coordinator will maintain proper tracking of loads shipped to their respective disposal facilities. The on-site transportation and disposal coordinator will be the primary interface between site personnel and USE representatives involved with the project. The on-site coordinator will also communicate daily with USE's transportation and the respective disposal facilities as to the planned daily production. In addition to the above responsibilities, the on-site coordinator will act as a safety manager to ensure that the transportation and disposal activities that USE is responsible for are conducted in a safe manner in accordance with the HASP.

### **3.0 WASTE PROFILING / PAPERWORK**

After notification of award, USE's project personnel will work with Chemours and its representatives to establish waste profiles for the non-hazardous and hazardous soils. USE will assist in the profiling of non-hazardous soil to the agreed upon Subtitle D landfill (Republic Services Newton County Landfill). For the hazardous soil, USE anticipates setting up profiles into its USE Chicago (Harvey, IL) facility as well as USE Detroit South and USE Michigan (Belleville, MI) as backup facilities. The profiling process will require analytical which supports the proper characterization of each type of soil.

If requested, USE will work to furnish all required shipping paperwork for both non-hazardous and hazardous waste shipment activities.

### **4.0 TRUCK HANDLING & LOADING PROCEDURES**

#### **2.1 Truck Management**

USE's transportation manager will be involved with the daily scheduling and assignment of trucks to the site work areas once notifications are made for next day activities. For any subcontracted transportation, USE will meet in advance with the haulers to review the scope of work, health and safety requirements, Traffic and Accident Management Plan, hauling routes to the disposal facilities, and procedures for accessing the disposal facilities. USE would like to point out that the drivers assigned to the project are most likely going to be non-union.

#### **2.2 Truck Loading & Tarping**

Once the project commences, USE will maintain communication with Chemours and its representative(s) as to the location of the staging and/or loading areas. USE is prepared to furnish either 20 yard rolloff boxes and/or semi-dump trailers which will be live loaded. Rolloff boxes will be lined with polyethylene liners prior to arrival on site. Also upon arrival, boxes will be inspected to ensure they are safe and compliant for over-the-road transportation. Once boxes are loaded, they will be tarped and inspected for any loose soil found on rails.

USE has proposed the use of both end dumps and 20 yard rolloff boxes to ship soils to its Chicago (Harvey, IL) facility. The use of rolloffs allows loads to be staged at the facility and processed over a longer period of time rather than within an 8 hour day. Any additional daily volumes that are produced that exceed USE Chicago's capacity will be shipped in end dumps and hauled to USE Detroit (Michigan). The combination of both of these facilities will enable US Ecology to handle average daily volumes of 600 or more tons per day based upon the amount of soil produced and the number of available trucks.



## 5.0 HAUL ROUTES

USE has conducted a review of the potential haul routes from East Chicago to the proposed disposal facilities. USE has revised the originally submitted haul route plan to take into account the Kennedy Avenue property being used as a material staging and loading area. The intent is to identify routes which limit residential traffic and present the most safe and effective manner to route material to the proposed facilities.

### 5.1 Traffic Pattern to the Kennedy Avenue Site

Trucks traveling to the Kennedy Avenue staging/loading area may come from I-80/94 to the Cline Avenue (SR 912) exit. From Cline Avenue trucks will head north to Chicago Avenue (SR 312). Trucks will travel west on Chicago Avenue then southbound on Kennedy Avenue (Huish Drive) to the entrance of the staging/loading area near 5201 Kennedy Avenue.

### 5.2 Traffic Pattern from Kennedy Ave. Site Area to USE Chicago (Harvey, IL)

From the Kennedy Avenue staging/loading area, trucks will proceed north on Kennedy Avenue (Huish Drive) to Chicago Avenue (SR 312) and head east to Cline Ave. (SR 912) South, then to I-80/94 West. Trucks will exit I-80/94 at Halsted St. (IL Rt. 1) and head northbound to 167<sup>th</sup> St, then west on 167<sup>th</sup> to Center Ave, north to USE Chicago. Travel to USE Chicago from East Chicago is approximately 13 miles and takes approximately one half hour.

### 5.3 Traffic Pattern from Kennedy Avenue Site to Republic Newton County Landfill

From the Kennedy Avenue staging/loading area, trucks will travel northbound on Kennedy Ave. (Huish Drive) north to Chicago Avenue then eastbound to Indianapolis Blvd. (IN 152 / Rt. 41) South approximately 51 miles to SR 16 East, approximately 3.7 miles to the landfill entrance. The 58 mile trip takes approximately an hour and twenty minutes.

### 5.4 Traffic Pattern from Kennedy Avenue Site to USE Detroit

Trucks will leave the Kennedy Avenue site and travel northbound to Chicago Ave. then eastbound to Cline Avenue South. Trucks will have the option of traveling on I-90 east or continuing to I-94 east. Trucks will continue on I-94 through Indiana into Michigan approximately 258 miles to the Rivard/Russell Street exit (216B). Trucks will head south on Russell Street to Ferry Street then south to the entrance of the Detroit treatment facility at 1923 Frederick Street. The estimated travel time between the Kennedy Ave. site and the Detroit treatment facility is approximately 4 hours.

## 6.0 DISPOSAL FACILITIES

USE's proposal to Chemours includes multiple options for the secure disposal of non-hazardous and hazardous soils. USE has provided an option for non-hazardous soil disposal and two options for hazardous waste disposal with a third option available if necessary. The following are the facilities proposed for use:

USE Chicago – Harvey, IL	Hazardous Soil
USE – Detroit, MI	Hazardous Soil
Republic Services – Brook, IN	Non-Hazardous Soil

USE Chicago is a fully permitted RCRA treatment facility that specializes in handling heavy metal impacted soils. After the treatment process, soils are rendered non-hazardous and shipped to WM Laraway Landfill. The use of USE Chicago provides Chemours with a lower transportation cost compared to Detroit. However, USE Detroit offers much larger throughput capacity and will handle any materials that USE Chicago is not able to accept. In the event additional treatment capacity is needed, US Ecology has a third permitted treatment facility in Belleville, MI that can be utilized.

**APPENDIX B**  
**US ECOLOGY HEALTH AND SAFETY PLAN**

# **APPENDIX B**

## **US ECOLOGY HASP**

### **ZONE 3**

#### **USS LEAD SUPERFUND SITE EAST CHICAGO, LAKE COUNTY, INDIANA**

**Transportation  
Site-Specific Health & Safety Plan**

**USS Lead Superfund Site  
East Chicago, Indiana**

**June 2016**

Prepared for:  
The Chemours Company  
1007 Market Street, D-3084  
Wilmington, DE 19899  
Attn: Mr. Sathya V. Yalvigi

Prepared by:  
EQ / US Ecology

## Purpose

The purpose of this plan is outline health and safety protocols associated with the transportation and off-site disposal of contaminated soil from the USS Lead site in East Chicago, IN. This document is to assist Chemours in meeting their efforts to document and address potential site risks for employees and subcontractors and to help ensure a safe and successful project.

### 1. Overview

This Transportation Site-Specific Health & Safety Plan is part of an overall site health and safety plan developed by Chemours and the U.S. EPA.

This site-specific Health & Safety Plan is part of an overall project to transport both hazardous soils to US Ecology facilities located in Harvey, IL; Detroit, MI and Belleville, MI as well as non-hazardous soil to Republic-Newton County, IN Landfill .

This site-specific plan will address the hazards that may be encountered during the loading of vehicles for transportation at the site in East Chicago, Indiana.

### 2. Project Personnel

Please see Section 9.0, Project Personnel and Relevant Information of the HASP for additional contact information.

Job Title	Name	Telephone Number& E-Mail	General Responsibilities
Transportation & Disposal Primary Coordinator			Oversight of all transportation and disposal activities for both RCRA & Non-RCRA wastes.
Hazardous Waste Transportation Coordinator			Management of subcontracted RCRA licensed transporters
Non-Hazardous Waste Transportation (Subcontractor)			Management of subcontracted Non-RCRA transporters
Health and Safety Site Manager			Responsible for safe operations.

### 3. General Rules

Rules cannot be written to cover every possible situation that may arise concerning each individual task connected with your work. You are responsible for protecting yourself, your fellow workers, and the public. You should also

report any dangerous conditions or unsafe practices. The following rules are general in nature but important for maintaining a safe work environment.

1. Safety is important in the discharge of your duties. Obedience to the rules is essential to safety.
2. Drivers must be familiar with and obey all rules and instructions.
3. A driver working with trucking equipment deals with a very high potential of hazards for himself, his company, other workers, and the general public. Every effort must be made to ensure a safe environment is maintained for all parties.
4. Drivers must cooperate and help in carrying out the rules and instructions. They must promptly report any violation of the rules or instructions. They must report any conditions, practice, misconduct, or negligence that may imperil the safety of the driver, other workers, and the general public.
5. Report all accidents, personal injuries, defects in the equipment, or any unusual condition that may affect the safe and efficient operation of the equipment.
6. Drivers must exercise care to prevent injury to themselves or others. Drivers must always be alert and attentive when doing their duties and plan their work to avoid injury.
7. Drivers will obey all safety rules set forth in this document.
8. Drivers will follow all guidelines and requirements outlined in the Federal Motor Carrier Safety Regulations.

#### **4. Hazard Assessment & Precautions**

The following potential hazards have been identified and maybe present, or potentially present within the Remedial Action (RA) areas:

- Uneven surfaces that may result in slips and falls
- Poison plants and insects
- Animal burrows
- Slippery surfaces and areas of loose sediment and/or soils
- Vehicular traffic in and around the RA areas
- Heavy Machinery traffic in and around the RA areas
- Residential and Pedestrian traffic in and around the RA areas
- Severe weather conditions
- Extreme heat and cold conditions
- Overhead power lines

### Potential Chemical Hazards:

Chemical Name	Physical Description	Exposure Limits	IDLH	Exposure Routes	First Aid
Lead	A heavy, ductile, soft, gray solid	0.050 mg/m <sup>3</sup>	100 mg/m <sup>3</sup>	Inhalation, Ingestion, Contact	Eye: irrigate Skin: Flush Breath: Resp support Swallow: Medical Atten.

The items selected above were highlighted as potential hazards while working outside of the vehicle.

### ***Safety Rules for All Drivers***

Safety is a cooperative undertaking requiring an ever-present safety consciousness on the part of everyone. All operations must be planned to prevent accidents. To carry out this policy, the following basic safety rules will apply:

1. All drivers must be familiar with, and obey, their companies Health and Safety Plans.
2. All drivers must comply with all Federal Motor Carrier Safety Regulations as set forth in 49 CFR.
3. All drivers are responsible to know and understand the policies and procedures contained in this manual.
4. Anyone under the influence of intoxicating liquor or drugs, including prescription drugs, which might impair motor skills and judgment, shall not be allowed on the job.
5. No driver shall be permitted to work while their ability or alertness is so impaired by fatigue, illness, or other causes that it might expose the driver or others to injury.
6. Drivers shall not handle or tamper with any equipment, machinery, etc. in a manner not within the scope of their duties.
7. Drivers shall remain in visual contact with the equipment operator as the vehicle is being loaded.
8. Drivers shall follow and obey all posted traffic controls, such as, but not limited to fencing, sawhorse barricades, cones, flagmen, police details and/or caution tape.
9. All heavy equipment movements will be coordinated in advance to avoid incidents.
10. Steel Toe, leather, high top work boots are required on the job sites. Laces on work boots must be tied at all times. Work boots which have exposed steel toes or torn soles shall not be worn.
11. Hard hats are required on the job site while outside of the vehicle.
12. Safety glasses are required on the job site while outside of the vehicle.



13. Ear Plugs are required when working around operating machinery where the noise level prevents conversation using normal voice volume (85 decibels).
14. When working around any waste material, contact with the skin shall be avoided.
15. The correct work gloves shall be used on the job site. ( Leather gloves)
16. Reflective vests must be worn while the driver is outside of the vehicle.
17. All safety equipment shall be properly cleaned and stored at the end of the workday.
18. When outside of the vehicle drivers shall be cognizant of anything that might result in a slip, trip, fall or strain.
19. Horseplay of any kind shall not be permitted.
20. All drivers, shall at all times, strictly adhere to all posted speed limits. You are required to use extra caution when ice, snow, sleet, fog, mist, rain, dust, snow or road conditions impair vehicle control.
21. Overloading of trucks can create additional hazards while in transport, thus loaded weights should be monitored to ensure safe transport from the site to the designated disposal facility.
22. A pre-trip inspection shall be performed on all vehicles prior to loading.
23. A post-trip inspection shall be performed after delivery of the waste.
24. Whenever in doubt about a safety policy or procedure, please contact your Supervisor.
25. Loading and unloading of roll-off boxes will be done on firm level ground to prevent tipping.
26. Personnel will remain at a safe distance during loading and unloading of roll-off containers. Safe distance is one and a half the length of the roll-off cable.
27. All roll-off cables will be inspected on a regular basis by the driver and trained mechanics in order to identify any defects in the cable. Any defects identified will cause the cable to be replaced. Welding of cables is strictly prohibited.
28. Spotters will be utilized to load and unload roll-offs onsite. Spotters will never back a truck up by standing between the truck and roll-off box. Once the spotter has positioned a truck, they will move to a safe distance while the roll-off box is physically loaded or unloaded. Safe distance is one and a half the length of the roll-off cable.
29. When roll-off containers are lined onsite, the back door will be propped open during this activity.

## 5. Personal Protective Equipment

Activities	Personal Protective Equipment
Untarping/tarping and lining, or any other time that you are outside of your vehicle while on the job site	Hard hat, safety glasses, leather gloves, steel toed, leather, high top work boots, reflective vests, ear plugs (when noise levels reach above 85 decibels.)

## 6. Traffic Guidance and Control Plan

Specific routes and loading areas will be identified at the time trucks are ordered for the site. It is imperative that all drivers strictly abide by the routes identified.

These routes are designed for the safe transport in and out of the region and are specifically designed to minimize impact in residential areas.

At the time the trucks are dispatched, specific driving directions will be provided and must be followed. These directions may vary throughout the course of the project, and updated routes will be provided as necessary.

## 7. Emergency Preparedness

Local Emergency Resources	
Ambulance:	<b>911</b>
Hospital:	
Poison Control Center:	<b>(800) 222-1222</b>
Police:	
Fire Department:	
Occupational Health Clinic:	

Emergency Contacts		
Project Manager (PM)		Office: Cell:
Health and Safety Manager (HSM)		
Site Supervisor		Cell:

**Emergency Routes:**

**Directions to the hospital are as follows:**

**Directions to the Occupational Health Clinic are as follows:**

**Emergency Procedures:**

If an emergency develops at the site, the discoverer will take the following course of action:

- Notify the proper emergency services (fire, police, ambulance, etc.) for assistance.
- Notify other affected personnel at the site.
- Contact Project Manager and Health and Safety Manager to inform them of the incident immediately.

**Emergency Equipment Required On-site:**

- |   |   |
|---|---|
| <input checked="" type="checkbox"/> First Aid/Blood borne Pathogens Kit | <input checked="" type="checkbox"/> Fire Extinguisher   |
| <input checked="" type="checkbox"/> Eye Wash                            | <input checked="" type="checkbox"/> Spill Control Media |
| <input type="checkbox"/> Shower   | <input type="checkbox"/> Other: (describe)              |
| <input checked="" type="checkbox"/> Other: (describe) MSDS Binder       | <input type="checkbox"/> Other: (describe)              |

**Incident Management**

Any incident that occurs during this project will be managed according to US Ecology's Incident Management Program (QES-PR-005-ALL). In conjunction with this program, all traffic incidents will be responded to in the following manner:

1. Follow all of the notification steps spelled out in the Incident Management Program.
2. Employee on scene will call the police in order to obtain a police report once any medical or environmental emergencies have been managed.
3. Employee involved in the accident will document the incident on scene with an incident report, witness statements, and photographs of the scene.
4. If necessary the onsite project manager will go to the accident site to further investigate the scene if warranted.
5. Drug and alcohol procedures laid out in the Incident Management Program will be followed.
6. An Incident Review Team will be assembled to determine root causes of the accident and put the proper corrective actions in place to prevent further incidents.

**8. Deferment**

For additional information, or any item not specifically mentioned in this plan, please refer to the Health and Safety Plan as set forth by Chemours.

**9. Site Controls**

The EQ Project Manager and the Health and Safety Contact are responsible to ensure that all personnel entering this site will be properly trained and briefed on the site Health and Safety Plan. They are also responsible to ensure that no unauthorized people are able to enter the work site. EQ personnel will lead the daily tailgate safety meeting.

**Work Zones:**

To provide maximum worker protection and to further prevent ingress of unauthorized personnel, a system of work zone delineation will be instituted during all phases of this project.

**Support Zone:** The support zone is contaminant free and serves as the command center and communication center. EQ field vehicle(s) and or other areas designated by the HSM/SSO outside the Contamination Reduction Zone.

**Contamination Reduction Zone (area used for decontamination):** For hygiene purposes, any personnel protective clothing including gloves shall be discarded prior to leaving the contamination reduction zone. This zone is defined as the decontamination zone and will be a moving area relative to where excavating is taking place.

**Exclusion Zone (area considered contaminated):** For the purposes of this project, the exclusion zone will be defined by the work taking place rather than the contaminants present. The area(s) to be excavated, the pathway(s) to and from the areas of excavation will collectively be referred to as the exclusion zone or work zone. As much as possible, ingress and egress to these areas shall be limited to only those persons completing the work, thus unnecessary unauthorized pedestrian traffic should be minimized.

#### **Site Entry Procedures:**

- Read Health & Safety Plan and sign Acknowledgment Statement
- Check and sign in with the HSM and/or SSO
- Wear proper personal protective equipment

#### **Decontamination Procedures:**

**Personnel:** Decontamination procedures in the contamination reduction zone will be as follows when PPE is upgraded to Level C only:

- Protective outer garments will be removed and placed in disposable plastic bags immediately after leaving the exclusion zone;
- Boots will then be removed, then Tyvek suits and then outer gloves;
- For Level C work, respirators will then be removed, and spent cartridges or canisters will be removed. The face piece or respirator will then be washed in either a water and soap solution then rinsed with water or cleaned with respirator wipes. The storage of these items will be in sealed plastic bags;
- Field personnel will then proceed to wash and dry their hands at designated area(s). Used paper towels will be placed in a disposable bag; and
- The plastic bags containing waste materials will be bagged and disposed of as appropriate.

Clean outer garments will be kept accessible to field personnel in an area free from potential contamination. Water, soap and paper towels will be kept in a clean location at the job site for both regular cleanup and emergency use.

Water for decontamination purposes will be brought to the site and stored in appropriate portable containers.

**Equipment:** Equipment will remain in the exclusion zone for the duration of the project. Prior to equipment demobilization from the exclusion zone, each piece of equipment will be decontaminated by utilizing track spades, spuds or similar methods. In the event the





**APPENDIX C**  
**US ECOLOGY INCIDENT MANAGEMENT PLAN**

# **APPENDIX C**

## **US ECOLOGY INCIDENT MANAGEMENT**

### **ZONE 3**

**USS LEAD SUPERFUND SITE  
EAST CHICAGO, LAKE COUNTY, INDIANA**



## EQ / US Ecology, Inc.

### ***Standard Operating Procedure***

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Document Number:	EHS-PR-005-ALL	Issue Date:	04/10/2013
Author:	Bryan Schultz	Revision Date:	06/26/2014
Job Title:	Director of Health and Safety	Department:	EHS
		Review Date:	

---

#### **TITLE: Incident Management Program**

**PURPOSE:** To establish a comprehensive program to manage the reporting, management, investigation, and corrective actions of all incidents.

**SCOPE:** This program applies to all EQ offices, facilities, and jobsites.

#### **RESPONSIBILITIES:**

**All employees:** Have the responsibility to report all incidents to their direct supervision and cooperate and participate with the investigation and IRT Meeting.

**Supervisors:** Have the responsibility to report all incidents of the employees they supervise to the EHS Department. They also will assist in gathering of information for the investigation and participate in the IRT Meetings and potentially the Review Panel Proceeding.

**EHS:** Ensure that all employees have been trained on this program and ensure that it is followed. EHS members will ensure that all of the reporting is completed and the incident is managed appropriately.

**Director of H&S:** Overall responsibility of the program. Support all divisions in all phases of the program. Participate in the IRT Meetings and as a member of the Review Panel Proceeding.

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**DEFINITIONS:** Many of these definitions have different meanings at the federal or state level, but for the purposes of this procedure are defined as follows:

**Incident:** An unplanned or undesired event that adversely affects a company's work operations.

**Injury:** An incident that results in physical damage to an employee or a subcontractor under the direct supervision of EQ.

**Vehicle Accident:** An incident that occurs when a vehicle or piece of equipment collides with another vehicle, pedestrian, animal, road debris, or other stationary obstruction.

**DOT Vehicle Accident:** Any vehicle accident that involves a commercial motor vehicle (CMV) that when it occurs, results in one of the following; (1) a fatality, (2) Bodily injury to a person who, as a result of the injury, immediately receives medical treatment away from the scene of the accident, or (3) One or more of the vehicles incurring disabling damage as a result of the accident, requiring it to be transported away from the scene by a tow truck.

**At-Fault Accident:** Vehicle accident or DOT vehicle accident in which the employee or subcontractor under the direct supervision of EQ causes the accident to occur.

**Near Miss:** An unplanned event that did not result in injury, illness, or damage – but had the potential to do so.

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**Significant Near Miss:** A near miss that could have resulted in loss of life, catastrophic loss of property, or significant environmental impact.

**Management Discretion:** Any employee at the Operations Manager level or above may decide to initiate the IRT or Review Panel process for any incident they feel necessitates it.

**Breach of Security:** Any activity that does not comply with EQ's security plans outlined in either a site DOT security plans, DEA Program Protocols, or other best management practices.

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## PROCEDURE:

### 1) Reporting

#### a) Initial Reporting

- i) **Verbal** – Immediately after an incident, the affected employee(s) is required to report the incident to their direct supervisor. That supervisor is responsible to ensure that their EHS personnel are immediately contact either by the affected employee or themselves.
- ii) **Written** – A written report of the incident shall be document on QES-FM-001-ALL and submitted to the EHS Department within 24 hours of the incident.

#### b) Secondary Reporting

- i) **Insurance Issues** – For any incident that involves a vehicle where an insurance claim is expected, a copy of the incident report shall be forwarded to Jodie Estes via email as soon as possible.
- c) **Drug Testing** – Drug testing is required when an employee goes off-site for first aid, medical evaluation, or initial medical treatment due to a work related incident. Drug testing is also required if an employee has been involved in a work related incident where vehicle / equipment (other than cosmetic) damage has occurred. A non-DOT regulated, 5-panel drug screen shall be performed for these types of incidents. An alcohol EBT shall be performed as long as the employee makes it to a testing center within two hours of the incident.

For DOT vehicle accidents where EQ is cited as the at-fault party, a DOT regulated drug screen is required within 32 hours. An alcohol evidential breath test (EBT) will also be performed. A note to file must be created if an EBT can not be completed within two hours. If an EBT can not be performed within eight hours, then a note to file must be made to explain why one could not be completed within the required timeframes and the test will not need to be completed.

#### d) Worker's Compensation

- i) **Incident Requiring a Claim** – All incidents that involve a personal injury will be managed by Comprehensive Care / 1 Source OHS. Comprehensive Care is EQ's corporate medical directive and will determine which claims will be reported to Alternative Service Concepts (ASC) and which claims will be self-paid by the respective business unit. The Corporate Director of Health & Safety should be contacted with questions.
- ii) **Case Management** – EHS Managers will be responsible to ensure that all employee injuries are managed properly. They will ensure that the employee is seen at the appropriate medical facilities, contact the doctors and Comprehensive Care to discuss care and work restrictions, and communicate restrictions to the affected employees' supervisor(s). It is highly recommended that when possible, the EHS Manager of the facility should accompany the employee to the medical facility to accomplish these goals.
- iii) **How to File a Claim** – If a claim is to be filed directly by EQ instead of Comprehensive Care, then the following steps will be taken:
  - (1) **Methods:** A claim can be reported by:

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- (a) Email: [newclaims@ascrisk.com](mailto:newclaims@ascrisk.com)
- (b) Fax: (615) 30-5698
- (c) Or by emailing the local ASC claims representative directly

(2) **Information that is required**

- (a) EQ Incident Report (QES-FM-001-ALL)
- (b) Employee Personal information: DOB, Address, Phone Number, and SSN. These items can be provided by HR if the EHS Personnel reporting them does not have access to them. Copy the Manager of Human Resources on your email if EHS does not have access to this information and HR will provide it.
- (c) Copy Manager of HR and Director of Health & Safety on communication with ASC.

e) **Post-Incident Internal Notifications**

i) **Incident Management Database** – All incidents will be entered into EQ's Incident Management Database.

- (1) Log-in at: <https://www.esonesolutions.com/Account/Logon>
- (2) Hover over "problemREPORTER", then click on "Report Incident"
- (3) After entering the initial data in the incident detail screen click "Save"
- (4) Select the incident from the list and complete the other relevant fields.
- (5) From the detail screen click on "Share" and send the brief description and the link to the Incident Notification Group at: IncidentNotificationGroup@eqonline.com
- (6) In the detail screen, attach a pdf copy of the incident report and any other necessary details.

ii) **Dashboard** – All incidents and near misses are to be entered into the Daily Dashboard per the EHS Metrics Reporting Procedure (QES-OP-011-ALL).

f) **External Notifications** – The EHS Department will determine if an incident requires notification to a regulatory agency, and handle that communication if deemed necessary. Communication to regulatory agencies about incidents must be authorized by a member of the EHS Department. For large scale incidents where the media may involve itself, no communication is allowed, and the media should be directed to the appropriate corporate personnel.

2) **Investigation**

a) **Immediate Corrective Actions** – When an incident occurs, the work area will cease work long enough for a supervisor to assess the work area to determine if work is safe to resume. The entire jobsite or facility will not cease operations, just the area where the functions that caused the incidents will cease long enough to reassess the hazards. Controls shall be put in place immediately to prevent recurrence and all affected employees should be briefed on the incident and controls.

b) **Investigation Process** – Facility EHS Personnel shall manage the investigation of all incidents. Investigative tasks may be delegated to operational personnel as necessary. Incident Investigation form (QES-FM-XXX-ALL) may be used as a guide to investigate all incidents.

c) **Interviews** – The affected employee, witnesses, and the immediate supervisor of the affected employee shall be interviewed separately. Interviews will only be used to determine facts and timelines as presented by each party involved of the incident. The interviews will be conducted one-on-one and will be kept private from all other personnel involved with the incident until the IRT.

d) **Timelines** – EHS will document the timeline of the incident and aftercare in cases involving personnel injuries on the Incident Investigation form (QES-FM-XXX-ALL).

e) **Documentation** – All information gathered during the investigation stage of the process shall be kept by the facility EHS staff. It is the EHS Departments responsibility to maintain these files and present the documentation at the IRT.

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3) **Incident Log** – All facilities will be required to keep an incident log that includes all incidents and near misses. This log will be located in the EQ Incident Management Database. All confidential OSHA data will be kept from public view based on the systems security settings.

4) **Incident Review Team (IRT) Meeting**

a) **Triggers** – An IRT Meeting must take place in a timely manner if there is a preventable injury, at-fault VAR accident, breach of DOT security plan, potential diversion from DEA Program, management discretion of environmental issues, significant near miss, or management discretion. Any triggers listed in Section 5(a) will require an IRT as well.

b) **Team Composition**

Required	Recommended
-Direct Supervisor of affected employee -General Manager of facility -EHS Personnel of facility	-Affected employee -Witnesses -Vice President of facility -Director of Health & Safety -Management Representative (MR) -Subject Matter Expert

c) **Presentation of Facts** – IRT meetings should be led by the facilities EHS Personnel. All of the facts discovered in the investigation stage will be presented including employee interviews, photographs, timelines, and/or information from a subject matter expert. If employees involved in the incident attend the meeting then they should present the initial explanation of the incident.

d) **Root Cause** – The team will then be responsible for determining the root cause of the incident. There is a tool in the Incident Investigation Form (QES-FM-XXX-ALL) that utilizes the “Fishbone Diagram” and the “Five Whys” to assist the team in drilling down through the causes to address the true root cause(s) of the incident.

e) **Controls** – Once the root cause(s) has been determined, then controls can be determined to prevent a similar incident.

i) **Action Plan** – The action plan will lay out the tasks that must be accomplished to implement the controls determined by the IRT. The team will agree on responsibilities and timelines for completion.

ii) **Verification Plan** – A follow-up audit plan will be put in place by the IRT that will take place after all of the controls have been implemented. The purpose of the audit is to determine if the controls put in place by the IRT are effective. If the controls are not effective, then the IRT will be reopened and repeated.

iii) **HIRA / MOC Impacts** – Some controls that are developed may require vetting through the HIRA process and/or a MOC. Refer to these specific programs to ensure compliance with the internal processes.

5) **Finalized Report / Lessons Learned**

**Note:** Prior to circulating a IRT report to the company, Section 1 of the form will be removed or blacked out as to not circulate the names of the individuals involved in the incident.

a) **IRT Report** – A copy of the finalized IRT Report will be sent out to the Incident Notification Group at [IncidentNotificationGroup@eqonline.com](mailto:IncidentNotificationGroup@eqonline.com).

b) **EHS Staff Meetings** – All IRTs will be reviewed during the monthly EHS staff meetings. EHS personnel will take any IRT that affects similar operations back to their facility for review during their safety committee meeting.

- c) **Safety Committee Meeting (SCM)** – All facility IRT reports will be reviewed during the monthly SCM. EHS will supply any applicable IRT reports from other facilities for review during SCMs for lessons learned.
- 

**REFERENCES:**

29 CFR 1904  
49 CFR 382  
40 CFR  
21 CFR  
OHSAS 18001:2007

**ASSOCIATED DOCUMENTS:**

QES-FM-001-ALL Incident Report  
Incident Investigation Report  
QES-FM-141-ALL Incident Review Team (IRT) Report

**RECORDS:** The cited records are retained in a manner that supports the requirements of the various local, State, and federal regulatory agencies to which EQ adheres.

Incident Report  
All materials collected during investigation  
Incident Investigation Report  
IRT Report  
Review Board Approval / Denial

**REVISION LOG:**

Section	Revision	Date	Approval
1(e)	Incident Database direction added	6/26/14	BRS
5	Officer Review Panel removed	6/26/14	BRS

**APPENDIX D**  
**ADDENDUM TO THE EAST CHICAGO HEALTH AND SAFETY PLAN**

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**ADDENDUM**  
**to the**  
**EAST CHICAGO HASP**

**USS LEAD SUPERFUND SITE**  
**EAST CHICAGO, LAKE COUNTY, INDIANA**

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**July 26, 2016**

Prepared by:

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## ACRONYMS

AOC	Administrative Order of Consent
bgs	Below ground surface
BMPs	Best management practice
CD	Consent Decree
CQAP	Construction Quality Assurance Plan
cy	Cubic yards
EC	Chemour's East Chicago site
ECHA	East Chicago Housing Authority
EPA	U.S. Environmental Protection Agency
ft	Foot, feet
GIS	Graphic Information System
HASP	Health and safety plan
HEPA	High efficiency particulate arrestance
IC	Incident Commander
IDEM	Indiana Department of Environment Management
mg/kg	Milligrams per kilogram
NPDES	National Pollution Discharge Elimination System
O&M	Operation and maintenance
OU	Operable unit
Parsons	Parsons Corporation
ppm	Parts per million
RA	Remedial Action
RCRA	Resource Conservation and Recovery Act
RD	Remedial design
QAPP	Quality assurance project plan
SWPPP	Stormwater pollution prevention plan
T&D	Transportation and disposal
TCLP	Toxicity Characteristic Leaching Procedure
TSDF	Treatment, storage, and disposal facility

TSTP	Temporary Storage and Transportation Plan
USS Lead	U.S. Smelter and Lead Refinery
$\mu\text{g}/\text{m}^3$	Micrograms per cubic meter

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## 1.0 PURPOSE AND SCOPE

At the former USS Lead facility soils that contain TCLP levels will be removed and transported to the East Chicago (EC) site for temporary storage. From the temporary EC soil staging area US Ecology trucks will be loaded for transportation and disposal. This HASP addendum has been developed to address the additional hazards posed by site changes or additions to the scope of work as originally developed in the HASP entitled East Chicago Revision 2 Health and Safety Plan and dated October 2013, and Revised May 2015 for work to be accomplished at the Former Chemours East Chicago Facility in East Chicago Indiana. This HASP addendum is to be used in conjunction with, and not as a replacement to, the site specific HASP referenced above. Please consult the original HASP for health and safety information not contained within this addendum.

## 2.0 BACKGROUND INFORMATION

Project Name:	USS Lead Temporary Storage and Transportation & Disposal		
Parent HASP Title and Date	East Chicago Revision 2 Health and Safety Plan October 2013, Revised May 2015		
HASP Addendum Author:	Everett Jones		
Project Number:	Chemours PN 502620 ; Parsons PN 449332		
Project Manager:	Everett Jones	Phone No.	(518) 858-1834
Project Director:	Sathya Yalvigi	Phone No.	(484) 678-8984
Primary Plant Contact:	Keith Thompson	Phone No.	(312) 930-5130

## 3.0 ADDITIONAL SCOPE OF WORK

### 3.1 USS LEAD TEMPORARY STORAGE AND TRANSPORTATION & DISPOSAL

1. EPA remedial contractor trucking soil into EC site.
2. EPA remedial contractor unloading dump trucks on EC concrete pad.
3. EPA remedial contractor trucking exiting EC site.
4. Mobilization / demobilization of stockpile management contractor's equipment.
5. Management with heavy equipment of the slope and height of the EC soil stockpile.

6. Management of dust suppression of EC soil stockpile if required.
7. Mobilization / demobilization of transportation company's trucks including roll-offs.
8. Loading of stockpiled soil into trucks or roll-offs provided by US Ecology.

### **3.2 HEAVY EQUIPMENT**

Heavy equipment operations such as excavators, dump trucks, front end loaders, and roll-off trucks may be used to perform various tasks on site. Refer to Parent HASP for additional information.

## **4.0 ADDITIONAL HAZARDS**

### **4.1 CHEMICAL HAZARDS**

#### **4.1.1 Constituents of Concern (COCs)**

The COCs for soil transport consist of: arsenic, lead. See Parent HASP for additional information. These metals can present a health hazard upon overexposure via inhalation of dusts in the air or ingestion by contact with hands. Air monitoring for total dust will be conducted using a Real-Time Aerosol Monitor in addition to weekly air sampling for metals. More information regarding the constituents of concern may be found in the Parent HASP.

#### **4.1.2 Materials/Products to Accomplish Work**

A Safety Data Sheet (SDSs) must be provided to the CSR for any materials or products that will be brought on site to accomplish the work. Prior to use, the CSR must review each SDS and approve that product for use. In addition, plant-specific approval requirements may apply. Materials or products may include such items as treatment chemicals, decontamination solutions, and fuel for equipment operation. All labeling and storage of hazardous materials must be in accordance with regulatory requirements.

#### **4.1.3 Potential Exposure Routes and Risk Mitigation Measures**

Routes of exposure are inhalation, dermal contact, and the incidental ingestion of dust from contaminated hands, food, or cigarettes. Exposure will be mitigated by dust suppression, wetting the soils with water during soil disturbance activities, decontamination and personal hygiene; the level of respiratory protection will be upgraded if necessary based on air monitoring results if engineering controls are not effective. In addition, the site has a high water table that will assist with minimizing dust generation. Dermal contact with soils will be avoided by the use of Personal Protective Equipment (PPE) in the work zone and practicing good hygiene.

When engineering or administrative controls are not adequate to minimize the hazards, personal protective equipment (PPE) will be used. Additional information regarding PPE is provided in Section 5.0.

## 4.2 PHYSICAL HAZARDS

The primary physical hazards are working around heavy equipment, line of fire, caught between, noise, slip, trip, and fall, pinch points and material handling. Procedures to be used to monitor/reduce these hazards will include the following:

- **Cutting hazards:** Fixed, open-blade tools are never permitted for use. Identify all hand safety hazards as part of the job planning process BEFORE starting to work. Remember that gloves are a secondary level of defense when it comes to hand safety; the primary way to avoid hand injuries is by proper hand placement and using the right tool for the job. When using any cutting tool, set up your work so that you cut away from your body or anyone else working nearby, and pay attention to the location of your free hand when cutting. Workers will use tube cutters when cutting tubing. No glove can eliminate the potential for cuts or punctures, but wear Kevlar® (cut resistant) gloves to reduce the hazard when handling sharp cutting tools or when exposed to sharp objects.
- **Drum handling:** Do not manhandle full drums. Partially fill drums to reduce weight when possible. Get help when moving drums. Use a drum cart or forklift with a drum grappler or other mechanical lifting device if possible. Wear gloves and pay close attention to the position of hands and feet.
- **Electrical:** Portable electrical tools and equipment shall be UL listed, double insulated tools or be grounded through a third wire in the cord. The ground wire connection shall not be defeated. Tools with damaged or defective cords should not be used. Taped splices are not permitted. Power tools that may be used in a wet location or a construction site shall have must be in good working order and used with ground fault circuit interrupt (GFCI) protection. All electrical cords and extension cords must be inspected prior to use. Do not overload plugs.
- **Excavation:** Consult and follow the procedures presented in Chemours FC&S Excavation Standard B-5.1 (Appendix F). This standard applies whenever there are excavations of six inches or deeper. The procedure does not apply for excavations that employees physically could not or do not enter (e.g., well borehole).
- **Fire/explosion:** Fueling of any gas- or diesel-powered equipment shall be performed only after the equipment is cooled. Grounding techniques will be used during transfer of fuel and/or other flammable liquids.
- **Heat/cold:** Ample breaks will be taken during hot or cold ambient conditions (SEE Parent HASP).
- **Heavy equipment:** Appendix H provides the Chemours FC&S C.5-1 procedure for earth moving equipment. All construction equipment will be inspected prior to arrival on site and daily throughout the project. Backup alarms must be operable on all equipment. Spotters will maintain communication with operators ,

be visible to drivers and wear high visibility vests. Designated traffic routes will be established and communicated to operators and truck drivers.

- **Hot Work:** Prior to conducting any work that involves a potential source of ignition such as welding, cutting, torching, grinding, etc., a Hot Work Permit is required. An authorized flame/spark-producing permit may be required in addition to a work permit when work involves flames, sparks, or high temperature-producing tools or equipment. Such equipment may include internal combustion engines, electrical tools and motors, and any spark-producing device. See Parent HASP.
- **Materials handling:** Use proper lifting techniques: get a good footing, place feet shoulder width apart, bend knees to pick up load. Do not bend from waist, keep back straight, and get a firm hold on the load. Grasp opposite corners of the load if possible, keep the back as upright as possible and lift gradually by straightening the load. Do not jerk the load and keep the weight as close to the body as possible. When changing direction, turn the entire body, including the feet and do not twist the body. Plan all heavy (greater than 50 pounds) or awkward lifts. A maximum of 50 pounds may be lifted by fit individuals. Any lifting over 50 pounds must be performed via a team lift or using mechanical equipment. Chemours has an 80-lb, 2-person lift limit. Avoid any team manual lifts above 80 pounds. In general, use the buddy system or mechanical lifting aids when moving heavy or bulky items. Plan the lifting job ahead of time to balance and evenly distribute the load. Wear gloves.
- **Noise:** Personnel involved in operating or working near heavy equipment will wear hearing protection at all times. Appropriate ear plugs and/or earmuffs with a Noise Reduction Ratio (NRR) greater than 25 will be worn to prevent over exposure to noise hazards. Workers **must** wear approved hearing protection when working around equipment that produces sound levels in excess of 85 decibels, whenever signs indicate that hearing protection is required, and whenever voices must be raised to be heard at a distance of three feet or less.
- **Overhead obstructions/lines:** New overhead lines have been installed. Observe proper safety procedures; see Parent HASP.
- **Pinch points:** Personnel must always be aware of limb or body position in close proximity to moving equipment to reduce pinch point hazards. Wear appropriate hand protection to protect hands and mark or guard significant pinch points.
- **Rigging and suspended loads:** All tasks resulting in suspended loads such as the placement or movement of equipment will require preplanning and equipment inspection. Inspect all equipment prior to use. Verify that rigging equipment is approved for lifting and that the rated capacity of the slings, wire rope, or chains is not exceeded for the load and the load angle. All rigging equipment must have permanently affixed durable identification stating the rated capacity. Hooks, links, or other attachments must have at least an equal rating. No makeshift links



or fasteners are allowed. Clear a pathway when materials are moved and check for overhead lines and other obstructions. Never allow personnel under a suspended load. Barricade work area to prevent unauthorized access. Rigging will only be completed and inspected by a designated and trained Competent Person.

- **Slip/trip/fall:** Good housekeeping practices should be employed to prevent slip/trip/fall hazards. Access-ways must be kept free of materials, supplies, and obstructions at all times. Tools, materials, and equipment subject to displacement or falling must be adequately secured. Caution must be employed when walking to prevent slip/trip/fall hazards caused by terrain.
- **Tools and Equipment:** Inspect all hand tools before using to determine if they are the proper size, free of oil or grease, and in good condition. Use all tools for the purpose for which they are designed. Use the right tool for the job.
- **Underground utilities:** Underground utilities include such things as electric lines, communications lines, pipelines, or sewer lines that are buried below the surface. These must be located before intrusive activities begin. Location methods could include a geophysical survey, the use of SOFT DIG technology, and/or hand dig. The PD and PM are responsible for verifying that the appropriate method(s) of identifying underground utilities are funded and implemented or signing a variance (PSA form) indicating why such methods should not be required. In addition, once on site, the Site Supervisor must obtain the appropriate permit from the plant prior to initiating intrusive activities. See Parent HASP. A joint utility meeting will be conducted to verify all utilities have been identified and marked and documented on a pre-clearance checklist. Adequate distance from utilities will be maintained by operators.
- **Vehicle traffic:** All vehicles must be in good condition and meet the requirements of Chemours. See Parent HASP Appendix T for the Chemours Driving Safety Fact Sheet. Use barricades, traffic cones, or other appropriate measures to control vehicle traffic through the work area. Verify if there are limitations/restrictions regarding driving on plant. Verify plant speed limits and vehicle emergency requirements. Truck drivers will be notified of site speed limits and designated routes upon entry to the site. Special caution will be observed around the trailer areas.

#### 4.3 BIOLOGICAL HAZARDS

- See Parent HASP

## 5.0 TASK LEVEL PROTECTION

The levels of protection to be used during project-related activities are as follows:

- Modified Level D
  - Tyvek® coveralls taped to wrists
  - Safety glasses with affixed side shields
  - Hard hat
  - Steel-toe boots
  - High visibility traffic safety vest
  - Nitrile inner gloves
  - Leather work gloves
  - Hearing protection as needed
  - Full face shield during cleaning of heavy equipment
  
- Level D
  - Hard hat
  - Safety glasses with affixed side shields
  - Steel-toe boots
  - High visibility traffic safety vest
  - Appropriate task specific-gloves (leather work gloves)
  - Hearing protection as needed
  - Standard work clothes (long pants and long sleeve shirt)
  - Operators of weed cutters shall wear safety glasses, steel-toe boots, shin protectors/leg protection, work gloves and a full-face shield over safety glasses.
  - Operators of chain saws shall wear safety glasses, steel-toe boots, Kevlar® chaps and jacket, work gloves and full-face shield over safety glasses.
  
- Level C
  - Hard hat
  - Steel-toe work boots with chemical resistant over boots or chemical resistant boots
  - Full-face purifying respirators with P-100 particulate cartridge or other filters depending on air monitoring assessment
  - Tyvek® for poisonous plants and direct physical contact with soils

- Work gloves for materials handling, Nitrile gloves under work gloves if there is a potential for skin contact with contaminated water. Kevlar® gloves when cutting or exposed to sharps
- Hearing protection (as needed)

Protection discussed in the paragraphs that follow will be used to initiate each task. An upgrade or downgrade to the specified level of protection will be based on potential contact with biological hazards such as poisonous plants or ticks and/or a change in air quality. The Parsons Safety Manager and client must approve any changes or adjustments to these levels of protection.

---

**Task:** Mobilization/Demobilization

**Location:** Sitewide

**Engineering/Administrative Controls:**  Yes  No **If Yes, please list:**  
 List: Follow the Chemours SOP for use of heavy equipment and overhead obstructions

	PPE Level	Range (ppm or mg/m <sup>3</sup> / condition)
Initial Level	Level D	No Biological Hazards of concern
Downgrade Level	N/A	N/A

**Chemical/Physical Hazard Analysis:**

Text: There is no intrusive activity associated with these tasks and chemical hazards are not expected. Physical hazards associated with these tasks are as follows: hand tools/pinch points, lightning and adverse weather, heat/cold stress, slips, trips, falls, spills, fire hazards, biological hazards and heavy equipment. Pay close attention to hand placement when moving items and wear leather gloves.

---

**Task:** Operation of heavy equipment

**Location:** Soil Staging Stockpile

**Engineering/Administrative Controls:**  Yes  No **If Yes, please list:**  
 List: Heighten worker's visibility to vehicular traffic by using traffic safety vests and traffic warning barricades, as needed

	PPE Level	Range (ppm or mg/m <sup>3</sup> / condition)
Initial Level	Level D	No Biological Hazard of concern
Downgrade Level	N/A	N/A
Upgrade Level	Modified Level D	Biological Hazards (poison ivy, ticks, bees, mosquitoes) are a concern

**Chemical/Physical Hazard Analysis:**

Physical hazards associated with these tasks are as follows: hazards associated with working around heavy equipment, (struck by or line of fire) noise, pinch points, vehicular traffic, lightning and adverse weather, heat/cold stress, slips, trips, falls, and biological hazards.

**Task:** Soil Stockpiling, Material handling

**Location:** Temporary Soil Staging Area

**Engineering/Administrative Controls:**  **Yes**  **No** **If Yes, please list:**

Inspect all equipment prior to use. Use the right equipment for the job. Have fire extinguishers and spill control kits readily available. Dust generation at disturbed soil areas, vehicle pathways and soil stockpiles shall be avoided by applying water as necessary to reduce dust. Potentially hazardous soil stockpiles will be covered with plastic liner. Dust and COC-specific air monitoring will be implemented. See Section 6.0 for the detailed air monitoring plan.

	<b>PPE Level</b>	<b>Range (ppm or mg/m<sup>3</sup> / condition)</b>
Initial Level	Modified level D	Ambient dust < 0.5 mg/m <sup>3</sup> or 0.2 mg/m <sup>3</sup> above upwind readings (1 hour average, collected at the breathing zone)
Down grade Level	N/A	N/A
Stop Work Level	Level C (only after all other engineering controls have been attempted and upon client approval)	Ambient dust > 0.5 mg/m <sup>3</sup> or 0.2 mg/m <sup>3</sup> above upwind readings; Lead >0.03 mg/m <sup>3</sup> (TWA 8 hours) Arsenic >0.01 mg/m <sup>3</sup> (TWA 8 hours)

**Chemical/Physical Hazard Analysis:**

The potential for physical hazards can be high, especially for hazards associated with heavy equipment, overhead and underground utilities, slips/trips/falls due to hoses, vehicle traffic, noise, materials handling, pinch points, exertion, and weather-related hazards. The potential for chemical exposure is moderate.

**Task:** Pressure washing of equipment

**Location:** Decontamination Pad

**Engineering/Administrative Controls:**  **Yes**  **No** **If Yes, please list:**

Only trained personnel will operate pressure washing equipment. Construct decontamination pad in order to prevent overspray. See additional controls for pressure washing in Section 5.3

	<b>PPE Level</b>	<b>Range (ppm or mg/m<sup>3</sup> / condition)</b>
--	------------------	--

Initial Level	Modified Level D or slicker suit with face shield	NA
Downgrade Level	NA	
Upgrade Level	NA	

**Chemical/Physical Hazard Analysis:**

The potential for physical hazards can be high, especially for slips/trips/falls, noise, pressure washer usage, cold /heat stress, materials handling, pinch points, exertion, and weather-related hazards. The potential for chemical exposure is moderate. .

## 6.0 UO REPORT PROCEDURE

### Unexpected Occurrence Reporting Numbers

**Contact Name Number**

Title	Name	Phone Number	Alternate Numbers
(1) Hospital Name: Address:	St. Catherine Hospital 4321 First Street East Chicago, Indiana	(219) 392-1700 Non-Emergency	
(2) CRG Project Director	Sathya Yalvigi	(484) 678-8984	
(3) Parsons Program Safety Manger	Greg Ertel	(585) 353-2574	
(5) CRG Health & Safety	Brian Ambrose	(302) 528-6553	
(6) Regulatory Agency	Jennifer Dodds USEPA Region 5	(312) 886-7566	
(7) Environmental Release Contact	IDEM 24-hr Spill Reporting	(888) 233-7745	
(8) Parsons Project Manager	Everett Jones	(518) 858-1834	
(9) Parsons CSR	Keith Thompson	(312) 810-5016	
(11) Parsons WC Analyst	Donna Miller	(626) 440-2950	(661) 904-0978

The evacuation route, assembly area, and alarm system will be identified by the site

Supervisor / CSR prior to onset of field activities and reviewed with all field personnel. Maps showing the hospital route and emergency evacuation routes are included in the Parent HASP.

**APPENDIX E**  
**EAST CHICAGO HEALTH AND SAFETY PLAN**



HEALTH AND SAFETY PLAN (REVISION 2)  
CHEMOURS EAST CHICAGO SITE  
**EAST CHICAGO, INDIANA**

---

*Prepared for:*

The Chemours Company LLC  
Chestnut Run Plaza  
974 Centre Road  
Wilmington, DE 19805

*Prepared by:*

**PARSONS**

October 2013, Revised May 2015

Chemours PN 507754

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## 1.0 PURPOSE

The purpose of this health and safety plan (HASP) is to assign responsibilities, establish personnel protection standards, specify safe operating procedures, and provide for contingencies that may arise during field activities at the Chemours East Chicago Facility in East Chicago, Indiana.

This HASP has been developed in accordance with the Chemours Corporate Remediation Group (CRG) and Parsons safety and health standard operating procedures, and is in compliance with requirements set forth in 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response.

The site supervisor and site safety officer (SSO) have shared responsibility for implementing and enforcing this HASP. The SSO will evaluate this HASP for continuing adequacy throughout the course of field activities to incorporate changes necessitated as a result of changes in site activities. All proposed revisions to this HASP will be reviewed and by the Health and Safety Manager prior to implementation by the project team and annotated on the revision checklist provided at the beginning of this document.

All participants involved in the project will be briefed on and afforded the opportunity to question this HASP. In addition, all personnel will sign the HASP Compliance Form provided in Appendix A (see Appendix A for field-related forms).

**ATTENTION:** All employees working on the Chemours East Chicago Facility project must comply with all applicable plant safety rules. It is mandatory that a close working relationship be maintained with the Chemours contract administrator, the plant safety contact, as well as any area manager so that applicable rules can be known, understood, and adhered to. In the event of a conflict between plant policies and internal policies, the plant policies will have precedence.

**ATTENTION CONTRACTORS:** You are responsible for compliance with this HASP and any other regulatory requirements set forth by the Occupational Safety and Health Act (OSHA) and other federal/state regulations.

### The Project Safety, Health, and Environmental Plan (PSHEP)

Parsons goal is zero incidents using control measures designed to minimize or eliminate hazards to personnel, processes, equipment, the general public and the environment. This PSHEP outlines safety, health, and environment (SH&E) requirements and guidelines developed by Parsons for client-specific work. When implemented, these requirements will help protect site personnel, visitors, the public, and the environment from incidents caused due to SH&E hazards. Parsons employees should never perform a task that may endanger their own safety and health, the safety and health of coworkers or the public, or damage the environment.

This plan should be updated as conditions change or situations change, usually by addenda to the PSHEP. All Parsons and Parsons' subcontractor personnel must understand and implement the PSHEP and any addenda. Parsons documents this process by having employees sign an acknowledgement form stating that they understand the PSHEP and its requirements.

### Subcontractor Safety, Health, and Environmental Plans (SSHEPs)

Parsons' subcontractors must establish their own safety program for their work and employees. Contract specifications require all subcontractors to accept the Parsons' PSHEP and prepare their own subcontractor safety, health, and environment plan (SSHEP) for work activities the subcontractor has responsibility for performing. The subcontractor will present the SSHEP to the Parsons' Project Manager at least 10 days before site mobilization. At a minimum, subcontractor plans must meet the requirements of this PSHEP and provide SH&E equipment and safeguards suitable for the hazards involved. This PSHEP may not cover all potential hazards on every project, and subcontractors must ensure that appropriate SH&E information is available for all of the subcontractor's project tasks.

## **PARSONS**

### **Corporate Safety, Health & Environment Policy Statement**

As an industry-leading engineering, construction, and technical services firm, Parsons is firmly committed to maintaining a safe, healthy, and environmentally compliant workplace at all its offices and project facilities, guided by the following tenets:

- Safety, Health and Environment (SH&E) is a core value.
- Executive management will lead the SH&E process.
- SH&E will be a responsibility shared by all.
- SH&E performance will be a key business performance indicator.
- SH&E performance will be communicated openly.
- Employees will be given the knowledge and skills necessary to perform their jobs in a high-performance SH&E manner.
- We will extend our SH&E efforts beyond the workplace to include travel, homes, and communities.
- We will continually strive to improve our SH&E processes.

To meet our SH&E objectives, all employees are expected to be actively engaged with regard to SH&E issues. This requires the combined efforts of a concerned management, responsible and knowledgeable supervision, and conscientious, well-trained employees.

Executive Management shall lead and monitor and improve the performance of the organization's Safety, Health and Environmental Management System, at regular intervals, to ensure its continuing suitability, adequacy, and effectiveness.

Parsons will meet or exceed the applicable SH&E legal and other requirements and will continuously monitor and improve operations, procedures, technologies, and programs that are conducive to maintaining a safe, healthy, and environmentally compliant workplace.



**Charles L. Harrington**  
**Chairman and Chief Executive Officer**

**January 2012**

All PSHEP requirements for Parsons’ personnel (e.g., training, substance abuse screening, incident reporting, etc.) also apply to subcontractor personnel, and do not need to be repeated in the SSHEP. Since the SSHEP is part of the PSHEP, subcontractor personnel will be required to receive an Orientation that covers information from both documents, and sign off accepting the PSHEP.

### Subcontractor Prequalification Review

Should there be subcontractors directly hired by Parsons for this project, such subcontractors must be vetted through the Parsons prequalification review. Approved contractors must be listed in the table below, which includes specific work activities and the data on which the prequalification review was finalized and the subcontractor approved for work.

#### HIRED SUBCONTRACTORS

SUBCONTRACTOR	WORK ACTIVITIES	DATE OF EVALUATION
STOCK DRILLING	REMEDICATION SYSTEM SUPPORT AND DRILLING	5/30/14
TBD	CLEARING, EXCAVATION, GRADING	IN PROCESS (May 2015)

### Competent Person Submission Review

Copies of signed [Competent Person forms](#) for subcontractor personnel must be submitted prior to starting work and retained in the project files.

### ESHARP Compliance

To ensure compliance with Parsons Environment, Safety, Health and Risk Management Program (ESHARP), the requirements identified in this HASP are to be used in conjunction with the Parsons Chemours Corporate Remediation Group (CRG) Health and Safety Program Plan (DHASPP), dated May 2014.

Parsons and its subcontractors must comply with the recordkeeping requirements of the regional, municipal, local, and/or OSHA regulations, Owner, Parsons Corporation, and this PSHEP, including:

- OSHA 300 and/or applicable regional, municipal, and local regulation logs
- Medical treatment and follow-up
- Cranes
- Heavy equipment inspection logs
- Fall protection
- Training
- Inspections
- Audits
- Others, as required

Parsons Talent Management and the Division or Program SH&E Manager are the official recordkeepers for files relating to Parsons employees. Each subcontractor maintains its own files.

For this project, safety bulletin boards used for displaying regional, municipal, provincial, local and/or OSHA posters in conspicuous places will be located at the Chemours site office in a readily accessible and visible area.

### **Project Safety, Health, and Environmental Plan Application**

This PSHEP and its referenced documents dated May 2015 apply to all locations, facilities, operations, and projects associated with contract work performed by Parsons and its subcontractors. Locations/sites covered under this contract include on Parsons activities and reference documents located on the Chemours sharedrive site.



## 2.0 PROJECT DESCRIPTION

### 2.1 General

Plant/Facility Name:	Chemours East Chicago Facility
Plant/Facility Address:	5135 - 5215 Kennedy Avenue, East Chicago, Lake County, Indiana
Plant/Facility Description:	<p>The site is bounded on the north by the Riley Park residential area and various commercial properties, the south by the East Branch of the Grand Calumet River, the east by commercial properties (including the City of East Chicago Solid Waste Transfer Station), and the west by Kennedy Avenue and the former USS Lead Refinery.</p> <p>Currently, the majority of the site remains fenced and unused. With the exception of a 28-acre area in the southwestern corner of the site, the plant has been decommissioned and demolished, leaving only foundations and roadways in place. This area was referred to as the “previously active manufacturing area”. Active manufacturing continues in the southwestern corner of the site. The facility now manufactures a colloidal silica product (Ludox®) and a sodium silicate solution. These products are used in x-ray film; photographic paper; pigments; nonslip coatings; low phosphate detergents; and metal castings for aerospace, medical, and recreational products.</p> <p>A six foot high fence topped with razor wire surrounds the main operating area of the site, including the previously active manufacturing area. The fence and property perimeter are patrolled routinely to control trespassing and monitor the condition of the fence.</p>
Project/Site History:	<p>In 1892, the Grasselli Corporation constructed an inorganic chemical manufacturing facility at this site. Development occurred primarily within the western part of the property. The southern part of this developed area was used mainly for manufacturing purposes and is sometimes referred to as the active manufacturing area. The northwest quadrant of the developed area and the eastern edge of the developed area were used for waste management purposes. The easternmost portion of the site, referred to as the natural area, is not developed.</p> <p>The Grasselli Corporation began manufacturing at the East Chicago facility in 1893. DuPont operated the facility for Grasselli from 1927 through 1936. Grasselli formally deeded the entire property to DuPont on October 31, 1936, and the facility has since been owned and operated by DuPont. Operations peaked around 1945 and began to decline after World War II. Between 1950 and 1970, the facility employed 700 workers. In 1990, it employed 52 workers to manufacture two products – sodium silicate and colloidal silica. Manufacturing operations, including support activities, now cover 28 acres in the southwest corner of the site. The work force consisted of about 40 employees in early 2000 when the business was sold to W.R. Grace Company.</p> <p>Over its 105-year lifetime, the Chemours East Chicago facility produced more than 100 products, primarily inorganic acids and chemicals; various chloride, ammonia, and zinc products; and inorganic agricultural chemicals. Organic chemical manufacturing began in 1948, after more than 50 years of plant operation, and ended in 1986. Organic chemical manufacturing consisted primarily of trichlorofluoromethane (TCFM) or Freon® products. Freon® production by DuPont was initiated at the</p>

federal government's request. In addition, several organic herbicides and insecticides were also manufactured.

A site location map is included as Figure 1.

## 2.2 Nature of Activity

PRFI    RFI    Remedial Action    Other: Various remedial activities and treatment system installation

Project Name: Chemours East Chicago Facility

Project Number: Chemours: 507754 Parsons: 448339

Project Manager: Randy Palachek

Customer Contact: Sathya Yalvigi      Phone No. 302-999-2764

Contract Administrator: N/A      Phone No. N/A

### 3.0 SCOPE OF WORK

The following activities will be completed as part of the 2013 investigations, bench scale tests, and pilot tests:

1. **Site Visits** – Parsons project staff, Chemours Plant staff and subcontractors will complete site visits to determine site conditions and perform work tasks.
2. **Pre-Survey** – Proposed soil borings and monitoring wells will be surveyed and staked-out.
3. **Clearing and Grubbing** – Drilling locations and routs to drilling locations will be mowed/cleared of vegetation as needed.
4. **Geophysical Survey** – A survey will be performed to identify buried underground utilities at proposed boring locations. The geophysical survey field staff will use various methods that may include: electro-magnetic sensing instruments, ground penetrating radar, sewer inspection/tracing camera and hand tools.
5. **Soil Boring Installation** – Soil borings will be installed using direct push drilling methods for the collection of soil samples. Soil borings will be advanced to the top of the confining layer (approximately 35-foot depth). Some of the soil borings will be installed using Hollow Stem Auger (H.S.A.) drilling methods. Final depths of monitoring wells will be determined by field conditions.
6. **Soil Sampling** – Surface and subsurface soil samples will be collected for laboratory analysis/bench scale testing.
7. **Geotechnical Soil Sampling** – Approximately twenty soil borings will be advanced within the on-site solid waste landfill using H.S.A drilling methods to depths of 30-feet. Samples for geotechnical analysis will be collected using alternating split spoons and Shelby tubes.
8. **Monitoring Well Installation** – Monitoring wells will be constructed using 2-inch PVC riser and screens. Surface completions will consists of stickup protective covers set in concrete pads with protective posts.
9. **Monitoring Well Development** – Newly-installed monitoring wells will be developed using a combination of a surge block, disposable bailers and or a 12V submersible pump.
10. **Groundwater Sampling** – Groundwater samples will be collected from monitoring wells. Low-flow groundwater sampling methods utilizing a 12V peristaltic pump and disposable tubing will be employed.
11. **Surveying** – Land surveys will be performed for coordinates of sample locations, well locations or for delineation tasks.

The 2014/2015 Scope of work will consist of the following:

Parsons will build and operate an injection trailer for use during the East Chicago Enhanced Sulfate Reduction Injections.

Stock Drilling will install 20 shallow GeoProbe injection wells and perform injections on them.

Large volumes of groundwater pumped from on-site injection water supply wells will be supplemented with treatments and injected into injection well transects. To do this, site groundwater will be pumped to the injection trailer where a concentrated treatment solution will be metered from the treatment solution totes into the water supply line using a dosimeter in the trailer (See photo below). Manifolding and valves within the trailer are used to direct the flow of supplemented water to multiple injection wells simultaneously at desired and adjustable rates. The total flow capacity will be approximately 30 gpm.

The tasks in this project include:

1. Construction of Injection Trailer, picture provided in PSA. Using pre-built enclosed utility trailer.

2. Mobilization and underground injection of arsenic immobilizing compounds (mixture of onsite groundwater, EVO (emulsified vegetable oil) (Newman's Zone 6730), sodium lactate (WilClear) and ferrous sulfate) into deep injection wells. The deep injection wells will be drilled and installed under a project that is currently underway (under a separate POAD/PSA, completed 10-28-2014). Stock Drilling will install these wells. These injections will be performed by Parsons.
3. Stock Drilling will also install 20 shallow GeoProbe injection points and they will inject a composite product (EHC® Metals: a wheat mill cellulosic waste product, zero valent iron and magnesium sulfate) to remediate/immobilize subsurface arsenic.

Additional activities will be performed in 2015 to complete the 2012 Interim Remedial Measures (IRM) activities and comply with stipulations included in EPA's approval letter for the Interim Remedial Measures Buffer Zone Area Completion Report (May 2013) and the Statement of Basis for the Natural Area. These activities largely transport of the approximately 83,000 cubic yards of excavated soil/sediment generated from the 2012 IRM to the foot print of the existing on-site solid waste landfill where it will be rendered non-hazardous before placement into the landfill. The soils will be stabilized to meet non-municipal Type I Landfill requirements. A temporary cover will be placed on the solid waste landfill once transport and stabilization of all soils is complete, in preparation for final cover and closure of landfill.

## 4.0 PROJECT ORGANIZATION

CRG/Parsons personnel on site:	<u>        ?</u>	Maximum number:	<u>        6</u>
Contractor personnel on site:	<u>        ?</u>	Maximum number:	<u>        6</u>

### 4.1 Responsibilities

#### 4.1.1 Project Manager

Randy Palachek

Responsibilities include overall coordination of site activities. The Parson Project Manager (PM) has overall accountability and responsibility for the safety of operations and the health and safety of all personnel. The project manager is responsible for ensuring that the project is audited to verify compliance with the project health and safety program. In addition, the PM must ensure that the Parsons SHARP (safety, health, and risk management) program is implemented throughout the life of the project.

#### 4.1.2 Health and Safety Manager

Greg Ertel

The health and safety manager is a resource for development of the site-specific HASP and will be consulted on all related health and safety issues that arise in the field, including any changes in the scope of work. The health and safety manager will make all final decisions regarding questions on the HASP.

#### 4.1.3 Site Supervisor

Keith Thompson

The site supervisor is responsible for field-related activities under the direction of the project manager and for maintaining field operations in accordance with project requirements. He is responsible for enforcing daily implementation of the HASP and resolving health and safety issues with the SSO. He also will assist in conducting daily site briefings and document having done so (see Section 8.4) on the Daily Safety Briefing Log (refer to Appendix A) or in the field logbook. He will substitute for the SSO as required by project activities.

#### 4.1.4 Site Safety Officer

##### Keith Thompson

Responsibilities of the SSO include daily implementation of this HASP. The SSO is responsible for implementing and enforcing the HASP, overseeing the safety of daily operations, serving as the Respiratory Protection Program Administrator and coordinating safety with subcontractors. In particular, the SSO will:

- Ensure that personnel are aware of the provisions of this HASP and are instructed in work practices, safety, waste management, and emergency procedures.
- Establish and ensure maintenance of site work zones.
- Monitor the work area and personal breathing zone and ensure compliance of workers relative to pre-established personal protection levels.
- Evaluate site conditions (i.e., weather, chemical, physical) and recommend any modifications to existing levels of protection.
- Ensure that daily safety briefings are conducted with assistance from the site supervisor.
- Initiate emergency response procedures with immediate communication to the project manager.
- Exercise stop-work authority in the event of imminent danger to project personnel.
- Resolve any noncompliance issues with the site supervisor.
- Conduct regular inspections to determine effectiveness of the HASP.
- Maintain the SSO logbook.
- Ensure the adequacy of the Respiratory Protection Program including proper respirator use, cleaning, inspection, and storage.
- Maintain copies of documents (e.g., training, medical, fit test).

#### 4.1.5 Project Personnel

Project personnel involved in field activities are responsible for:

- Taking all reasonable precautions to prevent injury to themselves and to fellow employees.
- Conducting only those tasks that they believe they can do safely.
- Reporting all occurrences and/or unsafe conditions to the SSO or project manager.

## 5.0 HAZARD EVALUATION

### 5.1 Project Safety Analysis/Job Safety Analysis

A project safety analysis (PSA) is required for all projects and must be completed prior to project start-up. A copy of the PSA template and the completed PSA can be found in Appendix B. A copy of the completed PSA will be reviewed with the project team and kept on site by the SSO and in the health and safety plan. Prior to conducting tasks that require the use of physical labor or mechanical equipment, the hazards of these tasks and mitigation measures to be used must be reviewed. If at any time tasks have not been addressed in the PSA, review the hazards associated with that task. The time involved and level of crew involvement should be appropriate to the complexity of the tasks being performed. This discussion should be documented in some manner (e.g., Job Safety Analysis, field book, daily report, etc).

A PSA for 2014 with the latest PSA form was completed in November.

Site SH&E hazards and risks are controlled using one or more of the control measures listed below (in order of precedence):

- **Engineer/design to eliminate or minimize hazards.** A major component of the design phase is to select appropriate features to eliminate a hazard/risk and render it fail-safe or provide redundancy using backup components.
- **Guard the hazard.** Hazards that cannot be eliminated by design must be reduced to an acceptable risk level by guards or isolation devices that render them inactive.
- **Provide warnings.** Hazards or risks that cannot be totally eliminated by design or guarding are controlled through using a warning or alarm device.
- **Provide special procedures or training.** When design, guarding, or warnings cannot eliminate hazards/risks, procedures, training, and audits must be developed to ensure safe and environmentally compliant completion of work. Training cannot be a substitute for hazard elimination when life-threatening hazards are present.
- **Personal protective equipment (PPE)** is the last control measure to protect workers from injury.

The Parsons TAG program will also be employed. The purpose of the TAG program is to improve and promote hazard recognition and encourage everyone to take personal responsibility for their safety and the safety of others. TAG does not require completing any forms, but it does require personnel to:

- **THINK** about the hazards associated with their task
- **ANALYZE** and find safe solutions
- **GO** ahead and complete their tasks safely

All significant changes to the scope of work or equipment that are not replacements in kind must be properly documented in accordance with the approved Management of Change program. This includes a deviation from an established process or technical standard, modification of existing technology, or demonstration of remediation in different equipment. The change approval will include documentation of any operating instructions required for the specific change and will ensure that the change has no adverse effects on safety, remedy quality, and the environment

### 5.2 Chemical Hazards

#### 5.2.1 Constituents of Concern (COCs)

The COCs for soil and groundwater consist of: arsenic, lead, cadmium and zinc (Metals).

More information regarding the constituents of concern and historical sampling data including the highest concentrations of each COC from the most recent and historical sampling results may be found in Table 1. Additional occupational health information may be found in the Chemical Hazards Table included as Table 2.

Treatment system chemicals include ferrous sulfate, metals amendment, buffer solutions and other relatively low hazard treatment chemicals. MSDS for all treatment chemicals will be reviewed by staff and readily available in a binder in the treatment trailer.

## 5.2.2 Potential Exposure Routes and Risk Mitigation Measures

Dermal contact with impacted soil and groundwater, and inhalation/ingestion of airborne dust are the possible exposure routes for the activities specified in this health and safety plan.

The dermal contact route of exposure could result from contact with impacted groundwater or soil during the handling of: impacted soil, groundwater and decontamination fluids. Worker exposure will be minimized through the use of low-volume, discrete soil sampling equipment (direct push drilling), worker training in proper handling of impacted sample media, and proper decontamination methods.

The inhalation/ingestion of impacted airborne dust will be controlled through the use of minimal disturbance, discrete soil sampling equipment (direct push drilling). If field conditions indicate dust suppression is necessary, the SSO will initiate dust suppression controls including misting of loose sample material with water, or stop work until weather conditions (wind) are appropriate to continue work.

When engineering or administrative controls are not adequate to minimize the hazards, Personal protective equipment (PPE) will be used. Additional information regarding PPE is provided in Section 6.0.

## 5.2.3 Material Safety Data Sheets

A Material Safety Data Sheet (MSDSs) or Safety Data Sheet (SDS) must be provided to the SSO for any materials or products that will be brought on site to accomplish the work. Prior to use, the SSO must review the MSDS and approve that product for use. In addition, plant-specific approval requirements may apply. Materials or products may include decontamination solutions, fuel for equipment operation, preservative for sample containers, etc. All labeling and storage of hazardous materials must be in accordance with regulatory requirements.

MSDS are included in the MSDS binder located in the job-site trailer.

## 5.3 Physical Hazards

Procedures to be used to monitor/reduce these hazards will include the following:

- **Materials handling:** Use proper lifting techniques. Plan all heavy (> 50 pounds) or awkward lifts. In general, use the buddy system or mechanical lifting aids when moving heavy or bulky items. Wear appropriate gloves.
- **Drum handling:** Do not manhandle full drums. Partially fill drums to reduce weight when possible. Get help when moving drums. Use a drum cart or fork lift with a drum grapppler or other mechanical lifting device if possible. Wear gloves and pay close attention to the positions of hands and feet.
- **Overhead obstructions/lines:** Before the start of work, all work areas and mobilization pathways will be evaluated to determine if overhead obstructions are present. Overhead obstructions (OHOs) include electrical and communications lines, piping, bridges, and crosswalks. Determinations must be made if high clearance equipment or trucks with raisable beds (dumps, roll off containers, etc) will be used on the project. All equipment (e.g., drill rig, excavator) must remain a safe distance (minimum 20 feet) from overhead power lines. If working adjacent to overhead obstructions will be performed during the project, an OHO Work Plan must be developed (see Appendix E).
- **Underground Utilities:** Underground utilities include electric lines, communications lines, pipelines sewer lines, etc., which are buried below the surface. These must be located before intrusive activities begin. Location methods could include a geophysical survey, the use of SOFT DIG technology and/or hand dig. The PD/PM are responsible for verifying that the appropriate method(s) of identifying underground utilities are funded and implemented or signing a variance (PSA form) indicating why such methods should not be required. In addition, once on site, the Site



Supervisor must obtain the appropriate permit from the plant prior to initiating intrusive activities. See CRG Standard HS-163 in Appendix B for information regarding underground hazards. Also see Soil Disturbance Protocol in Appendix H.

- **Drill rig:** The drill rig will be inspected prior to on-site use and daily throughout the project. An inspection checklist will confirm that the drill rig meets all requirements including a kill switch, backup alarms, and fire extinguisher. All high pressure air hoses will be inspected daily to ensure the integrity of the hose and that each hose joint is secured with safety chain/whip-checks. Hoses will be placed away from worker's activities and out of worker's walking paths. Only trained operators (driller) will operate equipment. A spotter will be used to position the drill rig and will communicate any moving truck traffic. Appendix C provides the CRG Drilling Safety Handbook, which provides safety requirements addressing drilling operations and drilling equipment safety checklists.
- **Excavations:** Excavations shall be in compliance with OSHA Regulations and DuPont Facility Construction Manual (FCSM) Procedure B-5.1, Excavations. Subject excavations into which persons will enter and perform work must be shored, sloped, or otherwise made safe for entry and egress. The Contractor shall provide a competent person for excavation tasks and planning. This person will be responsible for conducting documented daily inspections of excavation work and areas. Also see Excavation Safety in Appendix I and Soil Disturbance Protocol in Appendix H.
- **Clearing, Grubbing, and Working in Forested Areas:** Prior to setting up equipment or working in areas that are forested, verify that there is adequate overhead clearance. Look for limbs that could be impacted by overhead equipment such as drill rig booms as well as rotten limbs that could fall. Move locations if such hazards exist. If this is not possible, the area will be cleared with hand tools. If hand tools are not sufficient or practical, the area will be professionally cleared and this health and safety plan will be revised for the additional hazards (see Appendix D for DuPont FC&S Procedure B-42.1, for using lawn mowers, weed cutters and chain saws).
- **Noise:** Workers **must** wear approved hearing protection when working around equipment that produces sound levels in excess of 85 decibels, whenever signs indicate that hearing protection is required, and whenever voices must be raised to be heard at a distance of three feet or less. Noise levels requiring the use of hearing PPE will be located in the work zone of direct push drilling equipment.
- **Terrain:** Adequate site clearing and leveling should be conducted to accommodate equipment and supplies, and provide a safe work area. Curbs, heavy debris, and rebar may be marked with flagging, cones or high visibility paint. Vehicle pathways will be delineated around dangerous terrain if necessary.
- **Slip/trip/fall:** Good housekeeping practices should be employed to prevent slip/trip/fall hazards. Caution must be employed when walking to prevent slip/trip/fall hazards caused by terrain.
- **Heat/cold:** Ample breaks will be taken during hot or cold ambient conditions (see Appendix E).
- **Pinch points:** Personnel must always be aware of limb or body position in close proximity to moving equipment to reduce pinch point hazards. Wear appropriate hand protection to protect hands. Only trained competent persons will operate equipment with dangerous pinch points (drill rig, skidsteer).
- **Electrical:** Power tools must be in good working order and used with ground fault circuit interrupt (GFCI) protection. All electrical cords and extension cords must be inspected prior to use. Do not overload plugs.
- **Fire/explosion:** Fueling of any gas- or diesel-powered equipment shall be performed only after the equipment is cooled. Grounding techniques will be used during transfer of fuel and/or other flammable liquids.
- **Vehicle traffic:** Use barricades, traffic cones or other appropriate measures to control vehicle traffic throughout the work area. See the protocol for Signs, Barricades and Traffic Control in Appendix J.

- **Heavy Equipment Safety:** There may be various types of heavy construction equipment used during the execution of this project. All operators of this equipment will be familiar with and implement the requirements for inspection and operation of the equipment they will be using. Before equipment is placed into use, it will be inspected by the operator to ensure that it is in safe operating condition. Spotters will be used to back-up equipment and direct traffic in all “blind” areas. Equipment will be operated in accordance with the manufacturer’s instructions and recommendations. Personnel will not work or pass under or ride in the buckets or booms of loaders in operations. All self-propelled construction equipment, whether moving alone or in combination, be equipped with a reverse signal alarm.
- **Solar Radiation:** Wear sun-block and/or cotton clothing as needed to protect skin from sun.
- **Pressure Washing:** All personnel using equipment shall be trained in the proper use and inspection of the equipment. Both hands must be on the control gun while in use. No portion of the body shall ever be placed in front of the water jet. Never pass the control gun to another operator or place the control gun on the ground without disengaging water spray. Minimum wand length is 48”.
- **Concrete Coring & Chipping:** Personnel need to be aware of pinch points and hand placement around machinery to avoid injury. Wear face shield and metatarsal guards. Water to keep the core bit from overheating will be collected with a shop vacuum or equivalent equipment to avoid water damage inside buildings and slip, trip and fall hazards.
- **Chemical Handling:** Personnel need to be aware of chemical hazards when handling water treatment chemical and when there is potential for contact with contaminated groundwater. Wear face shield and spoggles/goggles, chemical resistant coveralls when handling corrosive or irritating liquids, refer to the task specific AHAs and Section 6 for PPE requirements.
- **Trailer Placement and Modification:** Physical hazards from moving equipment, struck-by and ergonomic risks from lifting and awkward postures. Be aware of surroundings and keep hands and feet out of hazardous areas. Plan your task and focus on activity. Have a thorough tailgate meeting and review status throughout the day.

## 5.4 Biological Hazards

- **Ticks:** Ticks are prevalent. Specific information regarding precautions and symptoms of tick bites is provided in Appendix H. Use tick repellent and check frequently for ticks on skin and clothing. Personnel should do a thorough tick inspection at the end of the work day. If embedded (physically attached) ticks are found, this must be reported to the SSO.
- **Feral animals:** Air horns or equivalent can be carried by field personnel as a deterrent for wild dogs.
- **Poisonous plants:** Poisonous plants, such as poison ivy and poison oak, are present or believed to be present on-site. Inspect work areas prior to entering. Wear Tyvek® coveralls and gloves to protect skin from contact with poisonous plants if appropriate. Remove outer layer clothing and gloves from the inside out to avoid contact with potentially contaminated clothing. Use poisonous plant barrier creams and cleansers as needed.
- **Rabid animals:** Avoid any animal acting in an uncharacteristic manner, especially skunks, feral dogs and cats, and raccoons. If bitten by any animal, go to the hospital immediately.
- **Mosquitoes:** Mosquitoes may be present and may be carriers of malaria, yellow fever, encephalitis, West Nile Fever and other diseases. Wear mosquito repellent as necessary, especially to areas not protected by clothing. Drain pooled or standing water if possible. Be aware of the mosquito-borne illnesses in your area.
- **Stinging insects:** If stung by a bee, carefully removed the stinger by gently scraping with a finger nail (do not squeeze). Wash the area with soapy water and apply a cold (ice) compress to decrease absorption and spreading of the venom. If excessive swelling or redness appears, seek immediate

medical attention. (**Note: Allergic reactions to bee stings can be life threatening; therefore, identify susceptible persons prior to project start-up. See form in Appendix A.**)

## 5.5 Other

Procedures to reduce these hazards are as follows:

- **Security:** All work areas are within the site property and a chain link fence. However, if any worker notices signs of vandalism, theft, trespassers or feels threatened, work will stop and the SSO will be immediately notified. Work will not resume until the SSO completes an incident report and the SSO and all staff feel comfortable resuming work.

## 6.0 WORKER PROTECTION

The levels of personal protection are selected by evaluating the performance characteristics of the clothing against the requirements and limitations of the site- and task specific conditions.

### 6.1 Level of Protection

The specific PPE listed for each level of protection was selected based on potential respiratory and dermal hazards. The levels of protection to be used during project-related activities are as follows:

#### Level C

- Tyvek® coveralls taped to wrists and ankles
- Full face respirator with P100 particulates filters
- Hard hat
- Steel-toed boots (steel-toed rubber boots when weather or site conditions necessitate)
- Surgical inner gloves
- Leather or nitrile outer gloves
- Hearing protection as needed

#### Modified Level D

- Tyvek® coveralls taped to wrists
- Safety glasses with affixed side shields
- Hard hat
- Steel-toed boots
- Surgical inner gloves
- Leather work gloves
- Hearing protection as needed
- Tyvek® suit with taped ankles
- Full face shield during heavy equipment decontamination

#### Level D

- Hard hat
- Safety glasses with affixed side shields
- Steel-toed boots
- High visibility vest
- Appropriate task specific-gloves (leather work gloves or surgical gloves for sample collection)
- Hearing protection as needed
- Standard work clothes (long pants and long sleeve shirt)

### 6.2 Task-specific Protection Level

Protection discussed in the paragraphs that follow will be used to initiate each task. An upgrade or downgrade to the specified level of protection will be based on airborne volatile organic or particulate concentrations and skin contact. The Health and Safety Manager must approve any changes or adjustments to these levels of protection.

**Task:** Surveying/utility clearance, **Location:** Site-wide

General Construction without  
chemical exposure

Mob/Demob

Engineering/Administrative Controls: Yes  No

If yes, list: Workers will always use the buddy system

	<b>PPE Level</b>	<b>Range (ppm or mg/m<sup>3</sup>)/Condition</b>
Initial Level	Level D	NA
Downgrade Level		
Upgrade Level	Modified Level D	If potential dermal contact with site constituents of concern or biological hazards (poison ivy, ticks, etc.)

**Hazard Analysis:**

Biological – Exposure to poison ivy, stinging insects (hornet/wasps) in stickup protective well covers, ticks in weeds/brush.

Chemical – Chemical hazards are not anticipated for this task; however, if there is a potential for dermal contact with Constituents of Concern, upgrade to Modified D PPE. Note: these tasks should not generate dust if dust is generated the task must be re-evaluated.

Physical hazards associated with these tasks are as follows: heat stress, sunburn, hand tools/pinch points, slips/trips/falls, muscle strain due to improper lifting or improper body positioning, lightning and adverse weather.

**Task:** Geoprobe® soil boring/ soil **Location:** Multiple Locations at Facility  
sampling

Engineering/Administrative Controls: Yes  No

If yes, list: Dust-generating activities should be avoided by moistening soil surfaces with a water mister. If dust cannot be controlled then dust monitoring will be implemented.

	<b>PPE Level</b>	<b>Range (ppm or mg/m<sup>3</sup>)/Condition</b>
Initial Level	Modified Level D	< 0.5 mg/m <sup>3</sup> or 0.2 mg/m <sup>3</sup> above upwind readings
Downgrade Level	N/A	N/A
Upgrade Level	Level C	Total dust >0.5 mg/m <sup>3</sup> or 0.2 mg/m <sup>3</sup> above upwind readings

**Hazard Analysis:**

Biological – Exposure to poison ivy, stinging insects (hornet/wasps) in stickup protective well covers, ticks in weeds/brush.

Chemical – Exposure to COCs in soil and groundwater.

Physical – Heat stress, sunburn, slips/trips/falls, vehicular traffic on site, driving hazards while mobilizing to the site, lifting hazards – back strain, noise, lacerations/hand injuries while using hand and power tools and handling glassware, pinch points from drill rig.

**Task:** Drilling/Monitor well installation                      **Location:** Multiple Locations at Facility

Engineering/Administrative Controls:    Yes  No

If yes, list:    Inspect rig before use. Dust-generating activities should be avoided by moistening soil surfaces with a water mister. If dust cannot be controlled then dust monitoring will be implemented.

	<b>PPE Level</b>	<b>Range (ppm or mg/m<sup>3</sup>)/Condition</b>
Initial Level	Modified Level D	< 0.5 mg/m <sup>3</sup> or 0.2 mg/m <sup>3</sup> above upwind readings
Downgrade Level	N/A	N/A
Upgrade Level	Level C	Total dust >0.5 mg/m <sup>3</sup> or 0.2 mg/m <sup>3</sup> above upwind readings

**Hazard Analysis:**

The potential for physical and chemical hazards is moderate. Greatest potential for injury is related to the drill rig (if in use), proper hand and body positioning if using a hand auger, and slips, trips, and/or falls. Other hazards may include heat/cold stress and materials handling.

Physical hazards include contacting overhead electrical lines and striking underground pipes or bury electrical lines. Additional hazards include a worker getting caught in the rotation of the auger and slip, trip, and fall hazards.

**Task:** Monitoring Well development and groundwater sampling **Location:** Multiple Locations at Facility

Engineering/Administrative Controls: Yes  No

If yes, list: Well development equipment will consist of a horizontal truck mounted polyethylene tank plumbed with fittings to accept the purge water discharge tube to reduce splash/spill hazards associated with running tubing into open top drums. Disposable polyethylene tubing will be used to reduce the amount of equipment that needs to be decontaminated.

	PPE Level	Range (ppm or mg/m <sup>3</sup> )/Condition
Initial Level	Modified level D	NA
Downgrade Level		
Upgrade Level	Modified level D	Ticks present in work zone

**Hazard Analysis:** The chemical hazards are metals (lead and arsenic). Inhalation hazardous are not anticipated, however work will be performed in Modified D PPE to prevent dermal contact with the water.

Physical hazards include pinch points, slips, trips, and falls hazards, muscle strain from improper lifting.

Biological hazards are exposure to poison ivy, stinging insects (hornet/wasps) in protective well covers, and ticks in weeds/brush.

**Task:** Decontamination of equipment **Location:** Designated Decon Area

Engineering/Administrative Controls: Yes  No

If yes, list: Personnel will keep hands clear of the nozzle and wand when decontaminating equipment. Small equipment and/or tools to be pressured washed will be secured (not by hands or any other body parts) to avoid movement and to eliminate the potential for it to become airborne during pressure washing. The wand will be the required length per the manufacturing instructions to avoid injury to hands and other body parts.

	PPE Level	Range (ppm or mg/m <sup>3</sup> )/Condition
Initial Level	Modified level D with a splash shield rain gear (coat, pants, over-boots or Polyethylene-coated	NA

	Tyvek® coverall)	
Downgrade Level		
Upgrade Level		

**Hazard Analysis:**

The potential for physical and chemical hazards are moderate. Greatest potential for injury is related to pressure washer operation and slips/trips and/or falls. Other hazards may include heat stress and solar radiation.

**Task:** Clearing and Grubbing, Using Chain Saws **Location:** Site-wide

Engineering/Administrative Controls: Yes  No

If yes, list: Inspect equipment prior to use. Be aware of trips/slips/fall hazards. Use the right equipment for the job.

	PPE Level	Range (ppm or mg/m <sup>3</sup> )/Condition
Initial Level	Level D	< 0.5 mg/m <sup>3</sup> or 0.2 mg/m <sup>3</sup> above upwind readings
Downgrade Level	Modified Level D	< 0.5 mg/m <sup>3</sup> or 0.2 mg/m <sup>3</sup> above upwind readings
Upgrade Level	Level C	Ambient dust ≥ 0.5 mg/m <sup>3</sup> or 0.2 mg/m <sup>3</sup> above upwind readings

**Hazard Analysis:**

Biological – Exposure to poison ivy, stinging insects (hornet/wasps) in stickup protective well covers, ticks in weeds/brush.

Chemical – Chemical hazards are not anticipated for this task; if dust levels are exceeded, implement dust control measures.

The potential for physical hazards can be high, especially for slips/trips/falls, noise, flying objects, power tool usage, cold stress, materials handling, pinch points, exertion, and weather-related hazards. Working in noisy areas, hot work, compressed air and hazardous chemicals and gases. Ladder and elevated work present the potential for falling from heights.



**Task:** Excavation, Stockpiling, and Grading; Material handling  
**Location:** Site-wide

Engineering/Administrative Controls: Yes  No

If yes, list: Inspect all equipment prior to use. Use the right equipment for the job. Have fire extinguishers and spill control kits readily available. Dust generation at disturbed soil areas, vehicle pathways and soil stockpiles shall be avoided by applying water as necessary to reduce dust. Potentially hazardous soil stockpiles will be covered with plastic liner. If dust cannot be controlled, then dust monitoring will be implemented.

	<b>PPE Level</b>	<b>Range (ppm or mg/m<sup>3</sup>)/Condition</b>
Initial Level	Modified Level D	< 0.5 mg/m <sup>3</sup> or 0.2 mg/m <sup>3</sup> above upwind readings
Downgrade Level	N/A	N/A
Upgrade Level	Level C	Total dust >0.5 mg/m <sup>3</sup> or 0.2 mg/m <sup>3</sup> above upwind readings

**Hazard Analysis:**

Biological – Exposure to poison ivy, stinging insects (hornet/wasps) in stickup protective well covers, ticks in weeds/brush.

Chemical – Chemical hazards are not anticipated for this task; if dust levels are exceeded, implement dust control measures.

The potential for physical hazards can be high, especially for hazards associated with heavy equipment, overhead and underground utilities, slips/trips/falls due to hoses, vehicle traffic, noise, materials handling, pinch points, exertion, and weather-related hazards.

## 7.0 AIR/WORKPLACE MONITORING

### 7.1 Action Levels and Method of Determination

An action level of 0.5 mg/m<sup>3</sup> for total dust has been established for lead and arsenic. See the Chemical Hazards Section on Potential Exposure Routes and Risk Mitigation Measures and the Task-specific Protection Level sections for Drilling/Monitoring Well Installation, GeoProbe Soil Sampling/Soil Sampling, Clearing and Grubbing, and Excavation, Stockpiling, and Grading above for action levels, dust control methods and PPE information.

### 7.2 Real-time Monitoring

No  Yes

Appendix K presents the detailed Air Monitoring Plan. At a minimum, real-time monitoring will be implemented using a MIE pDR-1200 or Thermo MIE DR-2000 Data Ram Real-Time Aerosol Monitor. Monitoring will be conducted in the worker's breathing zone (WBZ), which is defined as the two-foot area around the worker's head. An action level of 0.5 mg/m<sup>3</sup> for total dust or 0.2 mg/m<sup>3</sup> above upwind concentrations, 0.3 mg/m<sup>3</sup> for lead (8-hour time weighted average [TWA]), and 0.1 mg/m<sup>3</sup> for arsenic (8-hour TWA) within the WBZ has been established. Dust-generating activities will be avoided by moistening soil surfaces with a water mister.

#### *Calibration Procedure*

All monitoring equipment will be calibrated in accordance with manufacturer's instructions prior to the first use of the day and documented in the field logbook and/or air monitoring data sheets (e.g., specify calibration gas/flow rates). In addition, background levels will be established before field activities begin. Air monitoring equipment will be "bump" checked at regular intervals or following any detection above the action level in the worker's breathing zone to confirm proper operation.

### 7.3 Air Sampling

No  Yes

Air sampling will be conducted to quantify the airborne concentrations of lead, arsenic and cadmium. Appendix K presents the detailed sampling plan, which includes copies of such elements as the sampling method, information regarding the number of persons to be sampled, and the areas and situations where sampling is required. Affected individuals will be notified of air sampling results, and a copy of these results will be sent to the Health and Safety Manager.

#### *Calibration Procedure*

All air sampling equipment calibrated will be **pre-** and **post-event** in accordance with the manufacturers' instructions; calibration date will be noted in the field logbook and/or on an industrial hygiene data sheet.

### 7.4 Noise Monitoring

No  Yes

Although noise monitoring will not be performed, any area where individuals must raise their voices to communicate at a distance of three feet or less, and where posted as a mandatory hearing protection area, hearing protection is required.

After installation of the system a noise survey will be conducted to identify any high noise areas. Any areas over 85 db will be labeled as hearing protection required.

## 7.5 Heat/Cold Stress Monitoring

No  Yes

If heat or cold stress monitoring is not conducted, protocols provided by the American Conference of Governmental Industrial Hygienists (ACGIH) will serve as guidance for dealing with heat and/or cold stress (see Appendix D).

## 7.6 Monitoring Equipment

No  Yes

The following monitoring equipment is required to perform the air and/or workplace monitoring necessary for this project:

- MIE pDR-1200 or Thermo MIE DR-2000 Data Ram Real-time Aerosol Monitor

## 8.0 PERSONNEL TRAINING

All personnel involved in field activities will be required to participate in a health and safety training program that complies with criteria set forth by OSHA in accordance with 29 CFR 1910.120(e).

Parsons and its subcontractors are individually responsible for training their respective employees and for complying with all project requirements. Failure to comply could lead to disciplinary actions against Parsons employees and subcontractors or their employees. Further guidance is available in the Parsons Corporate Safety and Health Manual; ParShare link is as follows: [Corporate Safety and Health Manual](#).

Competent Person and Activity Hazards Analysis Requirements

Safety and Health Requirement	Parsons Safety, Health, and Environmental Manual	OSHA Regulation	EM 385-1-1 Regulation	Competent/ Qualified Person	Training Required	Written Plan and AHA Required
General Safety and Health		1926.20	01.A	Yes	Yes	Yes
Safety Training		1926.21	01.B.01	Yes	Yes	Yes
Confined Spaces	15	1926.21, 1910.147	06.01	Yes	Yes	Yes
Confined Space Permit System	15	See above	06.01	Yes	Yes	Yes
First Aid and Medical	2	1926.23, 50	03.A	Yes	Yes	Yes
Fire Protection and Prevention	12	1926.24, 150-155, 352	09.A	Yes	Yes	Yes
Housekeeping	4	1926.25	14.C	N/A	N/A	N/A
Illumination	4	1926.26, 56	07.A	Recommended	N/A	N/A
Sanitation	4	1926.27, 51	02.A	N/A	N/A	N/A
Personal Protective Equipment	6	1926.28, 95-98, 100-107	05.A	Yes	Yes	Yes
Emergency Employee Action Plans	11	1926.35	01.E	Recommended	Yes	Yes
Noise Exposure	7	1926.52	05.C	Yes	Yes	Yes
Radiation Protection	9	1926.53, 54	06. E&F; 28.A.02	Yes	Yes	Yes
Gases, Vapors, Dusts and Mists	9	1926.1926.55		Yes	Yes	Yes
Ventilation	37	1926.57, 353		Recommended	Yes	Yes
Hazard Communication	10	1926.59	1.B.06	Yes	Yes	Yes

Competent Person and Activity Hazards Analysis Requirements (Contd)

Safety and Health Requirement	Parsons Safety, Health, and Environmental Manual	OSHA Regulation	EM 385-1-1 Regulation	Competent/ Qualified Person	Training Required	Written Plan and AHA Required
Hazardous Waste Operations and Emergency Response	13	1926.65 1910.120	28.A	Yes	Yes	Yes
Accident Prevention Signs and Tags	16	1926.200	08.A	N/A	N/A	N/A
Signaling	16	1926.201	08.B	Recommended	N/A	Yes
Barricades	16	1926.202		N/A	N/A	N/A
Material Storage	17	1926.250	14.B	N/A	Yes	Yes
Rigging	26	1926.251	15.A	Yes	Yes	Yes
Waste Disposal		1926.252	14.D	Yes	Yes	Yes
Tools	29	1926.300-307	13.A	N/A	N/A	Yes
Gas Welding and Cutting	28	1926.350	10.A	Recommended	Yes	Yes
Arc Welding	28	1926.351	10.E	Recommended	Yes	Yes
Electrical	24	1926.400-415	11.E	Yes	Yes	Yes
General Electrical	24	1926.416	11.A	Yes	Yes	Yes
Lockout Tagout	23	1926.417, 1910.147	12.A	Yes	Yes	Yes
Lockout Tagout Permit System	23	See above	12.A	Yes	Yes	Yes
Maintenance of Electrical Equipment		1926.431	11A	Yes	Yes	Yes
Environmental Deterioration of Electrical Equipment	24	1926.432		Yes	Yes	Yes
Batteries/Battery Charging Equipment	24	1926.441	11.E	N/A	Yes	Yes
Scaffolding	20	1926.450-454	22.A	Yes	Yes	Yes
Aerial Lifts	21	1926.453	22.J and K	Yes	Yes	Yes
Fall Protection	22	1926.500-503	21.A	Yes	Yes	Yes
Cranes, Derricks, Hoists, Elevators and Conveyors	26	1926.550	16.A	Yes	Yes	Yes

## Competent Person and Activity Hazards Analysis Requirements (Contd)

Safety and Health Requirement	Parsons Safety, Health, and Environmental Manual	OSHA Regulation	EM 385-1-1 Regulation	Competent/Qualified Person	Training Required	Written Plan and AHA Required
Motor Vehicles, Mechanized Equipment	25	1926.600-603	18.A	Yes	Yes	Yes
Powered Industrial Trucks (forklifts)	25	1910.178		Yes	Yes	Yes
Site Clearing	32	1926.604	31.A	N/A	Yes	Yes
Marine Operations and Equipment		1926.606	16.F	Yes	Yes	Yes
Excavations	33	1926.650-652	25.A	Yes	Yes	Yes
Excavation Permit	33	N/A	N/A	Yes	Yes	Yes
Concrete and Masonry Construction	4	1926.700-706	27.A	Yes	Yes	Yes
Steel Erection	34	1926.750-761 and SENRAC		Yes	Yes	Yes
Underground Construction	30	1926.800	26.A	Yes	Yes	Yes
Caissons		1926.801	26.H	Yes	Yes	Yes
Cofferdams		1926.802		Yes	Yes	Yes
Compressed Air	30	1926.803	26.I	Yes	Yes	Yes
Demolition	32	1926.850-860 inclusive	23.A	Yes	Yes	Yes
Power Transmission and Distribution		1926.950-960 inclusive	11.H	Yes	Yes	Yes
Rollover Protective Structures; Overhead Protection	25	1926.1000-1003 inclusive		N/A	N/A	Yes
Stairways and Ladders Scope	18	1926.1050	21.A	N/A	Yes	Yes
Stairway/Ladder General Requirements	18	1926.1051		Yes	Yes	Yes
Stairways	18	1926.1052	21.E	Recommended	Yes	N/A
Ladders	19	1926.1053	21.D	Yes	Yes	Yes
Ladder/Stair Training	19	1926.1060		Yes	Yes	Yes
Diving Scope		1926.1071-1072	30.A	Yes	Yes	Yes
Dive Team Quals		1926.1076	30.A.08	Yes	Yes	Yes
Dive Safe Practices Manual		1926.1080	30.A.16	Yes	Yes	Yes

Competent Person and Activity Hazards Analysis Requirements (Contd)

Safety and Health Requirement	Parsons Safety, Health, and Environmental Manual	OSHA Regulation	EM 385-1-1 Regulation	Competent/Qualified Person	Training Required	Written Plan and AHA Required
Pre-dive Procedures		1926.1081		Yes	Yes	Yes
Procedures During Dive		1926.1082	30.A.15	Yes	Yes	Yes
Post Dive Procedures		1926.1083	30.A.22	Yes	Yes	Yes
SCUBA Diving		1926.1084	30.B	Yes	Yes	Yes
Surface-Supplied Air Diving		1926.1085	30.A.04	Yes	Yes	Yes
Mixed-gas Diving		1926.1086	30.D	Yes	Yes	Yes
Liveboating		1926.1087	30.A.05	Yes	Yes	Yes
Diving Equipment		1926.1090	30.E	Yes	Yes	Yes
Diving Recordkeeping Requirements		1926.1092	30.A.06	Yes	Yes	Yes
Internal Traffic Control	16	N/A	8.D	N/A	Yes	Yes
Traffic Movement Restriction Times	16	N/A	8.C	N/A	Yes	Yes
Line Breaking	23	1910.119 and 1926.54		Yes	Yes	Yes
Major Material Movements	17	N/A	N/A	N/A	Yes	Yes
Right-of-way Restrictions	16	N/A	N/A	N/A	Yes	Yes
Bicycles/Golf Carts		N/A	18.D	N/A	Yes	N/A
IIPP/SSPP		Cal 3203	Cal 3203	Yes	Yes	Yes

ParShare link: [Competent Person and Activity Hazards Analysis Requirements](#)

### 8.1 Pre-assignment and Annual Refresher Training

Prior to arrival on site, each employer (contractor) will be responsible for certifying that his or her employees meet the requirements of 40/24-hour pre-assignment OSHA training. In addition, each employee must be able to document dates of attendance at annual eight-hour OSHA refresher training and three/one day(s) of fieldwork under a qualified supervisor. Failure to provide these documents will prohibit entry to the site.

### 8.2 Site Supervisor Training

Consistent with OSHA 29 CFR 1910.120(e)(4), prior to arrival on site, individuals designated as site supervisors require an additional eight hours of specialized training.

### 8.3 Site Safety Officer Training

All Site Safety Officers must meet the requirements of CRG Standard HS-1001.

## 8.4 Initial HASP Review

In addition to 29 CFR 1910.120(e) training, all site employees will attend an initial HASP review prior to initiating field activities. This review must include the following:

- **Project Personnel Roles and Responsibilities**  
Personnel will understand the lines of authority regarding health and safety and site personnel roles and responsibilities.
- **Site-specific Health and Safety Hazards**  
Personnel will be informed of specific hazards related to the site and site operations, such as health hazards of site chemicals and specific safety hazards of process equipment.
- **Personal Protective Equipment**  
Personnel will be trained in the proper use of PPE.
- **Safe Work Practices/Engineering Controls**  
Personnel will be informed of appropriate work practices and engineering controls that will reduce risk of exposure to site hazards.
- **Communication Methods**  
Personnel will be informed of means for normal site and emergency communication.
- **Medical Surveillance Program**  
Personnel will be informed of the medical surveillance requirements, including recognition of symptoms and signs of exposure.
- **Site Control Methods**  
Personnel will understand site methods used to reduce exposure to on- and off-site personnel.
- **Decontamination Procedures**  
Personnel will be trained in proper decontamination procedures, including decontamination of PPE, equipment, and vehicles.
- **Emergency Response**  
Personnel will be trained to respond properly in the event of an emergency.
- **Confined-space Entry/Special Hazards**  
Personnel involved in specific hazardous activities, such as confined-space entry and/or drum handling, will receive training in the appropriate techniques to employ prior to commencing these operations.

## 8.5 Daily Briefings

Daily briefings will be conducted before each work shift at a location designated by the SSO or site supervisor. All personnel will attend this briefing in order to participate in field activities for that day. Attendance at the briefing will be documented in the Daily Safety Briefing Log (see Appendix A) or the SSO's field logbook.

## 8.6 Other Required Training

Plant Orientation     No     Yes    If yes, specify: \_\_\_\_\_

Area Orientation     No     Yes    If yes, specify: \_\_\_\_\_

The SSO will provide a work area orientation to all project workers.

Other     No     Yes    If yes, specify    Telehandler



## 8.7 Visitor Procedures

All on-site visitors will be escorted by CRG representative and will be required to review and agree to comply with provisions of this HASP. In addition, visitors will sign in and out of the site logbook. Only visitors who meet the training and medical monitoring requirements of 29 CFR 1910.120 will be allowed to enter the Exclusion Zone or Contamination Reduction Zone.

## 9.0 MEDICAL MONITORING

All personnel involved in field activities must participate in a medical monitoring program as outlined in 29 CFR 1910.120(f).

Contractors will assume responsibility for obtaining the necessary medical monitoring for their employees and will provide a medical clearance letter to CRG as requested.

Based on the scope of work, the following hazards or activities are associated with this project, which may result in an exposure that requires an employee to participate in a medical surveillance program.

Work Activity	Hazard	Medical Surveillance/Training
Limited duration landscape and maintenance activities	Noise	If noise exposures exceed 85 decibels over an 8-hour time weighted average, an employee must participate in a Hearing Conservation Program. (not anticipated for this project)
Sampling	Chemical exposures – total VOC's	For respirator use, medical qualification, training and fit-testing must be received on an annual basis. If an individual is exposed at or above the PEL or wears a respirator more than 30 days per year, then participation in a Medical Surveillance Program is required. (not anticipated for this project)

## 10.0 SITE CONTROL/ILLUMINATION

Site control measures are as follows:

- SSO will depict the actual site layout in SSO logbook daily, or on site figures/plans and as needed thereafter.
- Appropriate containers will be used for collection of trash.
- Mobile phones will be established as the primary means of communication prior to the beginning of site work.
- In event of an emergency, the SSO will alert all personnel to leave Exclusion Zone and await further instructions.
- The buddy system will be employed to the extent feasible to assist in event of an emergency (see CRG Standard HS-120).

### 10.1 Illumination

Hours of field operation: 7:00AM to 6:00PM (maximum)

Describe lighting source: Daylight

If required to complete outdoor activities after daylight hours, adequate artificial lighting will be provided for all activities. Work to be performed inside must have adequate illumination. Refer to 29 CFR 1910.120 (m).

## 11.0 DECONTAMINATION

### 11.1 Personnel Decontamination Procedures

Personnel decontamination procedures are as follows:

1. Remove Outer Glove
2. Remove Inner Glove (if necessary)
3. Wash hands and face

When project requirements necessitate deviations from the listed steps, deviations will be noted in the field logbook.

### 11.2 Sample Equipment Decontamination Procedures

Equipment decontamination procedures are as follows:

- 1<sup>st</sup> - Rinse/wash in water to knock off loose mud/debris if necessary;
- 2<sup>nd</sup> – Wash/scrub in a solution of laboratory grade detergent and water;
- 3<sup>rd</sup> – Rinse in potable water;
- 4<sup>th</sup> – Rinse in laboratory supplied de-ionized water;
- 5<sup>th</sup> – Containerize spent decon fluids.

All investigation derived wastes will be managed in accordance with the Waste Management Plan

### 11.3 Heavy Equipment Decontamination Procedures

Heavy equipment decontamination procedures are as follows:

- 1<sup>st</sup> - Rinse/wash in water to knock off loose mud/debris using a steam cleaner or pressure washer;
- 2<sup>nd</sup> – Wash using a pressure washer / steam cleaner and a solution of laboratory grade detergent and water;
- 3<sup>rd</sup> – Rinse in potable water;
- 4<sup>th</sup> – Containerize decon fluids.

Decontamination of heavy equipment will be completed at the designated decontamination pad.

**ALL EQUIPMENT WILL BE INSPECTED PRIOR TO DEPARTURE OFF-SITE. MEANS OF APPROVAL WILL BE DETERMINED BY:**

- Visual inspection

## 12.0 SANITATION

Sanitation facilities will be provided in accordance with 29 CFR 1910.120(n). Highest number of personnel (Parsons and contractors) anticipated on site: 10.

### 12.1 Potable Water

Provided by CRG     Provided by site     Provided by contractor

All potable water will be clearly marked, tightly closed, and equipped with a tap. Provisions will be made for sanitary storage and proper disposal of cups.

### 12.2 Non-potable Water

Provided by CRG     Provided by site     Provided by contractor

Sources of non-potable water will be segregated and clearly marked as unsafe for drinking, cooking, and washing.

### 12.3 Toilet Facilities

Provided by CRG     Provided by site     Provided by contractor

### 12.4 Washing/Showering

Is project duration greater than six months?     No     Yes

Are showering facilities necessary?     No     Yes

Provided by CRG     Provided by site     Provided by contractor

### 12.5 Personal Hygiene

Prior to eating, drinking, or smoking, hands and face must be thoroughly washed.

Are hand-washing facilities necessary?     No     Yes

Provided by CRG     Provided by site     Provided by contractor

## 13.0 EMERGENCY CONTINGENCY PLANNING

### 13.1 Pre-Planning

The facility does not have a medical clinic or emergency response team onsite. In the event that non emergent medical treatment is necessary, report the incident to Chemours and Parsons before seeking medical treatment at the clinic or hospital listed below.

- **In case of an emergency dial 911. Do not transport a seriously injured worker to the hospital.**
- For emergency room treatment that does not require an EMT response, injured workers will be transported to Saint Catherine Hospital.
- For medical treatment that does not require emergency or urgent care, injured workers will be transported to Concentra Medical Center

The assembly area for medical evacuation is the main gate. First aid supplies are located in all Parsons vehicles.

Fire/Ambulance response time is approximately 5 minutes.

### 13.2 Emergency Phone Numbers

Contact	Name	Number
Police	East Chicago Police Department	Non Emergency Calls (291) 391-8400 Emergency Calls 911
Plant Security	Grace Davison: Primary POC John Polley Plant Security/Guard House	(219) 391-4607 (219) 391-4600
Fire	East Chicago Fire Department	(291) 391-8472 Emergency Calls 911
Ambulance	East Chicago Fire Department	(291) 391-8472 911
Plant Medical	NA	
Point of Entry Worker's Compensation Provider <sup>1</sup>	Concentra Medical Center 6423 Columbia Ave Hammond, IN 46320	(219) 937-3632

<sup>1</sup> Point of Entry (POE) providers will see worker's compensation patients without an appointment. See the AIG web site (<http://www.aigcs.net/>) to obtain State Laws regarding Worker's Compensation Claims, required State postings for work sites, and Point of Entry Providers.

Contact	Name	Number
Hospital Name: Address:	Saint Catherine Hospital 4321 First Street East Chicago, Indiana	(219) 392-1700 Non-Emergency
CRG Project Director	Sathya Yalvigi	(302) 999-2764 (484) 678-8984
Parsons Project Manager	Randy Palachek	Wk (512) 719-6006 Cl (512) 663-9590
Plant/Client Contact	NA	
Environmental Release Contact	IDEM 24-hr Spill Reporting	(888) 233-7745
CRG Safety Manager	Brian Ambrose	(302) 999-2518 cl (302) 528-6553
Parsons Safety Manager	Greg Ertel	cl (585) 353-2574
Regulatory Agency	Ken Bardo USEPA Region 5	(312) 886-7566

The evacuation route, assembly area, and alarm system will be identified by the site supervisor/SSO prior to onset of field activities and reviewed with all field personnel. Maps showing the hospital route and emergency evacuation routes are included as Figures 2 and 3, respectively.

### 13.3 Directions to Medical Facilities

Directions to Saint Catherine Hospital are provided here. The field team **MUST** physically verify the accuracy of these directions on site:

1. Head NORTH on KENNEDY AVE for 0.2 miles
2. Continue on HUIISH AVE for 0.6 miles
3. Turn RIGHT at E. CHICAGO AVE and go for 0.3 miles
4. Turn LEFT at EUCLID AVE and go for 0.3 miles
5. Take the 1<sup>st</sup> RIGHT onto E. 144st ST and continue for 0.3 miles
6. Turn LEFT at FIR ST, hospital is 308 feet ahead.

Directions to Concentra Medical Center are provided here:

1. Head SOUTH on KENNEDY AVE for 1.6 miles
2. Turn RIGHT at 165<sup>th</sup> ST and travel for 2.0 miles
3. Turn RIGHT on S. COLUMBIA AVE. and travel for 0.2 miles.

### 13.4 Field Emergency Data Sheet

All personnel working on the project must complete the Field Emergency Data Sheet included in Appendix A. In addition, all personnel who have a medical condition that can be impacted by the work must make the site supervisor and the SSO, as well as any key coworker, aware of that condition.

### 13.5 Notification Procedure

In the event of an incident, follow the Chemours CRG Unexpected Occurrence Reporting procedures found in Appendix G.

Parsons incident reporting is described below and the Parsons Corporate Emergency contact number is (866) 727-1411.

The fundamental purpose of the incident investigation is to identify causes and recommend corrective actions to prevent the possibility of future similar events. Essential to the investigation process is the proper reporting of all incidents including near-misses. This point cannot be overemphasized. The investigation of an incident will not progress unless that event is properly reported.

If there is an incident involving a General Contractor employee or lower tier subcontractor, the GC is responsible for submitting a written incident report to the Parsons Project Manager ASAP after the incident. If the incident involves a fatality, serious injury, or serious property damage, the GC must inform the Parsons Project Manager and the Owner CM of the incident immediately. Similarly, incidents that occur to Parsons employees or employees of subcontractors to Parsons on site, must be reported ASAP to the Parsons Project Manager and Parsons Project Regional H&S Manager.

The Project site H&S Manager or Project Manager is responsible for submitting an online incident report no later than 4 hours after the occurrence of the accident. Note that if the employee's injury is likely to result in a lost workday case, the GBU Sector Manager must be contacted within 4 hours of the occurrence ( this will be performed jointly by the Project Manager & Project H&S Manger).

If an incident results in a fatality, injury to a private citizen, property loss in excess of \$50,000 or three or more hospitalizations, the GBU Sector Manager (Randy Palachek, 512 719 6006) must be immediately notified. (Note that the GBU Sector Manager or other Parsons Safety Administrator will contact the OSHA Area Office within 8-hrs of a fatality or incident involving 3 or more hospitalizations).

Subcontractors must submit a monthly report of exposure hours (hours worked on the project, paid or unpaid) to the Parsons Project Manager within four days after the end of each month. The Project Manager compiles the figures and submits them via the online safety reporting system by the first Friday of each month. If necessary, estimated figures are acceptable, but the reports must be filed.



### 13.6 Injury Response

In the event a person becomes ill or injured while in the Exclusion Zone, the SSO will:

- Ensure that all equipment has been shut off.
- Assess the nature of the injury.
- Phone **911** for emergency assistance.
- Administer first aid (if certified to do so).
- Meet the emergency crew.
- Follow the Unexpected Occurrence Reporting procedure found in Appendix I.
- Begin injury investigation.

### 13.7 Fire/Explosion Response

In the event of a fire or explosion:

- Ensure that all equipment is shut off.
- Phone **911** for emergency assistance.
- Rally at main gate and take head count.
- Secure the area until emergency assistance arrives.
- Meet emergency crew and advise fire chief of location and nature of the situation.
- Follow the Unexpected Occurrence Reporting procedure found in Appendix F.

### 13.8 Spill/Release Response

In the event of a spill or leak:

- Ensure that all equipment is shut off.
- Phone **(888) 233-7745** for site spill response coordinator.
- Secure the area.
- Locate and stop or contain the spill if it can be done safely (proper PPE must be worn).
- Meet spill response crew and advise them of the location and material that has spilled.
- Follow the Unexpected Occurrence Reporting procedure found in Appendix F.
- Begin investigation.

## 13.9 Tornado/Earthquake Response

In the event of a tornado:

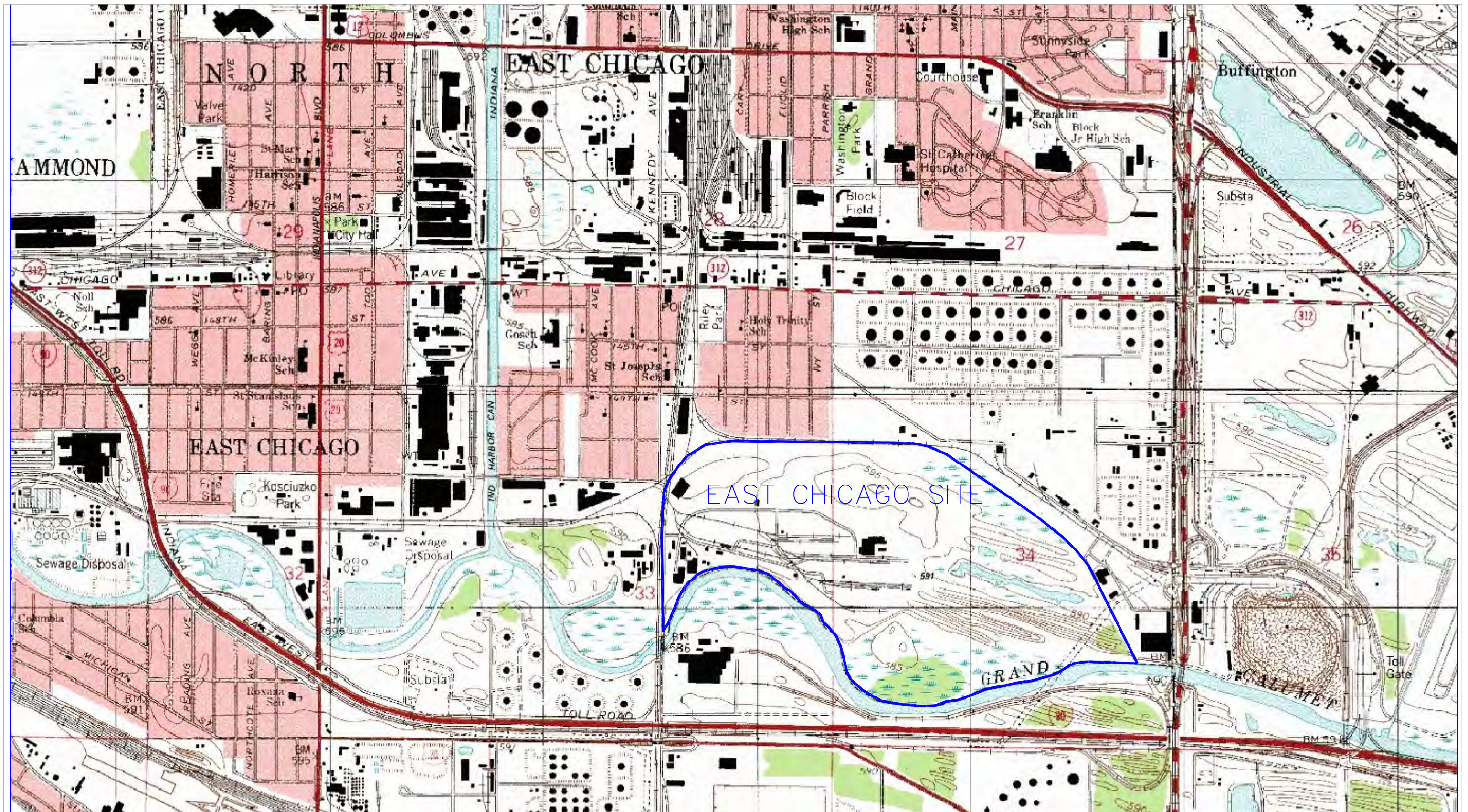
- Sound alarm.
- Phone **911** for assistance.
- Take head count.
- Secure immediate first aid.
- Meet emergency crews and advise of situation.
- Secure area and assess replacement needs and phone Parsons Office to ensure client has been notified.
- Begin investigation, if applicable.

## 13.10 Emergency Equipment

- First-aid kit
- Emergency eyewash
- Fire extinguisher
- Spill kit
- Other emergency equipment available: Blood-borne Pathogen kit

First-aid Kit Locations:                      All Parsons Vehicles

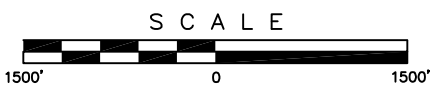
# FIGURES



EAST CHICAGO SITE

— PROPERTY BOUNDARY

WHITING QUADRANGLE  
 INDIANA  
 7.5 MINUTE SERIES (TOPOGRAPHIC)  
 TOWNSHIP 37 NORTH; RANGE 9 EAST; SECTIONS 33



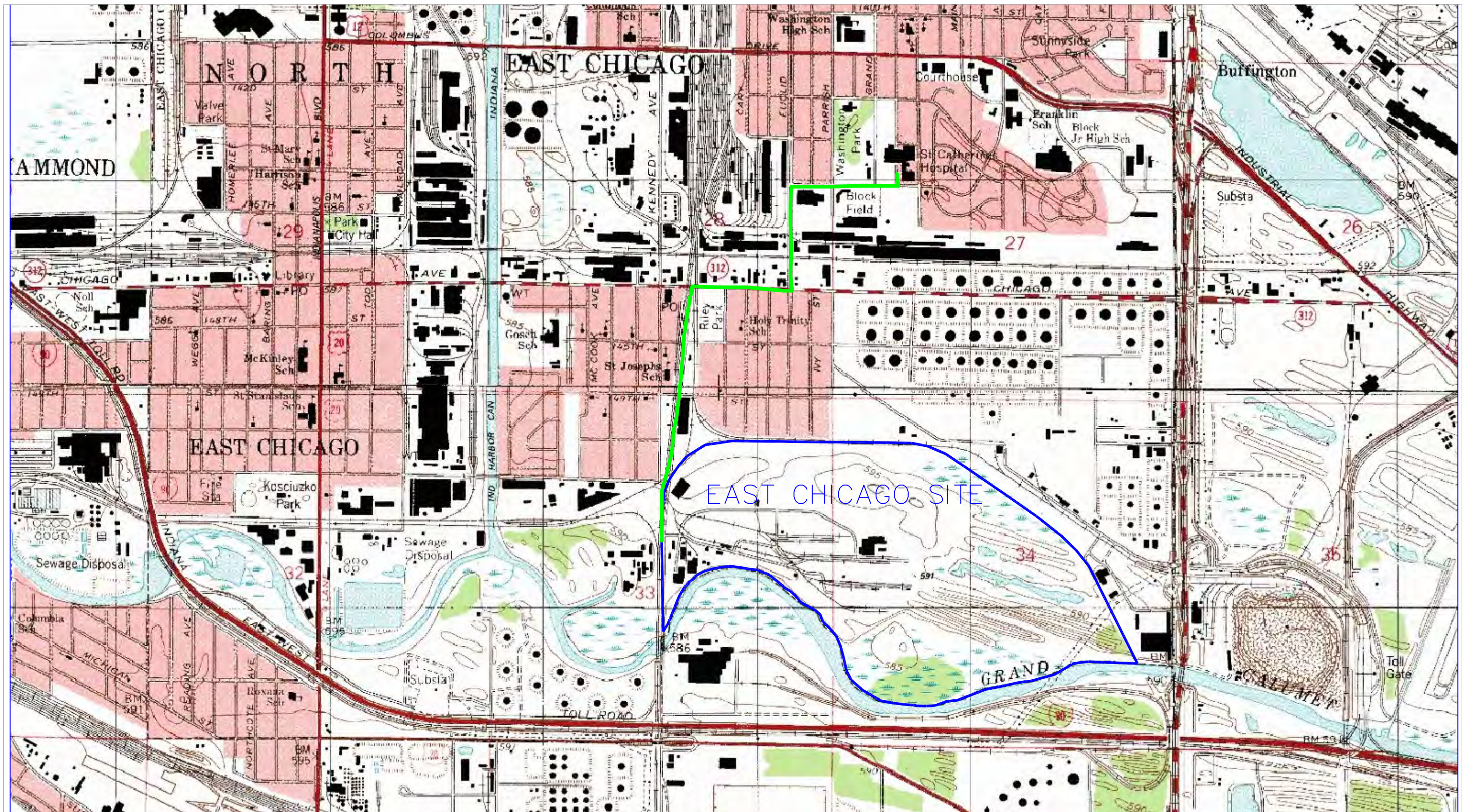
DESIGNED	DANA VTEK	INITIALS	
DRAWN	DANA VTEK		
CHECKED			
APPROVED(DESIGN)			
APPROVED(CONSTRUCTION)			

**PARSONS**  
 1601 Market Street  
 Suite 900  
 Philadelphia, PA 19103

EAST CHICAGO  
 SITE LOCATION MAP

DuPONT EAST CHICAGO INVESTIGATION  
 5215 KENNEDY AVENUE  
 EAST CHICAGO, INDIANA 46312

PROJECT NUMBER	445160	DUPONT PROJECT NUMBER	7754	SCALE	1:18000	DATE	9/08/09	CAD FILE NO.		FIGURE	1
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- PROPERTY BOUNDARY
- ROUTE TO HOSPITAL

SCALE



**WHITING QUADRANGLE**  
**INDIANA**  
 7.5 MINUTE SERIES (TOPOGRAPHIC)  
 TOWNSHIP 37 NORTH; RANGE 9 EAST; SECTIONS 33



DESIGNED	DANA VTEK	INITIALS	
DRAWN	DANA VTEK		
CHECKED			
APPROVED(DESIGN)			
APPROVED(CONSTRUCTION)			

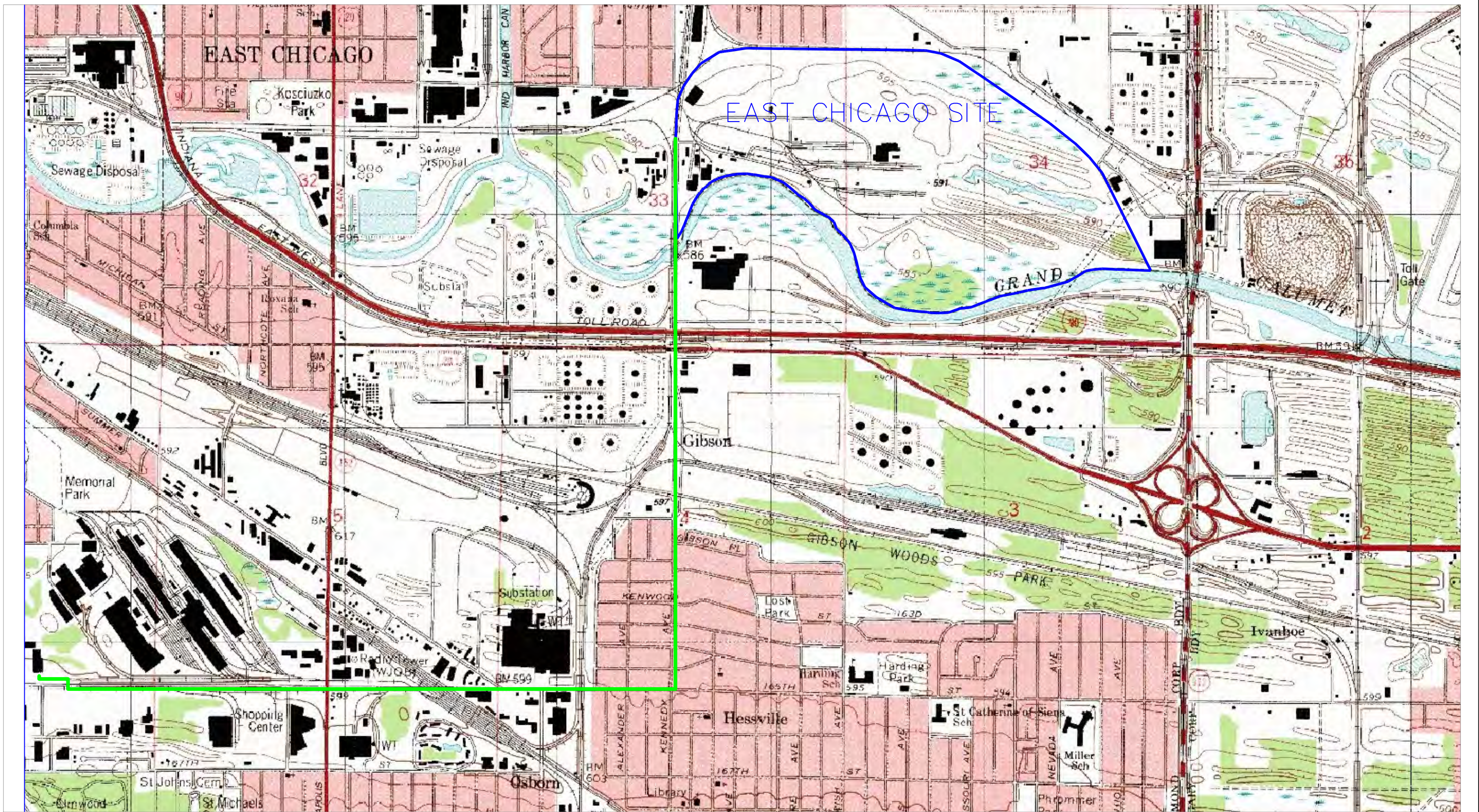
**PARSONS**

1601 Market Street  
 Suite 900  
 Philadelphia, PA 19103

EAST CHICAGO  
 HOSPITAL ROUTE MAP

DuPONT EAST CHICAGO INVESTIGATION  
 5215 KENNEDY AVENUE  
 EAST CHICAGO, INDIANA 46312

PROJECT NUMBER	445160	DUPONT PROJECT NUMBER	7754	SCALE	1:18000	DATE	9/08/09	CAD FILE NO.		FIGURE	2
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- PROPERTY BOUNDARY
- ROUTE TO NON-URGENT CARE

SCALE



**WHITING QUADRANGLE**  
**INDIANA**  
 7.5 MINUTE SERIES (TOPOGRAPHIC)  
 TOWNSHIP 37 NORTH; RANGE 9 EAST; SECTIONS 33



DESIGNED DANA VTEK	INITIALS
DRAWN DANA VTEK	
CHECKED	
APPROVED(DESIGN)	
APPROVED(CONSTRUCTION)	

PARSONS

1601 Market Street  
Suite 900  
Philadelphia, PA 19103

EAST CHICAGO  
 NON-URGENT CARE ROUTE  
 DuPONT EAST CHICAGO INVESTIGATION  
 5215 KENNEDY AVENUE  
 EAST CHICAGO, INDIANA 46312

PROJECT NUMBER 445160	DUPONT PROJECT NUMBER 7754	SCALE 1:18000	DATE 9/08/09	CAD FILE NO.	FIGURE 3
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# TABLES

**TABLE 2  
CHEMICAL HAZARD TABLE**



TABLE 2  
CHEMICAL CONSTITUENTS

Chemical Name Synonyms (trade name) (CAS No.)	OSHA PEL ACGIH TLV DuPont AEL ACGIH STEL NIOSH IDLH Skin Designation	Characteristics	Route of Exposure	Symptoms of Exposure
<b>METALS</b>				
Arsenic (inorganic) (7440-38-2)	PEL: 0.01 mg/m <sup>3</sup> TLV: 0.01 mg/m <sup>3</sup> AEL: N/E STEL: N/E IDLH: 5 mg/m <sup>3</sup> (CA) Skin: No	Silvery-gray or tin-white brittle, odorless solid.	INH ABS CON ING	Symptoms include ulceration of nasal septum, gastrointestinal disturbances, respiratory irritation, and peripheral neuropathy. Potential occupational carcinogen.
Cadmium (elemental) (7440-43-9)	PEL: 0.005 mg/m <sup>3</sup> TLV: 0.01 mg/m <sup>3</sup> AEL: 0.005 mg/m <sup>3</sup> STEL: N/A IDLH: 9 mg/m <sup>3</sup> (CA) Skin: No	Silver-white, blue- tinged lustrous, odorless solid. Air odor threshold: N/D	INH ING	Symptoms include pulmonary edema, cough, tight chest, head pain, chills, muscle aches, vomiting, and diarrhea. Potential occupational carcinogen.
Lead (Elemental & inorganic as Pb) (7439-92-1)	PEL: 0.05 mg/m <sup>3</sup> TLV: 0.05 mg/m <sup>3</sup> AEL: 0.05 mg/m <sup>3</sup> STEL: N/E IDLH: 100 mg/m <sup>3</sup> Skin: No	A heavy, gray ductile soft solid.	INH ING CON	Accumulative poison may cause weakness, insomnia, facial pallor, anorexia, malnutrition, constipation, abdominal pain, anemia, gingival lead line, paralysis of wrists and ankles, hypertension, and kidney disease.
Zinc Oxide (Zinc dust) (1314-13-2)	PEL: 5 mg/m <sup>3</sup> TLV: 10 mg/m <sup>3</sup> AEL: N/E STEL: N/E IDLH: 500 mg/m <sup>3</sup> Skin: No	Fine white odorless particulate. Air odor threshold: N/A	INH	Irritant to eyes, nose, throat, and skin. Symptoms include metal fume fever, blurred visions, chills, nausea, muscle ache, fever, and tight chest.

# APPENDIX A PROJECT FORMS

# HEALTH AND SAFETY PLAN COMPLIANCE AGREEMENT

**Project Name:** \_\_\_\_\_ **Project Number:** \_\_\_\_\_

I have read, understood, and agree with the health and safety protocols presented in the Health and Safety Plan (HASP) and the information discussed in the health and safety briefing. I also understand that noncompliance with the HASP may result in dismissal from the site.

<b>Printed Name</b>	<b>Organization</b>	<b>Signature</b>	<b>Date</b>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
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_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Personnel Health and Safety briefing conducted by:

\_\_\_\_\_  
Name Signature Date

## Guideline - *Work Permit & Safety Briefing Procedure*

### Purpose

To provide guidance for DuPont Site Representatives (DSRs) and/or Site Safety Officers (SSO) in preparing Work Permits and conducting Daily Safety Briefings that:

- Adequately identify the hazards involved with the work
- Are interactive between the supervisors and the workers, and
- Clearly establish the CRG Safety expectations regarding management of changing field conditions.

Consistency in the application of this Standard Operating Procedure (SOP) is integral to the success of the process. Use of this procedure will build a strong well-balanced team where the worker and supervisor have a shared responsibility to safely accomplish the work.

### Background

Historically, the majority of unexpected occurrences are attributable to human error. Primarily, the errors are related to: inadequate identification of the hazards involved with the execution of the work; a lack of understanding or failure to implement mitigation measures for the hazards; and improper management relating to changing conditions or revised scopes of work. The number of unsafe acts and conditions observed during field audits further substantiates this pattern. Using a daily work permit and performing safety briefings are the ideal setting in which to drive personal accountability and ownership of the safety process to the level of the employee performing the work.

The Work Permit and Safety Briefing are tools which allow us to identify hazard mitigation measures at the task level. They are intended to be used in conjunction with the Health and Safety Plan (HASP) and Project Safety Analysis (PSA) in order to drive the understanding at the task level necessary to adequately identify all hazards and mitigation measures. In addition, this process allows participation by the individuals who are performing the work and most familiar with the hazards involved in executing the work.

### Key Terms

The following definitions apply to terms used in this procedure:

**Daily Safety Briefing (aka toolbox or tailgate meeting):** This process is directed by the Contractor supervisor, the DSR, and/or SSO and occurs when daily work assignments are made and the safety aspects of the work are discussed. During this process, the various tasks involved with the planned work are identified and mitigation measures discussed. Also, the need to evaluate any changes or modifications to the proposed operations as the work progresses is reinforced. This is an interactive process conducted with input from the workers.

**Project Safety Analysis (PSA):** A process to identify safety and health hazards, which may be known or anticipated, and the associated control measures while planning for the design and implementation of a project.

**Work Permit:** Written authorization to perform daily tasks. This may be documented using the attached form or a facility generated form.

### Responsibilities

The **Project Director** is responsible for:

- Assuring that the project team uses this process to adequately identify and mitigate field hazards.

The **Project Manager** is responsible for:

- Assuring that this process is in place to address the safety hazards and mitigation measures

- for the work being performed at the field site.
- Periodically audit to verify that this process is implemented.

The **DuPont Site Representative and/or Site Safety Officer** are responsible for:

- Ensuring that the Contractor is actively participating in the Work Permit and Daily Safety Briefing Procedure.
- Approving the Work Permit
- Participating and contributing to the Safety Briefing discussion.
- Verifying that the Daily Safety Briefing Discussion is adequately documented.
- Auditing to ensure that the mitigation measures specified in the Work Permit and the Daily Briefing are implemented.

The **Contractor Supervisor** is responsible for:

- Assigning workers that have adequate instruction to safely perform the task.
- Assuring that all workers understand that they are to stop work if the work cannot be completed in the manner specified in the Work Permit and during Daily Safety Briefing.
- Initiating the work permit (if no plant permit is in place) or participating in the development of the Work Permit if the facility has a permit system in place.
- Leading and documenting the Daily Safety briefing discussion.

## Application

This procedure should be implemented for all work locations that CRG (to include URSD, URS) manages/coordinates field activities.

## Procedure Methodology

The Contractor Supervisor completes Work Permit (Attachment 1) for work to be performed that day. Note: The Work Permit may be completed the day before if possible. SSO, DSR, and the Contractor Supervisor discuss the work to be performed and any safety observations from the previous day's work. Once all parties are in agreement with the work tasks and safety mitigation measures, the work permit is signed. Contractor Supervisor begins tailgate meeting by discussing the day's activities and assigning tasks and then leads into an interactive discussion regarding the safety hazards of the day's work. This discussion should be documented in the Daily Safety Briefing log (Attachment 2).

**Note:** The briefing should be an interactive discussion where the Contractor Supervisor questions the workers to solicit comment and get agreement as to the requirements. The DSR and the SSO should participate in and contribute to this discussion. Each work task, the hazards associated with that assignment, and the mitigation measures to be taken must be discussed to ensure understanding throughout the field team. Workers should be asked interactive, open-ended questions which require a response. Examples are:

- What assignment do you have that causes you the most worry regarding safety? Why?
- Who did you observe making a positive safety contribution yesterday?
- Where is the greatest potential for serious injury in your work area?
- Who do you go to if you have a safety concern?
- What are you doing to achieve accident-free performance?
- How can I help you improve your safety performance?
- What do you do if conditions change?

If during the course of work, conditions change which necessitate a change in the way the work is performed or a new task is begun (other than what was discussed), the affected worker or group of workers should stop work and consult the Contractor Supervisor, the DSR, or the SSO. The Safety Briefing Process is then re-visited to evaluate the adequacy of precautions in place and updated as necessary.

## References

N/A

**Corporate Remediation Group  
DAILY WORK PERMIT**

DATE: \_\_\_\_\_ TIME: \_\_\_\_\_ To \_\_\_\_\_ Project Name / ID: \_\_\_\_\_

Work Location: \_\_\_\_\_

Work Description (summary of tasks/equipment): \_\_\_\_\_

<u>Special Procedures to Follow</u>	<u>Check all that apply</u>	<u>Permits Required</u>	<u>Check all that apply</u>
Rigging	[ ]	Excavation	[ ]
Electrical Safety (GFCI, Lock, Tag, Try)	[ ]	Line Break	[ ]
Traffic Control	[ ]	Elevated Work	[ ]
Property Security Issues	[ ]	Work on/near Energized Equipment	[ ]
Elevated Work	[ ]	Critical Lift / Proximity	[ ]
Work Over Water	[ ]	Confined Space Entry	[ ]
Explosive Materials	[ ]	Open Flame / Hot Work	[ ]
Truck Tarping	[ ]	Other _____	[ ]
Hand Safety	[ ]	Public Relations / Impact to Community Concerns:	[ ]
Biological Hazards	[ ]		[ ]
Heat / Cold Stress	[ ]		[ ]
Equipment Operation / Drilling	[ ]		
Lifting / Ergonomic	[ ]		

**PPE Requirements (review HASP for task specific PPE and complete section below)**

Eyes:  Hands:   
 Foot:  Respiratory Protection:   
 Chemical Resistant Clothing:  Specialty Clothing: (Nomex, High Vis. Vest, etc.)

**FLAME PERMIT (Place line through if not needed)**

Will there be open flame or spark producing tools used? Yes No  
 Fire extinguisher present? Yes No Location: \_\_\_\_\_  
 Extinguisher charged Yes No To extent possible, have combustible materials been removed Yes No  
 Name of fire watch: \_\_\_\_\_ Have limits of permit area been defined? Yes No  
 Has material been inspected before burning/cutting Yes No Explosimeter Readings: O2 \_\_\_\_\_% Tox \_\_\_\_\_ LEL \_\_\_\_\_%

**EXCAVATION PERMIT (Place line through if not needed)**

Underground obstructions identified? Describe: \_\_\_\_\_  
 Has MISS UTILITIES been notified? Yes No N/A  
 Call Number: \_\_\_\_\_  
 Will personnel need to enter excavation? Yes No  
 Soil Type: Type A Type B Type C  
 Who is the competent person? \_\_\_\_\_  
 Describe method (i.e., shoring, sloping) of safeguarding excavation.  
 Signature of Competent Person: \_\_\_\_\_  
 Overhead Utilities w/i 15'? Yes No  
 If yes identify precautions \_\_\_\_\_

**In Case of Emergency:**

1. Evacuate work location and assemble at rally point: \_\_\_\_\_
2. Number of personnel on site: \_\_\_\_\_
3. Contact the DuPont Site Representative: \_\_\_\_\_  
 Printed Name \_\_\_\_\_ Phone Number \_\_\_\_\_

Approved / Issued by: \_\_\_\_\_ DuPont Site Representative Date: \_\_\_\_\_

I agree to comply with the requirements of this permit: \_\_\_\_\_ Contractor Supervisor Date: \_\_\_\_\_

**WORK MUST NOT START UNTIL PERMIT IS SIGNED AND ALL PRECAUTIONS ARE TAKEN!**

**TAILGATE MEETING**

Prior to the “Tailgate” meeting the DSR and the contractor supervisor discuss the work to be performed and any safety observations from the previous day’s work. Once in agreement with the work, tasks and safety mitigation measures, the Work Permit (see reverse side) is signed.

The contractor supervisor begins tailgate meeting by discussing the day’s activities and assigning tasks and then leads into an interactive discussion regarding the safety hazards of the day’s work. With assistance from the DSR/SSO, the discussion should be started by asking open-ended questions to solicit comments from field crew. Areas for improvement, positive observations, mitigation measures, key points regarding mitigation measures, etc., should be noted in the space below. In addition the following points must be addressed:

Have field personnel been made aware of the hazards / special procedures / permit requirements identified on the Work Permit?

Are all personnel aware of the requirement to inspect all equipment & tools before the first use of the day?

Has there been any change in work area conditions that may require additional discussion?

Are all personnel aware of their obligation to STOP work in view of changing conditions or activities not included on the work permit?

**Date & Time of Meeting:** \_\_\_\_\_

**Discussion:**

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Attendee’s Name (Printed)	Signature		Time In	Time Out	Time In	Time Out



# FIELD SAFETY AUDIT

\* denotes a required field

\*Date:

Business Team:

\*Site:

\*Audit Focus:

\*Audit Team:

PSA Compliance: [ ] Completed

\*Activities Audited:

HASP Present: Yes or No

\*Site Contact:

\*Number of Personnel Audited:

Originator:

\*Project Team:

Contractor Name:

---

---

## Positive Observations within Focus:

Number of observations:		List Observations:	

## Improvement Observations within Focus:

Number of observations:		List Observations:	

## Positive Observations outside of Focus:

Number of observations:		List Observations:	

## Improvement Observations outside of Focus:

Number of observations:		List Observations:	

**Hand Safety Observations:**

Number of observations:		List Observations:	

**Environmental Focus:**

Number of observations:	<input type="checkbox"/> WMP Present?	List Observations:	

**Unsafe Acts:**

Number of observations:		List Observations:	

**Unsafe Conditions:**

Number of observations:		List Observations:	

# FIELD EMERGENCY DATA SHEET

**Name:**

**Home Phone:**

**Home Address:**

## **Whom to Notify in Case of Emergency**

**Name:**

**Daytime Phone Number:**

**Personal Physician's Name:**

**Medical Conditions:**

**Allergies:**

**Special Considerations:**

# CRG UNEXPECTED OCCURRENCE REPORT

REPORT NO.: UO-      YY-      No.

**Title:**

**Location:**

**Date and Time:**

**Description:**

(The description should be a concise statement of what happened in one to three sentences)

**Key Learnings**

**Summary of Investigation:**

(Include bullet items of the incident findings)

o

**Conclusions:**

(List the cause(s) of the unexpected occurrences or the key learnings)

**Recommendations/Responsibility:**

(What should be done to prevent a recurrence or other relevant path forward items, with assignment to an individual or the team and the completion date). Be specific and concise.

VEHICLE SAFETY INSPECTION FORM

# PARSONS

## ANNUAL VEHICLE SAFETY INSPECTION

<b>GBU:</b>	<b>Job #:</b>	<b>Job Name:</b>	
<b>Assigned Driver:</b>		<b>State:</b>	<b>Location:</b> <b>Zip Code:</b>
<b>Vin #:</b>	<b>Mileage:</b>	<b>Make:</b>	<b>Model:</b>
<b>Year of Mfr:</b>	<b>Asset #:</b>	<b>Date:</b>	

**Operator Controls**

	OK	Needs Repair	NA
Steering Wheel			
Ignition Switch			
Wiper controls			
Light Switch			
Heater / AC Controls			
Seat / Seat Belt			
Pedals			
Window Operation			
Rear View Mirrors			
Windshield Wipers			
Horn			
Instrumentation			

**Engine Compartment**

	OK	Needs Repair	NA
Brake Fluid			
Power Steering Fluid			
Washer Fluid			
Coolant			
Oil Leaks			
Coolant Leaks			
Unusual Noises			
Belts			
Charging System			
Starting System			
Battery			

**Exterior Condition**

	OK	Needs Repair	NA
Paint			
Body			
Trim / Moldings			
Bumpers			
Glass			
Tires and Wheels			
Lights			
License Lamp			

**Underneath**

	OK	Needs Repair	NA
Exhaust System			
Shocks			
Suspension Comp			
Brakes			
CV Joints			
Exhaust Smoke			

**During Operation**

	OK	Needs Repair	NA
Unusual Noises			
Vibrations			
Shakes			
Squeals/Squeaks			
Puling Left/Right			
Safety Light Pkg			

Please annotate anything not mentioned above in the space provided below:

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---



---

# Activity Hazard Analysis (AHA)

Activity/Work Task:	Overall Risk Assessment Code (RAC) (Use highest code)					Add code and color
Project Location:	Risk Assessment Code (RAC) Matrix					
Contract Number:	Severity	Probability				
Date Prepared: (mm/dd/yy)		Frequent	Likely	Occasional	Seldom	Unlikely
Prepared by (Name/Title):	Catastrophic	E	E	H	H	M
Reviewed by (Name/Title):	Critical	E	H	H	M	L
	Marginal	H	M	M	L	L
Employer/GBU:	Negligible	M	L	L	L	L
	Step 1: Review each "Hazard" with identified safety "Controls" and determine RAC (See above). The RAC is developed after correctly identifying all the hazards and fully implementing all controls.					
Notes: (Field Notes, Review Comments, etc.) References :	P "Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.				<b>RAC Chart</b>	
	S "Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible				E = Extremely High Risk	
	Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.				H = High Risk	
				M = Moderate Risk		
				L = Low Risk		

Job Steps	Hazards	Controls	P	S	RAC

Equipment to be Used	Training Requirements/Competent or Qualified Personnel	Inspection Requirements

SH&E Risk Mitigation Two-Week Look-Ahead Form



SH&E Risk Mitigation 2-Week Look-Ahead Form

SH&E Plan for Week Ending:		Subcontractor:	
Project/ Location:		Meeting Date:	
Plan Prepared by:		Dated:	

Next Two Weeks Scope of Work:

Identified SH&E Risks/Exposures/Hazards Issues:

Identify Tasks requiring permitting (e.g., dewatering permit) or involving environmental regulatory issues (e.g., generation of new, uncharacterized waste):

Tasks with environmental risk of significant spills or releases:

Control Measures:

Additional Activity Hazards Analysis Required:

Subcontractors Mobilizing/Demobilizing:

Audit/Inspections Scheduled:

Competent Person Changes:

Planned Orientation/Training:

Recommendations/Comments/Concerns:

Note: This information should be incorporated into the meeting minutes.

# PARSONS

## Preconstruction SH&E Meeting Site-Specific SH&E Review Checklist Project Technical and General Conditions Specification Review (Sheet 1 of 3)

Date:

Subcontractor Representative:

Phone:

Project Location:

Parsons Project Manager:

Phone:

Subcontractor Safety & Health Representative:

Phone:

Parsons Safety & Health Manager:

Phone:

Subcontractor Environmental Representative:

Phone:

Parsons Environmental Representative:

Phone:

This checklist supports the identification of work activities and programs in a preconstruction SH&E meeting. This list also includes items identified through the subcontractor review and high-risk activities identified through the project specification review.

High-risk activities (denoted with an asterisk) checked with a checkmark must be followed up during the construction phase with training, written plans and/or a specific Activity Hazard Analysis (AHA).

This list should be reviewed with prospective bidders during the pre-bid meeting.

NOTE: Use check box and add specifics and details as applicable (next to the callouts)

### SAFETY & HEALTH

Site-Specific Safety, Health and Environmental Plans

Competent/Qualified Person Documentation

SH&E Audits/Inspections

Subcontractor Responsibilities

Site Orientation Requirements

Preconstruction SH&E Meeting/Date

Crane Inspection Certification

Personal Protective Equipment (PPE) (Work activities or work site requires hearing protection/using respirators/special protective clothing/other)

Public Exposure (Work activities or location requires special precautions to protect the public)

### CONSTRUCTION SAFETY ISSUES

Steel Erection (SENRAC Requirements)

Excavations/Trenching

Powered Industrial Trucks, Fork Lifts

Crane Work/Heavy Lifts, Rigging

Work involving Hazardous Materials

Electrical Tie-ins/Lockout – Tagout



# PARSONS

## Preconstruction SH&E Meeting Form Site-Specific SH&E Review Checklist Project Technical and General Conditions Specification Review (Sheet 2 of 3)

### CONSTRUCTION SAFETY ISSUES (Contd.)

<input type="checkbox"/>	Aerial Lift Work – Scissor Lifts, Extendable Boom, etc.
<input type="checkbox"/>	Underground, Caissons, Cofferdams
<input type="checkbox"/>	Scaffold Erection/Work
<input type="checkbox"/>	Demolition
<input type="checkbox"/>	Marine Work/Live Boating
<input type="checkbox"/>	Heavy Hauling
<input type="checkbox"/>	Concrete
<input type="checkbox"/>	Diving
<input type="checkbox"/>	Work Adjacent to Production Areas
<input type="checkbox"/>	Site Security/Visitor Control/Public Areas
<input type="checkbox"/>	Process Safety Management (PSM)
<input type="checkbox"/>	Permits (Excavations, Scaffolding, Demolition, Traffic, Confined Space, Hot Work, Line Breaking, etc.)
<input type="checkbox"/>	Confined Space (Confined space entry is required)
<input type="checkbox"/>	Welding and cutting (Acetylene/gas cutting, arc welding, soldering and brazing)
<input type="checkbox"/>	Ladders (Portable ladder use is required)
<input type="checkbox"/>	Traffic Control (Work is on or near highways, roads, or mass transit)

### MEDICAL

<input type="checkbox"/>	Substance Abuse Screening
<input type="checkbox"/>	Emergency Procedures
<input type="checkbox"/>	Site Security
<input type="checkbox"/>	Smoking Policy
<input type="checkbox"/>	Medical Services Requirements
<input type="checkbox"/>	Treatment Locations, Addresses, and/or Phone List

### ENVIRONMENTAL

<input type="checkbox"/>	Environmental Hazards
<input type="checkbox"/>	Air Pollution/Emissions and required reporting
<input type="checkbox"/>	Wastewater Discharges
<input type="checkbox"/>	Drinking Water
<input type="checkbox"/>	Management of Hazardous Materials and Hazardous and Solid Wastes
<input type="checkbox"/>	Emergency Response to Spills and Releases Environmental Assessments
<input type="checkbox"/>	Protected Ecological and Cultural Resources
<input type="checkbox"/>	Specific Reports on Toxic or Hazardous Chemicals Usage and Storage (Required by Environmental Regulation)
<input type="checkbox"/>	Materials to be Recycled
<input type="checkbox"/>	Possibility of Buried Items Onsite (cultural artifacts, tanks, wastes, and ordinance) and what to do if encountered
<input type="checkbox"/>	Environmental Regulatory Requirements

# PARSONS

## Preconstruction SH&E Meeting Form Site-Specific SH&E Review Checklist

### Project Technical and General Conditions Specification Review (Sheet 3 of 3)

#### ENVIRONMENTAL (Contd.)

- Environmental Assets
- Resource Conservation/Sustainability

Additional Notes/Comments:

#### ATTENDEES

Name	Title	Company

# APPENDIX B UNDERGROUND OBSTRUCTIONS

## Guideline - *Underground Obstructions*

### Purpose

The purpose of this procedure is to provide guidance for CRG employees dealing with compliance inspections conducted by representatives of government agencies such as OSHA, or the state agencies. Both domestic and nondomestic locations should follow these guidelines.

### Key Terms

**Project Safety Analysis (PSA):** A review of the project with project participants (to include contractors when appropriate) to identify key concerns and problem areas before beginning field work.

**Geophysical survey** A survey using any number of tools which use radio transmitters/receivers, magnetic fields etc., to locate underground utilities. There are specific limitations and detection capabilities of each type of device.

**Underground Utilities:** Electric lines, communications lines, pipelines sewer lines, etc., which are buried below the surface.

**Soft Dig:** A soil removal technique that uses high pressure air to loosen and vacuum to remove soil without damaging underground utilities.

**Heavy Equipment:** Drill rigs, excavators, cone penetrometers (CPT), geoprobes and other types of construction equipment used to conduct subsurface work.

**Excavation Permit:** Written authorization to perform subsurface work.

### Responsibilities

Roles and responsibilities for the implementation of this guideline are defined as follows:

The **Project Director** is responsible for:

- Assuring that the project team has considered this hazard in the development of the work plan/HASP.
- Verifying that the appropriate method(s) of identifying underground utilities are funded and implemented or signing a variance (PSA form) indicating why such methods should not be required.

The **Project Manager** is responsible for:

- Assuring that pre-planning measures are put in place early in the project life cycle to prevent heavy equipment from damaging an underground utility. Controls should include one of the following: geophysical survey, SOFT DIG, or hand probing. If one of these methods is not implemented, a variance for intrusive work must be obtained.
- Assuring that this procedure and required control methods are included in the project budget and implemented as agreed.

The **Site Supervisor** and/or **Site Safety Officer** are responsible for:

- Implementing or requiring the contractor to implement the controls required by this procedure. Auditing to assure the procedures requirements are implemented.

## Application

This procedure shall be implemented at all work locations involving subsurface activities that CRG manages/ coordinates.

## Procedure Methodology

During project authorization the PD/PM must evaluate project activities and determine if activities to be performed will involve subsurface work.

If yes, then measures to evaluate underground utilities must be put in place prior to project start up. These measures could include a geophysical survey, the use of SOFT DIG technology and/or hand dig. A plant utility group can also be used if their capability is not limited to strictly electrical lines under current but rather a full geophysical survey.

The flow chart provided as Attachment 1 is a tool to identify and manage subsurface activities. This flowchart can be used at several points in the project life cycle. It should be used during the planning and budgeting stage of the project, during the PSA, and when acquiring excavation permits.

**Note: If a PD/PM elects not to perform a geophysical survey, SOFT DIG, and/or hand dig then the PD must fill in the variance section of the PSA documenting the decision.**

The CRG field team is responsible for providing a map and physically walking the areas of concern with the plant contact, the excavation permit issuer, and the person and or team performing the survey.

Upon completion of the survey, the CRG team or team member must review the data from the geophysical survey and make a decision to proceed with the subsurface work or if an alternative method needs to be employed because of the confidence level in the data. The data should also be reviewed with the plant contact or permit writer.

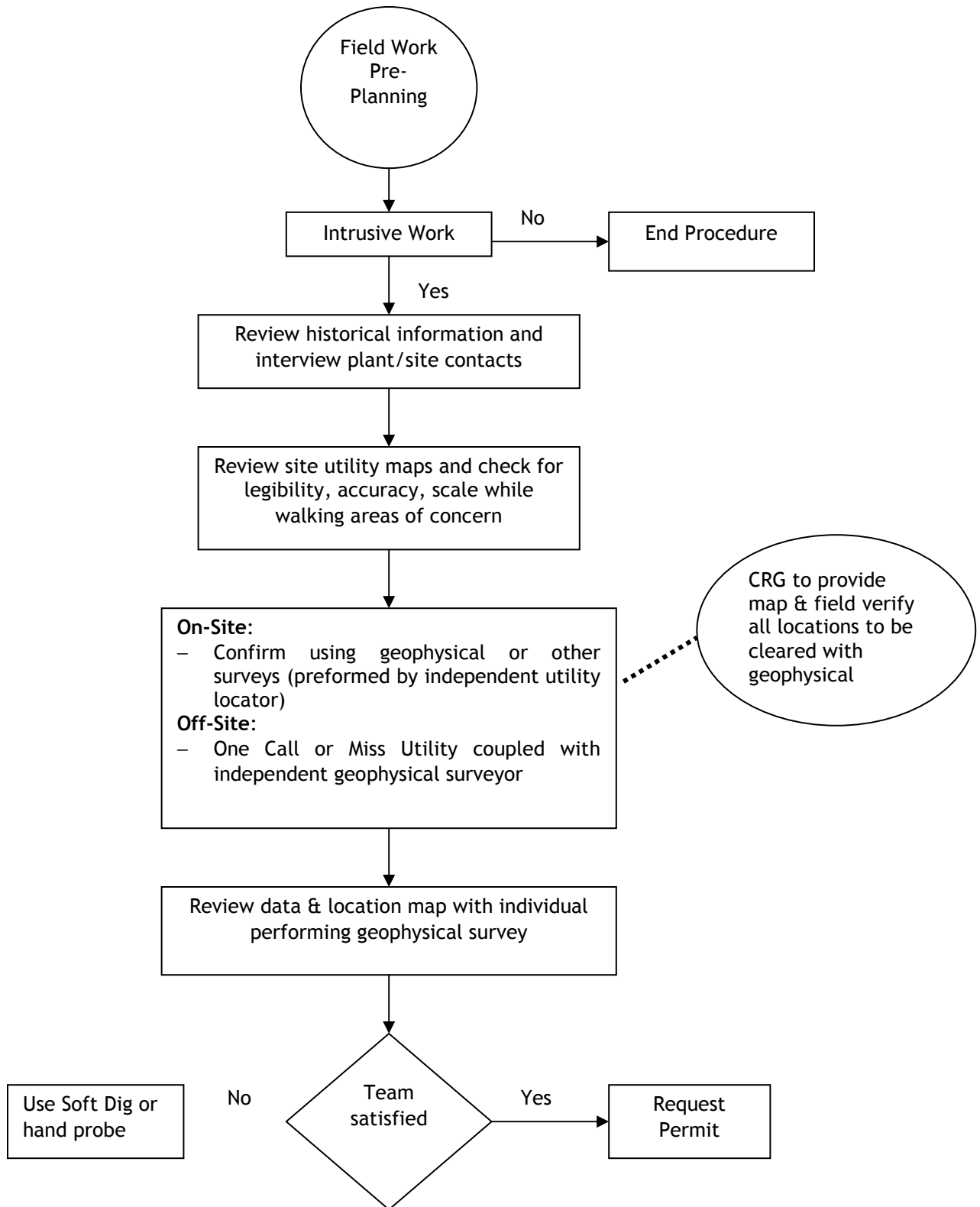
The CRG field team would then request a permit for the work and begin field activities.

**Note:** When working at an active plant, the CRG will use the plant excavation permit procedure, in the absence of a plant specific procedure, follow Excavation permit procedures found in FC&S Safety Manual Procedure B-5.1.

## References

- FC&S Safety Manual, Procedure B-5.1 Excavations
- OSHA 29 CFR 1926.651, Specific Excavation Requirements

Attachment 1  
 Decision Flow Chart



Note: public utility mark out service only guarantees markouts for 8-10 days after the check.

# APPENDIX C DRILLING SAFETY



# C-9.1

## Soil Drilling Equipment

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### 1.0 Scope

This procedure establishes guidelines for safely operating power drilling equipment used for soil sampling, test well and shallow well drilling, and drill foundation installation. This procedure does not include equipment for deep well drilling.

### 2.0 Definitions

**Attachment** - Any device that can be added to a basic or main piece of equipment.

**Electrical Source** - Items such as equipment, cables, lines, or busbars that are used to conduct electrical current.

**Engineer** - The person who requests the work and is responsible for the safety, quality, and timing of the work requested.

**Manufacturer** - The company responsible for the design and assembly of a piece of equipment. Distributors and sales organizations are not considered manufacturers.

**Qualified Inspector** - An experienced craftsperson or engineer (DuPont or contractor) who has demonstrated his or her ability or competency to inspect equipment to the site manager and/or the DuPont Mobile Equipment Solutions designee (formerly known as Fleet Operations).

### 3.0 General

#### 3.1 Equipment Inspection

A qualified inspector or designee must inspect all drilling equipment prior to its use on site and at least quarterly thereafter. For a sample equipment inspection form, see Attachment C-9.1-1.

#### 3.2 Planning

When planning drilling operations, the engineer must consider sub-surface soil and water for potential contaminants and use appropriate techniques to protect personnel from exposure to any identified health hazards. Coordinate this planning with the operating area SHE office.

Also consider additional hazards that may result from physical interference, either above or below ground, such as pipelines or electric cables. When any part of the equipment or load could come within 15 feet (4.5 meters) of an electrical source or hazardous pipes during the planned swing radius, the requirements in FCSM B-1.18 or FCSM C-10.1 must be met.

#### 3.3 Permits

An excavation permit, following site standards, must be issued for drilling operations. The permit must be obtained or issued by the engineer. For a sample permit and more information about excavation, see FCSM B-5.1.

#### 3.4 Attachments

Follow these guidelines when using attachments:

- Whenever possible, use manufacturer-supplied attachments.
- Use only attachments that are engineered, designed, and manufactured for the specific drilling equipment on which they are installed.
- Use attachments only for their designed and intended purposes.

#### 3.5 Operations

Consider the flammable and explosive classifications before using drilling equipment in an operating area when using rotational drill equipment. Do not allow nonessential personnel to work near the turning drill. Exercise extreme caution when it is necessary to use hand tools close to a turning drill.

Determine noise levels during equipment operation. High noise boundaries must be posted and appropriate personal protection devices must be used. For more information about noise measurement and hearing conservation, see FCSM E-6.1.

If holes are not filled after drilling, provide either hole covers or barricades. Erect barricades around holes according to site procedures. Depending on the size and depth of the drilled hole, fall protection may be required when working around the unprotected hole.

Maintain safe means of access and egress at all times. When it is necessary to climb drilling rigs, continuous fall



## C-9.1 Soil Drilling Equipment

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protection must be provided. For more information on continuous fall protection, see FCSM B-8.1.

During the drilling process, any emulsions or other materials brought to the site by the contractor must be brought onto site and removed according to site, local, state, and government regulations. Keep the area around the drilling operation clear of spoils, tools, and debris.

Use the appropriate personal protective equipment if any health hazards exist.

### 3.6 Environmental Considerations

Hydraulic lines must be maintained to prevent leakage. Equipment entering the site must be inspected for evidence of leaking and be cleaned prior to initial set-up. If a leak or failure occurs in a hydraulic system, the spill must be cleaned up according to site, local, state, and government regulations. Sites should have a written procedure to respond to this type of spill.

## 4.0 References

FCSM A-21.1, *Planning Work in Plant Areas*

FCSM B-1.18, *Use of Mobile Equipment Near Exposed Electric Lines*

FCSM B-5.1, *Excavations*

FCSM B-8.1, *Continuous Fall Protection*

FCSM C-10.1, *Mobile Equipment Work Near Hazardous/Critical Pipelines*

FCSM E-6.1, *Noise Measurement and Hearing Conservation*

# Attachment C-9.1-1

## Drilling Equipment Inspection

Equipment identification number: \_\_\_\_\_

Items	CONDITION			Remarks
	Good	Rejected	N/A	
1. Access & Egress*				
2. Backup Alarms*				
3. Body				
4. Brakes*				
5. Clutch*				
6. Control & Levers Labeled*				
7. Cotter Pins/Hardened Pins*				
8. Cover				
9. Data Nameplate				
10. Frame				
11. Fuel & Gas Systems*				
12. Glass*				
13. Guards*				
14. Horn*				
15. Hydraulic System (no leaks)*				
16. Lights				
17. Lugs				
18. Muffler & Exhaust Pipe*				
19. Muffler Guards*				
20. Parking Brakes*				
21. Platform Decking				
22. Rear View Mirror				
23. Rollover Protection*				
24. Seat Belts*				
25. Side Mirrors (both)*				
26. Steering Mechanism*				
27. Tracks, Tires, Wheels*				
28. Turn Signals				
29. Windshield Wipers				

\* If any of these are rejected, the equipment shall not be used.

\_\_\_\_\_  
 Inspected by Date

<b>Background Information</b>			
<p><b>Note:</b> The Background Information, Documentation, and the DuPont Site Representative (DSR) Preparation Checklist pages will be completed PRIOR TO ASSEMBLING PSA team. The Background Information page <u>WILL</u> be discussed during the PSA meeting. The purpose of the Background Information page is to</p> <ul style="list-style-type: none"> <li>• Introduce key project team members,</li> <li>• Verify that adequate and appropriate resources have been assigned, and</li> <li>• Provide a background on the scope of work to facilitate discussion.</li> </ul> <p>The Documentation and DuPont Site Representative (DSR) Preparation Checklist WILL NOT be discussed with the contractor during the call. The purpose of the Documentation and DuPont Site Representative Preparation Checklist are to verify that:</p> <ul style="list-style-type: none"> <li>• The appropriate front end loading of the project has been completed,</li> <li>• Appropriate support documents are in place, and</li> <li>• The assigned DSR is properly equipped and prepared to meet project and Client expectations.</li> </ul>			
PSA Date:	October 2013		
Site Name:	DuPont - East Chicago		
Project Name:	DuPont - East Chicago		
List Names Below. If present during the PSA meeting, also Check Box			
PSA Participants * If these key participants are not available, the PSA should be postponed.	Project Director*:	Sathya Yalvigi <input type="checkbox"/>	
	DuPont Safety Rep:	Brian Ambrose <input type="checkbox"/>	
	Project Manager*:	Randy Palachek <input type="checkbox"/>	
	Project Technical*:	Keith Rankin <input type="checkbox"/>	
	Project Technical*:	Glenn Ulrich <input type="checkbox"/>	
	DuPont Site Rep*:	Keith Thompson <input type="checkbox"/>	
	Site Supervisor*:	Keith Thompson <input type="checkbox"/>	
	Scribe for PSA*:	Dean Frohling <input type="checkbox"/>	
	H&S Professional*:	Greg Ertel <input type="checkbox"/>	
	Contractor Representatives*:	Richard Stock (Stock Drilling) <input type="checkbox"/>	
	Field Team Members:	Keith Thompson and Dean Frohling <input type="checkbox"/>	
	Site Safety Officer:	Keith Thompson <input type="checkbox"/>	
	Grand Calumet Site Manager:	Tyler Lee <input type="checkbox"/>	
Facility Representatives:	Carl Meuleman (Grace Davison) <input type="checkbox"/>		
Are there any Short Service Employees (SSEs) who will be working on this project? An SSE is any partner or contractor personnel with less than 6 months experience in the same job type, with his/her present employer. If so, list the names of SSEs below.	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
Who is serving as the field mentor for those individuals? List names below.			

Background Information			
<p><b>Note:</b> The Background Information, Documentation, and the DuPont Site Representative (DSR) Preparation Checklist pages will be completed PRIOR TO ASSEMBLING PSA team. The Background Information page <u>WILL</u> be discussed during the PSA meeting. The purpose of the Background Information page is to</p> <ul style="list-style-type: none"> <li>• Introduce key project team members,</li> <li>• Verify that adequate and appropriate resources have been assigned, and</li> <li>• Provide a background on the scope of work to facilitate discussion.</li> </ul> <p>The Documentation and DuPont Site Representative (DSR) Preparation Checklist WILL NOT be discussed with the contractor during the call. The purpose of the Documentation and DuPont Site Representative Preparation Checklist are to verify that:</p> <ul style="list-style-type: none"> <li>• The appropriate front end loading of the project has been completed,</li> <li>• Appropriate support documents are in place, and</li> <li>• The assigned DSR is properly equipped and prepared to meet project and Client expectations.</li> </ul>			
<p>Are there specific training or certification requirements to perform the work (i.e., HAZWOPER 40-hour training, heavy equipment operator credentials, forklift training, etc.)? If so, list requirements below.</p>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
<p><b>Brief Summary of the Scope of Work:</b> Mobilization/de-mobilization, staking of sampling locations, utility locate/clearing, clearing and grubbing of sample locations as needed, geoprobe drilling to collect soil samples, hollow stem auger (HSA) drilling for monitoring well installation, HSA drilling for geotechnical sampling (Shelby tubes and split spoons), final survey, well development, low-flow groundwater sampling, and IDW management.</p> <p>All site workers will be 40-hour HAZWOPER trained with current 8-hour refresher. Geologists and technicians will have competency in soil sampling, groundwater sampling, logging/documentation, decontamination, waste management, and drilling oversight. Drillers will have competency in geoprobe direct push and HSA operation, small equipment operation, well installation, decon procedures, and waste management procedures.</p>			

Checklist A					
Physical Hazards					
Item	Subject	No	Yes	If Yes, provide comments	
A	Terrain, Topography		X	Concrete / asphalt with uneven edges, uneven terrain or debris on ground, well stickups, and open manholes. Scout area prior to moving equipment. Use spotters when moving equipment. Mark holes with flagging and make field staff aware of where they are.	
B	Overhead obstructions		X	Active overhead power lines are present in the vicinity of proposed MW-43 near the river. 2300V line approximately 30' above grade and 480V line approximately 17-20' above grade are present. Possibly some small trees to contend with during clearing and grubbing. New electrical service line will be installed during week of 10/14/13. Route will run near the job site trailer and south of the landfill.	
B1	If yes, has an OHOP been prepared?		X	Draft OH Plan has been developed and is being reviewed by team. Open PSA call for Comments on OH electric. For clearing and grubbing, closed cab bobcat, hardhat, safety glasses. Parsons staff and laborers stay clear of equipment during operation.	
C	Underground obstructions (e.g. electric, water, gas, cable)		X	Existing live and abandoned utilities present. Indiana One-Call has been notified by driller. Active Petroleum Pipeline (Explorer) is present near north property line. Active sanitary sewer runs from pump house in middle of site and exits the site to the north. City of East Chicago came out to the site and stated that the line is not theirs (Private locator will mark out in the vicinity of any proposed borings). There is an old nitrogen service line that enters the site from the north. Praxair was contacted, and they stated that the line has been severed, and they will not mark it out (Private locator will mark it out in the vicinity of any proposed borings). Private utility locator will use GPR, EM Induction, and magnetometer to locate known and unknown utilities. Utilities will be mapped. Cleared locations will be flagged or similarly marked as cleared. For established proposed boring locations, the private locator will clear 10' radius around each boring.	

Checklist A Physical Hazards				
Item	Subject	No	Yes	If Yes, provide comments
C1	Will intrusive activities be performed?		X	Direct push and HSA soil borings, monitoring well installation, and geotechnical sampling.
C2	If yes, review Underground Obstructions SOP and complete flowchart.		X	Available site utility maps will be reviewed by consultant, driller, and utility locator. Indiana utility one call will be notified, a dig number will be generated, and public utilities will be marked. Private site utilities in the area of intrusive activities will be located and marked out by private utility locator. Each soil boring will be cleared with a 10-foot radius around each boring. If any of the boring locations are deemed as "high-risk", then the location will be moved.
D	Elevated work (over 5 feet) to be performed?	X		N/A
D1	Has a fall protection plan been developed?			N/A
D2	Has a rescue plan been developed?			N/A
E	Excavation, Trenches	X		N/A
E1	If yes, who is the competent person?			N/A
E2	How will the excavation be sloped/shored/barricaded?			N/A
F	Will heavy equipment be used?		X	Bobcat, mowers, and chain saws for clearing and grubbing work. Geoprobe and hollow stem auger rig for drilling work. All equipment and vehicles will be inspected daily.
F1	Equipment should be inspected under both static and loaded conditions.		X	
G	Traffic (flow and congestion)		X	Work is being performed outside of the active Grace Facility operations; however currently there is an active clean-up project for the Grand Calumet River restoration to be aware of. Observe site traffic flow pattern, following DuPont/Parsons driving SOP/H&S Expectations when performing a visit, engine on - phone off, confirm route prior to mobilization, perform vehicle checks. Be aware of possible limited rail car movement along spur that access the site. Contractors will rally at Parsons' field trailer daily. Use caution around railroad tracks.
G1	If yes, has this been discussed with the contractor?		X	
G2	What requirements will there be for spotters?		X	Spotters will be required anytime vehicles are driven into or backed out of areas with limited visibility/tight spaces. Parsons vehicles are equipped with backup alarms, vehicles not equipped with backup alarms will honk the horn 2X prior to backing up.
H	Slip, Trip, or Fall Potential		X	See "A" and "I" - Trips/Terrain, uneven terrain and weather. Use caution when walking on uneven ground. Weather can cause slips/ trips and falls. Communication is important.
I	Weather (heat, ice and rain)		X	Seek shelter if weather conditions deteriorate. Stop work if thunder/visible lightning is spotted.
I1	Has heat stress or cold stress been identified?		X	Dress appropriately for weather. Take heating/cooling breaks as needed. Monitor fatigue.
J	Rigging, Suspended Loads	X		N/A
J1	If yes, who is the qualified rigger?	X		N/A
K	Confined Space Activity	X		N/A
K1	If yes, has a rescue team been trained and notified?	X		N/A
L	Heat/ignition sources (powered tools, torches, lamps)		X	Hot surface from car/truck heat shield - do not park vehicle in tall grass. Fuel equipment after cool down period. Store fuel cans for equipment within secondary containment. If any hot work is to be performed, a hot work permit must be issued and proper PPE and SOPs must be followed.
M	Explosion potential (static, vapor, storage)		X	Fuel for equipment will be stored in safety cans and in secondary containment.

Checklist A Physical Hazards				
Item	Subject	No	Yes	If Yes, provide comments
N	Is there a potential for a fire?		X	Tall grass present. Possible ignition hazard present with engine and exhaust of field vehicles coming in contact with tall grass. Avoid driving through areas with tall grass. Clear/mow areas if necessary.
O	Rotating Equipment/Moving Parts		X	Rotating and moving parts present with geoprobes, drill rigs, and bobcat. Parsons field staff to stay away from operating field equipment. Only operator and helper with appropriate PPE allowed near operating equipment. Remote controls with kill-switches will be used to move equipment. Geoprobes and drill rig automatically stop when operator releases controls. Communication between geologist and driller must be made with eye contact and hand signals first. Driller will only be approached when it is safe to do so. Drillers will be qualified in the operation of their equipment and provide confirming documentation. All equipment will be inspected daily and documented. Good housekeeping practices will be observed around operating equipment.
O1	Will personnel be exposed to rotating/moving parts?		X	Driller and helper will be in close proximity to rotating augers and moving drill rods.
O2	What additional guards can be installed to minimize exposure?		X	Guards are in place for drilling equipment.
P	Pinch Points		X	Unloading equipment, p/u truck tail gates/closing p/u doors, setting down equipment. Bobcat, geoprobe, and auger rig have pinch points. Parsons field staff to stay clear during operation. Only operator and helper with appropriate PPE allowed near operating equipment.
Q	Drill Rigs		X	Direct push and hollow-stem auger rigs will be present.
Q1	If a drill rig will be used, does the potential exist to encounter flammable/combustible gases (methane, etc.)	X		Primary COCs are inorganic/metals.
Q2	If the answer to Q2 is "yes" specify what type of Combustible Gas Indicator will be used, how often and where the monitoring will take place, and the action limit.	X		N/A
R	Will there be work over / adjacent to water?	X		N/A
S	Will drum handling be performed?		X	Soil drums will be generated from the installation of soil borings/monitoring wells. Groundwater drums will be generated from development of the new monitoring wells. Drums will be moved with bobcat and staged on pallets at a central location for later disposal.  Drums for shipment of Shelby tubes will also be generated. Drums may weigh up to 140-lbs. Shelby tube drums will be packed at the UPS distribution facility then moved by mechanical means by UPS using drum dolly and/or forklift.
T	Are there any noise sources?		X	Noise from bobcat, brush hog, chain saw, drill rigs. Use ear plugs or ear muffs for hearing protection. Drilling operator and helper will wear a combination of ear plugs and muffs during hammer operation. Geologists will maintain safe distance and wear ear plugs during drilling activities.
U	Will there be any use of high pressure water or steam?		X	Pressure wash for equipment decon will not exceed 3000 psi. Wand length must be at least 48". Contractors wear modified Level D (tyvek, splash shield/goggles).
V	What hand safety concerns are associated with the SOW?		X	Pinch points as described in "P", and sharp edges from materials.
V1	What hand PPE is required?		X	Leather or synthetic cut resistant gloves while handling materials/equipment and tools.
V2	Is there special tool(s) to be used to reduce the hazard?		X	Extruder and cutting tool will be used to extract soil sample from lexane tube.
V3	Are additional precautions, techniques, etc. to be used?	X		N/A

Checklist A Physical Hazards				
Item	Subject	No	Yes	If Yes, provide comments
W	What ergonomic concerns are associated with the SOW (i.e., lifting, repetitive motion, materials handling)?		X	Use two person lift when items (ie sample coolers) are greater than 55 lbs. Engineering controls will be used for lifts greater than 80 lbs.
X	What hand or power tools will be used?		X	Drillers: hammer, wrenches, pliers, vice, screw driver, hand saw, liner cutting tool, chain saw, pressure washer. Geologists: tubing cutter, assorted hand tools.
X1	Who will perform initial inspection of hand tools?		X	Lead driller and site safety officer. All users of tools will perform inspections prior to use also.
X2	Who will perform initial inspection of power cords & GFCIs?		X	Lead driller and site safety officer. All users of tools will perform inspections prior to use also.

Checklist B Chemical Hazards				
Item	Subject	No	Yes	If Yes, provide comments
A	Are contaminants present (most recent data)?		X	Arsenic, lead, cadmium, and zinc
B	What are the concentration levels?		X	Highest As concentration in soil detected during the 2009 to 2011 Supplemental CMS Investigations was 55,400 mg/kg. IDEM closure for As is 5.8 mg/kg. The highest concentration of Pb recently detected was 129,000 mg/kg. The IDEM closure for Pb is 230 mg/kg. Highest detected Cd concentration was 1740 mg/kg. The IDEM closure for cadmium is 77 mg/kg. Highest detected concentration of zinc detected at the site was 263,000 mg/kg. The IDEM closure is 10,000 mg/kg. Areas with the highest Pb and As concentrations at the surface and areas of exposed surface soil have been identified. Extra PPE and decon precautions will be taken.
C	Are the contaminants toxic (e.g. carcinogen, mutagen, neurotoxin)?		X	Arsenic and lead are both neurotoxins. Arsenic is also a carcinogen. Cadmium causes liver damage. Zinc is toxic at high enough doses (zinc poisoning).
D	Do routes of exposure include inhalation, ingestion, and dermal absorption?		X	Inhalation, ingestion, dermal.
E	Are there PPE requirements? If yes, what are the levels of protection? Specify Levels A, B, C, D, or modified D below and describe any specific non-typical requirement.		X	Modified Level D PPE (with Tyvek, nitril gloves, safety glasses, steel-toe boots, boot covers).
F	Are there air monitoring requirements?	X		Stop work, if visible dust is present. Perform dust depression around boreholes by moistening surface soil as needed. Perform dust suppression at sample table by moistening soil with spray bottle as needed. During previous site investigations in 2009, 2010, and 2012 dust monitoring was conducted, however all readings well below the action level of >2.5 mg/m <sup>3</sup> of total dust; therefore dust monitoring will not be conducted during drilling activities in Spring 2013.
G	Is there a potential that respirator use will be required to complete this work?	X		During previous site investigation/drilling activities in 2009, 2010, and 2012 dust action levels were not exceeded. If action levels are exceeded, then work will be stopped until dust monitoring indicates it is safe to proceed.
G1	If so, list the names of the individuals who will wear respirators and be prepared to provide documentation of fit tests and medical clearances.	X		N/A
H	Are there products to be used in the execution of the work?		X	DEET biting insect repellent will be applied to pant legs when working in grass. Sun block for sun exposure. Tyvek will be worn in highly vegetated areas to protect against ticks. Alconox soap for decontamination. Gasoline for gasoline powered equipment. Bentonite and silica sand for well installation.
H1	Are Material Safety Data Sheets available and have they been reviewed?		X	MSDS's will be present on-site and reviewed.
H2	Will chemical addition or treatment be performed?	X		N/A
H3	Will the use of any products or materials result in heat generation or off-gassing?	X		N/A
I	Will sample preservatives be prepared in the field?	X		N/A
J	Is there proximity to Site Chemical Operations? If yes, specify the hazards if exposed to these operations.		X	Project area is in close proximity of influent and effluent dredging pipe associated with the Grand Calumet River dredging activities. JF Brennan (project management contractor) has been notified and will comply with providing access to drilling locations blocked by dredge pipe.
K	Are area orientations required?		X	Additional site orientation will be provided by the DSR (Keith Thompson).
L	Are additional permits/notifications required?	X		No permits required with Grace Davison. We will issue our own DuPont Daily Work Permit and ground disturbance permit.



Checklist C Other Hazards				
Item	Subject	No	Yes	If Yes, provide comments
<b>Driving</b>				
A	Will transportation involve personal, rental or company car? If yes, be specific as to type of car.		X	Parsons company truck, personal vehicles and rental vehicles. Drivers will familiarize themselves with vehicles prior to operation. 15 mph on site speed limit.
A1	Are drivers familiar with vehicle to be used (e.g., brakes, mirrors, lights, small vs. large vs. SUV)?		X	Yes. Drivers to familiarize themselves with vehicles prior to use.
A2	Will equipment / cargo be transported in the backs of vehicles being used by the project team?		X	All cargo will be safely packed, stowed, and secured during transportation.
A3	Are directions to the site available?		X	Map directions downloaded, address information has been provided to all workers routes discussed before mobilization to lunch.
A4	Is the vehicle in good condition, inspection current, and well maintained (tires, windshield wipers and fluid, brakes, etc.)?		X	Vehicles are in safe working condition, have safety equipment, Parsons vehicles are inspected daily.
<b>Site Access Requirements</b>				
B	Are there any special security requirements for work at the site (i.e., Homeland Security)?	X		N/A
B1	Is Maritime Security Act training required?	X		N/A
B2	Are security background checks required for site entry?		X	Documentation is required.
B3	Is substance abuse testing required?		X	Documentation is required.
B4	Is local Area Safety Council Training required?	X		N/A
<b>Project Audits</b>				
C	What is the audit requirement for this project based on project duration (< or > 2 weeks)?		X	<input checked="" type="checkbox"/> Self Audit <input checked="" type="checkbox"/> Scheduled Audits One safety audit per week.
C1	Who will develop the required audit schedule?		X	Parsons PM and DSR.
<b>Biological Hazards</b>				
D	Are there biological hazards present (e.g., poisonous plants, vectors, wild animals, snakes, ticks, bees)?		X	Insects/Animals: Presence of ticks/snakes, deer, feral animals (raccoons, opossums) in area. Animals will be avoided. Mosquitoes are present in area. Bees/Wasps are a problem with stickup wells and ground nests. Snakes are present. Snake chaps should be worn in and around wetland areas. If wells need to be opened, they will be opened very slowly and if bees/wasps are present the well will not be accessed. Be aware of anyone on site with allergy concerns. Plants - poison ivy has not been observed during previous site work, but workers should still be aware of its potential to exist on the site.
<b>Communications</b>				
E	Have adequate means of communication been established (cell phones, plant radios, etc.)?		X	Cell phones.
E1	Means of communication with facility?		X	Cell phone communication with Grace security.
E2	Means of communication between field team members?		X	Cell phones.
E3	Have cell phone numbers been exchanged as appropriate?		X	All team members will have contacts programmed in their phones.
<b>Buddy System</b>				
F	If there are circumstances where individuals must work alone?	X		Buddy system will be used.

Checklist C Other Hazards				
Item	Subject	No	Yes	If Yes, provide comments
F1	Has a buddy system been developed for the work?		X	Buddy system will be used.
F2	Have adequate provisions regarding check in and communication been made to assure individual safety?			N/A
<b>Other Hazards</b>				
G	Are there any other hazards applicable to the fieldwork being performed?		X	Always the possibility of other hazards being present, they will be identified in the field, documented and mitigated as necessary. Tools for identification include training, field experience, and MOC procedure if necessary.
<b>Management of Change</b>				
H	Do all parties understand the importance of and the process to identify and/or manage changing field conditions?		X	Always the possibility of changing conditions. They will be identified in the field, documented and mitigated as necessary. Tools for identification include training, field experience, and MOC procedure if necessary.
<b>Unexpected Occurrences</b>				
I	Do all parties understand the definition of an Unexpected Occurrence and are they familiar with the expected reporting and investigation process?		X	The UO procedure will be communicated to all staff and a hard copy will be posted in the job-site trailer.

Checklist D				
Project Security Planning				
Note: This section may be omitted if deemed unnecessary by the Project Team				
Item	Subject	No	Yes	If Yes, provide comments
A	Is this project located in an area where the personal security of the field team may be a concern? (Refer to current DuPont travel restrictions)	X		N/A
A1	Is it necessary to have a stand alone Project Security Plan developed?	X		N/A
B	Have project personnel exchanged contact information (phone numbers)?	X		N/A
B1	Has Emergency Contact information (back home) been exchanged?	X		N/A
C	Have preferred and varied travel routes travel to and from the site/hotel etc. been identified and communicated	X		N/A
C1	Have areas to be avoided been identified (seek guidance from regional Security Manager)	X		N/A

Checklist E				
Non Regulated Process Hazards				
Note: This section to be completed if a non-regulated process is involved.				
Item	Subject	No	Yes	If Yes, provide comments
A	Is there an O&M Manual?	X		N/A
A1	Does it address requirements such as safety interlock/valve inspection frequency?	X		N/A
B	Pipe code and classification	X		N/A
B1	Are materials of construction consistent throughout?	X		N/A
B2	Are valves and sample ports easily accessible?	X		N/A
B3	Are valves and joints adequately supported?	X		N/A
C	Electrical classification and codes	X		N/A
D	Are there lockout/tagout requirements (electrical, mechanical, hydraulic, and pneumatic)?	X		N/A

Checklist F				
Process Safety Hazards				
Note: This section only applies if the project involves a process that is covered by 29 CFR 1910.119. If so, then a formal Process Hazards Assessment (PHA) must be conducted.				
Item	Subject	No	Yes	If Yes, provide comments
A	Highly Hazardous Chemicals as determined by 1910.119	X		N/A
B	Steam Processes	X		N/A
C	High Pressure >3000 psi	X		N/A
D	Heat Generation	X		N/A
E	Chemical Addition	X		N/A
F	Management of Change	X		N/A

Documentation				
(These sections are not to be covered during the PSA but are a planning tool to be used by the PD/PM/DSR for project planning & preparation.)				
Item	Subject	No	Yes	If Yes, provide comments
HASP				
A1	Is the HASP current for the scope of work? Provide date and title of HASP in the comments section.		X	HASP Title: Health and Safety Plan DuPont East Chicago Site - October 2013
A2	Is there a HASP addendum that addresses the scope of work? Provide date, number, and title of Addendum in the comments section.	X		N/A
A3	Has a copy of the pertinent document(s) been made available to the project team?		X	HASP Received: Electronic and hard copies were made available to the project team
Scope of Work				
B1	Is there a written scope of work for the project? Provide date and title of document.		X	SOW Title: Treatability Study Work Plan for In-Situ Arsenic Fixation: Bench Scale Study and Pilot Study October 2013
B2	Has a copy of the scope of work been made available to key project members?		X	SOW Reviewed: Randy Palachek, Keith Thompson, Dean Frohling - Parsons and Richard Stock - Stock Drilling
Waste Management Plan				
C1	Is the waste management plan current for said activities? If yes, list date and title of WMP.		X	WMP Title: Project-Specific Waste Management Plan for Soil and Groundwater Sampling. Revised Supplemental Corrective Measures Study Investigation Work Plan - September 2009
C2	Has the WMP been reviewed by a member of the WM Network and the field team? If yes, list the names of the individuals.		X	WMP Reviewed: Keith Thompson and Randy Palachek - Parsons, Lance Holman - URS

Variance	
Supply justification for not completing geophysical survey in accordance with CRG SHE Procedure for Underground Obstruction.	
Justification	
PD Signature	
PM Signature	
Date	

## DSR Preparation Checklist

Instructions: To be completed by PM and DSR prior to mobilization as part of the front-end loading process. Note: The DSR is the individual on site who represents DuPont. While the DSR's responsibilities may vary by project, a basic understanding of the following items is required on all projects, regardless of the DSR's project-specific responsibilities (e.g. Site Supervisor, Site Safety Officer, Construction Manager, Sampler).

Check the box (place an X in the Item field) once the item is discussed.	
Item	
X	Review project goals and objectives with DSR and how current scope fits in with overall project
X	Permit requirements related to the work (e.g. federal, state, local, E&S, plant, internal)
X	Technical Specifications/Drawings/Work Plan
X	Contract-type (lump sum, unit price, or T&M) and how they relate to field management responsibilities
X	Contract administration (responsibility as a "Receiver" in the Buy/Release, Receive, Pay process, Cost Tracking, Progress Meetings, Meeting Minutes, etc.)
X	Health and Safety Plan
X	Waste Management Plan
X	Fieldwork Documentation Requirements
	Communication 1. Lines of Communication within the Project Team (CRG, plant, contractor, subcontractors) 2. How to address regulatory visits/questions if they arise 3. How to address Community issues/visits/questions if they arise

Together, we have thoroughly reviewed the project related information and requirements listed above for the project:

Site Name	DuPont - East Chicago
Project/Task	Additional Soil and Groundwater Data Collection (Soil borings, well installation, soil sampling, groundwater sampling)
Project Manager	
DSR(s)	
Date	

**DRILLING  
SAFETY HANDBOOK**

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## 1.0 PRE-FIELDWORK

It is very difficult to predict all problems that may occur during drilling fieldwork activities. However, if pre-fieldwork preparations are completed thoroughly, the job will likely proceed more safely and smoothly (i.e., with less down time). This section lists some important safety items that should be performed/considered prior to initiation of actual fieldwork. The DuPont Corporate Remediation Group (CRG) personnel (or CRG representative) should review this list and determine if other pre-fieldwork activities are necessary.

- Ensure that all items are completed on the Pre-fieldwork Checklist.
- A copy of all maps showing underground equipment, lines, or hazards must be attached or accompany the excavation permit.
- Check with utility one-call service before excavating or drilling.
- Visually inspect each location in the field for underground utilities.
- Drafting maps should be checked for utilities.
- Review a site map with a plant representative (on DuPont plants this should be second layer maintenance) familiar with layout of underground hazards.
- Determine if surveying is needed to locate underground hazards.
- Obtain work permits from the plant area work supervisor.
- Obtain an excavation permit from the appropriate supervisor. Any changes in job scope will require detailed review and reissuance of the excavation permit. The excavation permit clears the excavation only.
- Markers, flags, or painted lines, etc., should be used to identify excavation boundaries and locations, or hazards beyond which excavation must not exceed.
- All dimensions, elevations, and coordinates should be viewed as approximate locations of buried equipment, lines, etc. Elevations may change due to erosion or the addition of fill. Buried cables have been found three to five feet on either side of buried protective boards and markers.
- If buried equipment, lines, etc., exist within 10 feet on either side of the excavation, these should be considered in the excavation area.
- A conscious decision should be made on whether or not to de-energize underground cables within 10 feet (overhead cables within 20 feet) of the excavation prior to excavation.
- A signal generator and portable receiver can be used to roughly locate buried underground utility lines that are made of metal. Plants usually have this equipment; otherwise, check with CRG Field Services.
- If the location of a utility line is unclear, the local utility company should be contacted for clarification of line location.



- ❑ Prior to beginning excavation, probing or hand augering to a depth of five feet is recommended. Probing and hand augering should be performed such that the area to be excavated is within the radius of the investigation.
- ❑ Excavating around process lines requires extreme caution. If any unusual odors or other signs indicating leakage are observed, the job should be shut down immediately and area supervision notified. Air quality checks must be performed to ensure adequate personnel protection is provided. Whenever possible, process lines should be depressurized before excavating.

## 2.0 MOBILIZATION

The following are safe guidelines related to on- and off-road movement of drilling equipment. Prior to mobilizing or demobilizing drilling equipment, responsible individuals should consider the following:

- Inspect the rig, using the Drilling Equipment Checklist.
- Before moving any equipment, first walk the route of travel with driller, inspecting for depressions, slumps, gullies, ruts, and similar obstacles. The drill site also should be inspected for debris, plant, and animal hazards. It also should be determined if the ground is suitable for heavy equipment travel.
- Make sure bystanders and passengers are clear of equipment.
- After equipment has been moved to a new drilling site, set all brakes and/or locks. When grades are steep, block the wheels.
- Use caution when traveling on steep grades. Conservatively evaluate side-hill capability of equipment movement. Arbitrary addition of drilling tools may raise the center of mass. When possible, travel directly uphill or downhill.
- When moving up a steep grade or slope, anchor a winch line from the vehicle to a suitable object at the top of the slope.
- Attempt to cross obstacles such as small logs and small erosion channel or ditches squarely, not at an angle.
- Use the assistance of someone on the ground as a guide when lateral or overhead clearance is restricted, or when setting the drill rig on location.
- Never travel with the mast (derrick) of the drill rig in the raised or partially raised position.
- Do not raise the mast or operate the drill rig if this distance to overhead powerlines is less than 20 feet. In general, distance between the overhead power line and boom should be no less than the height of the boom. Remember to "Look Up and Live."
- Keep in mind that both hoist lines and overhead powerlines can be moved toward each other by the wind. If strong winds are present, consider having the utility company (or plant) cover the overhead power lines.
- Prior to drilling, adequate site cleaning and leveling should be performed to accommodate the drilling rig and equipment. This provides a safe, obstacle-free working area. Drilling should not commence when tree limbs, protruding objects, unstable ground, site obstructions, or debris may cause unsafe work conditions and/or limited, awkward work spaces. An area clear of obstructions or debris should be maintained around the drilling or support activities at all times.
- Never leave equipment idling and unattended, especially on any incline or on loose material; the vibration may put the machine in motion.

### 3.0 EQUIPMENT DECONTAMINATION

Due to the presence of water, heat, pressure, and heavy equipment, decontamination activities can be very dangerous. The following are safety items to be considered during equipment decontamination:

- Obtain flame permit where required for the steam cleaner.
- Follow equipment decontamination procedures outlined in the Health and Safety Plan (HASP) or Project Work Plan.
- Chock wheels of equipment/supply trailer prior to beginning work.
- Use face shield, *Tyvek*<sup>®</sup>, and gloves, boots, etc., to prevent physical contact with potential contaminants and debris.
- Check hose for possible weakness or potential break points prior to use.
- Do not point wand toward body when in use.
- Use anti-freeze (windshield washer type) in cold weather to prevent water from freezing inside equipment.
- Regarding access/egress, safe footing, lifting hazards, slipping on plastic should be considered as potential hazards, especially inside the decontamination area.
- Beware of burrs and sharp edges when moving augers and drilling equipment.
- Practice good housekeeping at all times.
- Be aware of heat and hot water from steam cleaner.

## 4.0 SET-UP AND START-UP

### 4.1 Set-up

This information should be reviewed prior to set-up activities at each drilling location:

- If required, a barricade should be set up after defining the exclusion zone.
- When drilling near suspected underground electrical hazards, the rig should be grounded with a ground wire attached to a ground rod.
- All brakes must be set before drilling begins. If the rig is positioned on a steep grade and leveling of ground is impossible or impractical, the wheel of the transport vehicle should be blocked and other means employed to prevent the rig from moving or tipping over (e.g., level jacks on rig).
- Use sufficient blocking under rig jacks to prevent sinking.
- Inspect pulley sheaves for wear and cable/rope positioning.
- Work to be done above three feet on the mast requires the use of a safety harness, or the mast must be lowered.
- Before lifting a relatively heavy object, approach the object by bending at the knees, keeping your back vertical and unarched while obtaining a firm footing. Grasp the object firmly with both hands and stand slowly and squarely while keeping your back vertical and unarched. In other words, perform lifting with muscles in your legs, not muscles in your lower back. If the object is in excess of 50 pounds, request assistance.

### 4.2 Start-up

After drill set-up, the following safety items should be observed:

- All personnel should know location and use of kill switch.
- Identify potential pinch points and hazards which could injure fingers and toes.
- All drilling rig personnel and visitors should be instructed to “stand clear” of the drilling rig immediately prior to and during starting of an engine.
- Make sure all gear boxes are in neutral, all hoist levers are disengaged, all hydraulic levers are in the correct non-actuating positions, and the cathead rope is not on the cathead before starting a drilling rig engine.
- Raise the derrick a few inches in order to check the brakes and always check for overhead power lines.
- Secure and/or lock the mast in upright position if required, according to the drilling manufacturer's recommendations.
- Place the fire extinguisher in an easily accessible location away from the drilling rig.

## 5.0 DRILLING

This section concerns rotating equipment, catheads, wire ropes, and hoists (the part of the drilling rig which may cause serious injuries), and drilling techniques most commonly used during auger and rotary drilling:

- Only personnel necessary to achieve drilling objectives should remain within the exclusion zone. All others should remain outside the exclusion zone.
- Drilling personnel should not wear clothing that may be awkward or loose and get caught in rotating equipment.
- Wear protective gloves when handling augers, cable, rods, or any sharp or splintery materials.
- Proper gloves (see HASP) should always be worn when handling materials which can irritate or contaminate skin.
- When appropriate, noise protection must be worn by employees who are working when drilling equipment is operating.
- Effective communication (hand signals, etc.), especially under high noise conditions, is essential to safety. Clarify use of hand signals.
- Use tools only for the job for which they were intended.
- Do not perform maintenance or refueling while equipment is running.
- Stay clear of cables while lifting equipment or while drilling rig is under heavy strain.
- Do not operate the drilling rig in an electrical (lightening) storm. If drilling when a storm approaches, stop drilling and lower the mast, if possible. Do not stay near drilling rig if the mast cannot be lowered.
- When removing drilling string from borehole, the rod string should not exceed 1.5 times the height of the mast.
- Do not ride on hook, ropes, or other traveling lines of the rig.
- Do not climb the rig mast while equipment is running. Shut down equipment and use safety harness if climbing mast, is necessary.
- When moving or hoisting stabilizers or drill collars, tag lines should always be used. A helper should not use his hands to hold or control heavy equipment. Instead, he should loop a rope around it and hold onto both ends of the rope.
- The operator of a drilling rig should only operate the rig from the position of the controls. The operator should shut down the drilling engine before leaving the vicinity of the drilling rig.
- All hydraulic lines should be inspected periodically for integrity, and replaced as needed.
- Drilling should always proceed cautiously, especially at depths less than ten feet.

- Operation of drilling equipment should be limited to qualified personnel.

## 5.1 Auger Drilling

Auger drilling uses direct power to rotate (screw) flighted augers into the ground. Be aware of the following hazards which may be unique to this type of drilling:

- Only use the manufacturer's recommended method of securing the auger to the drill drive coupling. Do not touch the coupling or the auger with your hands, a wrench, or any other tools during rotation.
- Whenever possible, use tool hoists to handle auger sections.
- Never place hands or fingers under the bottom of an auger section when hoisting the auger over the top of the auger section in the ground, or over other hard surfaces such as the drilling rig platform.
- Never allow feet to get under the auger section that is being hoisted.
- When rotating augers, stay clear of the rotating augers and other rotating components of the drilling rig. Never reach behind or around a rotating auger for any reason whatsoever.
- Never place your hands between the drill rig and an auger, even when attempting to free damaged or bound sampling equipment from the auger.
- Never use your hands or feet to move cuttings away from the auger.
- Augers should be cleaned only when the drill rig is in neutral and the augers have stopped rotating.
- Care should be taken to ensure augers are properly stored and secured when not in use and during transport.

## 5.2 Rotary Drilling

Mud rotary is direct rotary drilling using mud slurry circulation to remove cuttings and keep the borehole wall stabilized. Be aware of the following hazards which may be unique to this type of drilling:

- Lifting heavy equipment (i.e., drill rods, etc.);
- Rotating equipment/parts; and
- Slippery or dangerous work areas caused by messy mud pits or troughs (could fall in); keep area clear.

Air rotary is direct rotary drilling using high pressure air circulation to remove cuttings and keep the bit cool. Be aware of the following hazards which may be unique to this type of drilling:

- Rotating/lifting equipment;
- High pressure air lines;
- Air discharge of cuttings at high velocity; use a cover to control discharge of cuttings;
- Heavy drill rods being lifted;
- Very loud; wear hearing protection;
- Large drill rig and support vehicle (space limitations); and
- Dust generation in dry formations; move upwind and use a cover for dust control.

Listed below are general rotary (air and mud) drilling hazards:

- Drill rods should not be braked during lowering into the hole with drill rod chuck jaws.
- Drill rods should not be held or lowered into the hole with pipe wrenches.
- If a string of drill rods is accidentally or inadvertently released into the hole, do not attempt to grab the falling rods with your hands or a wrench.
- In the event of a plugged bit or other circulation blockage, high pressure in the piping and hose between the pump and the obstruction should be relieved or bled down before breaking the first tool joint.
- When drill rods are hoisted from the hole, they should be cleaned for safe handling with a rubber or other suitable rod wiper. Do not use your unprotected hands to clean drilling fluids from drill rods.
- If work must progress over a portable drilling fluids (mud) pit, do not attempt to stand on narrow sides or cross members. The mud pit should be equipped with a rough surface and/or cover panels of adequate strength to hold drilling rig personnel.
- Drill rods should not be lifted and leaned unsecured against the mast. Either provide some method of securing the upper ends of the drill rod sections for safe vertical storage or lay down the rods.

### **5.3 Cathead**

Listed below are guidelines regarding cathead operation:

- Only drilling personnel familiar with cathead operation should be allowed to operate equipment. Keep the cathead clean and free of rust and oil and/or grease. The cathead should be cleaned with a wire brush if it becomes rusty.

- The cathead operator must operate the cathead while standing on a level surface with good, firm footing conditions, without distraction or disturbance.
- Always use a clean, dry, sound rope. A wet or oily rope may "grab" the cathead and cause drill tools or other items to be rapidly hoisted to the top of the mast. Do not operate the cathead in rain.
- Never wrap the rope from the cathead (or any other rope, wire rope, or cable on the drilling rig) around a hand, wrist, arm, foot, ankle, leg, or any other part of your body.
- Always maintain a minimum of 18 inches (driving spoon length) clearance between the operating hand and the cathead drum when driving samplers, casing, or other tools with the cathead.
- Do not use a rope that is longer than necessary. A rope that is too long can form a ground loop or otherwise become entangled with the operator's legs.
- Do not use more rope wraps than are required to hoist a load.
- Do not leave a cathead unattended with the rope wrapped on the drum.
- Position all other hoist lines to prevent contact with the operating cathead rope.
- When using the cathead and rope for driving or back-driving, make sure that all threaded pipe connections are tight and stay as far as possible from the hammer impact point.
- When stuck tools or similar loads cannot be raised with a hoist, disconnect the hoist line and connect the stuck tools directly to the feed mechanism of the drill. Do not use hydraulic leveling jacks for added pull to the hoist line or the feed mechanism of the drill.
- Should the rope "grab" the cathead or otherwise become tangled in the drum, do not attempt to release the rope. Instead, sound an appropriate alarm for all personnel to rapidly back away and stay clear. The operator should also back away and stay clear. If the rope "grabs" the cathead, and tools are hoisted to the sheaves at the top of the mast, the rope often will break, releasing the tools. If the rope does not break, stay clear of the drilling rig until the operator cautiously returns to turn off the drilling rig engine and appropriate action is taken to release the tools. The operator should keep careful watch on the suspended tools and should quickly back away after turning off the engine.



## 5.4 Wire Ropes and Hoists

Listed below are guidelines regarding wire ropes and hoists:

- Replace damaged safety latches on safety hooks before using.
- Always wear the appropriate gloves when handling wire ropes.
- Minimize shock loading on wire rope; apply loads smoothly and steadily.
- Protect wire rope from sharp corners or edges.
- Do not guide wire ropes onto cable drum with your hands.
- Never leave a load suspended in the air when the hoist is unattended.
- Keep your hands away from hoist, wire rope, hoisting hooks, sheaves, and pinch points as slack is being taken up and when the load is being hoisted.
- Never hoist the load over the head, body, or feet of any person.

## 6.0 WELL CONSTRUCTION AND GENERAL HOUSEKEEPING

This section presents safety items around well construction, and general housekeeping. The following safety items should be observed:

- Before lifting a relatively heavy object, approach the object by bending at the knees, keeping your back vertical and unarched while obtaining a firm footing. Grasp the object firmly with both hands and stand slowly and squarely while keeping your back vertical and unarched. In other words, perform lifting with muscles in your legs, not muscles in your lower back. If the object is in excess of 50 pounds, request assistance.
- Wastewater and drilling fluids must be properly contained and labeled. Refer to the project Waste Management Plan.
- Suitable storage locations should be provided for all tools, materials, and supplies so that they can be conveniently and safely handled without falling on a member of the drill crew or a visitor, without creating tripping hazards, and without protruding at eye or head level.
- Avoid storing or transporting tools, materials, or supplies within or on the mast (derrick) of the drill rig.
- Pipe, drill rods, bit casings, augers, and similar drilling tools should be stacked in an orderly manner on racks or sills to prevent spreading, rolling, or sliding and should be secured prior to moving equipment.
- Work areas, platforms, walkways, scaffolding, and other accesses should be kept free of materials, obstructions, and substances such as ice, water, mud, excess grease, or oil that could cause a surface to become slick or otherwise hazardous. The use of additional footing safeguards (mats) should be evaluated on a case-by-case basis.
- Keep all controls, control linkages, warning, and operation lights and lenses free of oil, grease, or other substances which would decrease safe handling.
- Do not store gasoline in any portable container other than that specifically designed for the intended purpose.
- Welding gas cylinders should be stored in an upright and secured position. Protective caps should be in place when the cylinders are not in use.
- All unattended boreholes must be adequately covered or otherwise protected to prevent personnel, site visitors, or animals from falling into the hole. All open boreholes should be covered, protected, or back filled adequately and according to local and state regulations upon completion of the drilling project.
- Do not tolerate unprofessional conduct ("horse play") on the job site.

## 7.0 RIGGING DOWN AND DEMOBILIZATION

This section presents safe guidelines when rigging down at a drilling location, or demobilizing for the end of a project. The drill crew may be tired after a long field day, or in a rush to pack up and leave the site. Individuals are often less aware of their surroundings when either fatigued or in haste; which can often lead to an accident. Guidelines are listed below:

- Safety issues are similar to those in Mobilization (Section 2.0) and Set-up (Section 4.0).
- Remind crew to slow down and work safely when rigging down and demobilizing. Many injuries occur at the end of the day. Develop a safety attitude. Allow time to break down equipment.
- Review the day's activities and ensure everything is in order (e.g., field notes).
- Secure site.

**APPENDIX D  
USING LAWN MOWERS, WEED CUTTERS AND CHAIN  
SAWS**



## B-42.1

# Lawn Mowers, Weed Cutters, and Chain Saws

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### 1.0 Scope

This procedure explains how to inspect and safely operate lawn mowers, weed cutters (with string blades or other attachments), and chain saws. This procedure does not cover riding lawn mowers (see FCSM Procedure C-8.1).

### 2.0 Definitions

**Dead Man Switch (Interlock)** – A switch that de-activates or de-energizes equipment when the operator releases his or her grip on the controls or when the operator leaves the equipment.

**Engineer** – The person who requests the work and is responsible for the safety, quality, and timing of the work requested.

**Kick-back** – An action occurring when the chain of a chain saw is caught by the material being cut, causing the chain saw to jerk back towards the operator.

**Push Pole** – A piece of lumber or a tree limb that has a notch or fork, used to push against a small tree to force the tree to fall in a certain direction.

**Qualified Inspector** – An experienced craftsperson that has received training and demonstrated competency to inspect a specific piece of equipment.

### 3.0 General

Before operating this equipment, manufacturers' manuals and operating instructions must be reviewed.

#### 3.1 Inspection

A qualified inspector shall inspect all lawn mowers, weed cutters, and chain saws prior to their use on site at a regularly scheduled interval. At a minimum, the inspection should include the following:

- Checking the fuel system for leaks which can develop frequently due to vibration. (If leaks are found, the equipment must be repaired or removed from use.)

- Checking all equipment to ensure it is equipped with a dead man switch (interlock), which must be in good working condition. (Any tool with a defective interlock must be repaired or removed from use.)
- Checking the mechanical components of the equipment for wear and stability. (Mechanical parts such as mower blades, weed cutter heads, and chain saw cutting chains, if worn or unstable, could become projectiles during operation.)

#### 3.2 Operator Qualifications

The operator must understand the safety features of the equipment and know how to properly operate it according to the manufacturer's operating instructions. Minimum training requirements would include reading and understanding the operating manual for the equipment to be used. The qualified inspector must verify that the operator of the equipment has the proper qualifications.

#### 3.3 Protective Equipment

Operators of lawn mowers shall wear safety glasses, steel-toe shoes, and shin protectors/ leg protection (shin protectors/leg protectors are not required if guards are in place).

Operators of weed cutters shall wear safety glasses, steel-toe shoes, shin protectors/leg protection, work gloves, and a full-face shield.

Operators of chain saws shall wear safety glasses, steel-toe shoes, Kevlar® chaps and jackets, work gloves, and a full-face shield. For more information on use, issue, or purchase of personal protective equipment (PPE), see FCSM F-1.1 and F-2.1.

Lawn mowers, weed cutters, and chain saws often generate a high level of noise. The safety specialist, foreman, supervisor, or designee must take noise level samples and provide an appropriate hearing protection program, including a periodic audit for compliance with the program. In lieu of taking noise level samples, hearing protection can be used at all times

# B-42.1 Lawn Mowers, Weed Cutters, and Chain Saws

when operating this equipment. For more information on hearing protection, see FCSM E-6.1.

The safety specialist and engineer should review the types of PPE worn while operating lawn mowers, weed cutters, and chain saws to ensure that they provide adequate protection. Any additions or deletions of the requirements for PPE must be reviewed for approval.

## 3.4 Planning the Work and Operating the Equipment

While planning and administering the work, the operator must do the following at a minimum:

- Review the work area to identify any hazards, and provide a verbal or written plan for executing the work. Possible hazards include steep banks, exposed electrical lines at ground level, and loose gravel in grassy areas. The operator shall also be aware of bystanders and passersby that could potentially be struck by projectiles from the equipment.
- Involve the site DuPont electrical lead in planning the use of equipment around substations, exposed cables, lines, and other types of electrical equipment.
- Consider flammable and explosive environmental classifications before using the equipment in a plant area. For more information on classifications, see FCSM A-21.1.
- Avoid assigning individuals to work alone in remote areas. If an individual must work alone in a remote area, the site must have a procedure in place to deal with communications, transportation, and immediate first-aid treatment for this person.

At a minimum, operators and mechanics must adhere to the following guidelines while operating and maintaining lawn mowers, weed cutters, and chain saws. These guidelines should also be considered while planning work involving this type of equipment:

- Do not remove or bypass interlocks or any other safety mechanisms or devices to run the equipment.
- Check the work area for debris, obstacles, or hazards that may have been placed in the work area since the last activity. The area must also be free from natural hazards such as snakes, wasp nests, and hornet nests.

- Because lawn mowers, weed cutters, and chain saws are fueled by flammable/combustible liquids or gases, have a fire extinguisher present while refueling the equipment.
- Shut off the equipment and allow it to cool before refueling it. Use funnels or extended nozzles to avoid spilling fuel onto the equipment.

**3.4.1 Lawn Mowers** – Operators should take the following minimum safety precautions while operating lawn mowers:

- Do not use lawn mowers on steep inclines, drainage ditches, or areas where the mower may overturn or roll back on the operator.
- Keep other personnel a minimum of 25 feet (7.5 meters) away from a mower while it is running.
- Do not put your hands or feet anywhere on a mower while it is running, other than on the surfaces designed for operating the mower. (This precaution also applies to mechanics.)
- If the operator pulls the mower towards him/her, a potential is created for pulling the rotating blades into the feet of the operator especially in the event the operator slips and the operator continues to grasp the handle of the mower. This is more likely to happen if the grass is wet or if cutting on a hill.

**3.4.2 Weed Cutters** – Operators should take the following minimum safety precautions while operating weed cutters:

- Be careful when using weed cutters close to objects subject to damage, because the cutting radius of a weed cutter is difficult to determine and maintain during operation. An object may be damaged or become airborne if the weed cutter contacts it.
- Do not operate weed cutters closer than 25 feet (7.5 meters) to other personnel or in restrictive spaces.

**3.4.3 Chain Saws** – Operators should take the following minimum safety precautions while operating chain saws:

- Before cutting the material, inspect and clear it of foreign objects such as nails, wire, and rocks.
- Keep other personnel (other than those assisting in felling the object) at least 10 feet (3 meters) away from a chain saw while it is being used, or outside

# **B-42.1 Lawn Mowers, Weed Cutters, and Chain Saws**

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the radius equal to the height or length of the object to be cut, whichever is more restrictive. Use ropes or push poles to allow assisting personnel to control the direction of fall of the cut object.

- Do not use the tip of a chain saw for cutting or allow it to touch inadvertently a limb that is not being cut.
- To avoid kick back, be extremely cautious when cutting small limbs.

## **4.0 References**

FCSM A-21.1, *Planning Work in Plant Areas*

FCSM C-8.1, *Farm Tractors and Maintenance and Landscaping Equipment*

FCSM E-6.1, *Noise Measurement and Hearing Conservation*

FCSM F-1.1, *Personal Protective Equipment*

FCSM F-2.1, *Eye and Face Protection*

# APPENDIX E HEAT AND COLD EXPOSURE



## HEAT EXPOSURE

Heat stress may pose a threat to the health and safety of site personnel based on the season of the year. Depending on the relative humidity, temperatures may create heat stress conditions, particularly when working in chemical-protective equipment. This section discusses heat-related health hazards and details DuPont Corporate Remediation Group's (CRG) heat stress program, which has been used successfully.

### Heat Stress

Heat stress is a major hazard, especially for workers wearing protective clothing. Depending on the ambient conditions and the work being performed, heat stress can occur very rapidly—within as little as 15 minutes. The key to preventing excessive heat stress is to educate personnel on the hazards associated with working in heat and the benefits of implementing proper controls and work practices.

### Heat Rash

Heat rash (prickly heat) may result from continuous exposure to heat or humid air where the skin remains wet due to lack of evaporation, sweat ducts become clogged, and a skin rash appears. This uncomfortable rash can be prevented by resting in a cool place during breaks and by practicing good daily personal hygiene.

### Heat Cramps

Heat cramps are muscular spasms that usually occur in the abdomen or limbs due to a loss of salt from profuse sweating. Drinking large quantities of water tends to dilute the body's fluids, while the body continues to lose salt.

- o First Aid
  - Apply warm, moist heat and pressure to reduce pain.
  - Give electrolyte drinks by mouth (e.g., *Gatorade*<sup>®</sup>).

## Heat Exhaustion

Caution: Persons with heart problems or on a low-sodium diet who work in hot environments should consult a physician about what to do under these conditions.

Heat exhaustion is a result of overexertion in hot or warm weather. It is highly possible for an on-site worker to experience heat exhaustion due to the use of protective coveralls, boots, gloves, and respiratory protection, even if ambient temperatures are mild.

- o *Symptoms*
  - Pale, clammy skin
  - Profuse perspiration
  - Weakness
  - Headache
  - Nausea
- o *First Aid*
  - Get victim into the shade or to a cooler place.
  - Immediately remove any protective clothing.
  - Encourage victim to drink plenty of fluids.
  - Make victim lie down with feet raised.
  - Fan and cool victim with wet compress.
  - Transport victim to the hospital if vomiting occurs.
  - Instruct victim to rest for a few days.
- o *Prevention*
  - If possible, schedule work for early morning or evening during warm weather.
  - Have cool liquids at the Exclusion Zone border for down-range personnel to continuously replace body fluids.
  - The SSO or alternate should continually monitor personnel for signs of heat stress.

## **Heat Stroke**

The body's temperature control system, which causes sweating, stops functioning correctly in the case of heat stroke. Brain damage and death may occur if the body core temperature is extremely elevated and is not reduced.

- o *Symptoms*

- Flushed, hot, dry skin
- High body core temperature (greater than 105°F)
- Dizziness
- Nausea
- Headache
- Rapid pulse
- Unconsciousness

- o *First Aid*

Immediately take precautions to cool the body core temperature by removing clothing and sponging the body with alcohol or cool water, or by placing the victim in a tub of cold water until his or her body temperature is reduced sufficiently (102°F). Stop cooling and observe the victim for 10 minutes. Once the temperature is controlled at a low enough level, dry the person off. Use fans or air conditioning, if available. Do not give the victim stimulants. Transfer to a medical facility.

## **Heat Stress Program**

The heat stress program includes work and rest regimens employed as necessary so that personnel do not suffer adverse effects from heat stress. The SSO is responsible for monitoring heat stress throughout the day. Based on heat stress severity, the SSO will determine to what extent the elements of the heat stress program will be implemented.

Special clothing and an appropriate diet and fluid intake will be recommended to all site personnel to reduce the chance of heat-related hazards. The work and rest regimens followed by CRG were developed based on the current American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV) guidelines and on National Institute of Occupational Safety and Health (NIOSH) recommendations.

## Work Load

The following table will be used as a guide for establishing initial work and rest regimens. It takes into account TLV wet-bulb globe temperature (WBGT) correction factors for clothing.

Work/Rest Regimen	Work Load		
	Light	Medium	Heavy
Continuous work	76°F WBGT	70°F WBGT	67°F WBGT
75% work and 25% rest per hour	77°F WBGT	72°F WBGT	68°F WBGT
50% work and 50% rest per hour	79°F WBGT	75°F WBGT	72°F WBGT
25% work and 75% rest per hour	80°F WBGT	78°F WBGT	76°F WBGT

The work-load category will be established by ranking each job in light, medium, or heavy load categories based on the type of operation, as follows:

- o *Light Work*  
Sitting or standing to operate machinery, performing light hand or arm work.
- o *Moderate*  
Walking about with moderate amounts of lifting or pushing.
- o *Heavy*  
Heavy physical labor (e.g., pick and shovel work).

## **COLD EXPOSURE**

### **Cold Stress**

Cold injury such as frostbite and hypothermia may occur during field operations. The extent of injury caused by exposure to the cold will depend on such factors as wind velocity, temperature, and humidity. To guard against such injuries, personnel must wear appropriate clothing, have immediate access to warm shelter, carefully schedule work and rest periods, monitor workers' physical conditions, and learn to recognize warning symptoms, such as reduced coordination, drowsiness, impaired judgment, fatigue, and numbing of toes and fingers.

### **Frostbite**

Frostbite is a localized injury that results from the freezing of tissue. It is most common to the fingers and toes (due to reduced circulation in the extremities), and on the face and ear (most commonly exposed to the weather).

For frostbite to occur, there must be subfreezing temperatures. It is most prevalent in very cold temperatures (20°F or less) or when cold temperatures are exacerbated by the wind (wind chill).

#### o *Symptoms*

- Prefrostbite  
The affected area feels painfully cold, but is usually flushed (rosy-red in color)
- First-Degree Frostbite (Frost Nip)  
Crystallization occurs in superficial tissues. The affected area no longer feels cold, is completely numb, and shows as a small white or grayish-yellow waxy patch. Immediate treatment will completely reverse the condition with no ill effects.
- Second-Degree Frostbite (Deep)  
A deep freezing of the fluids in the underlying soft tissues. Symptoms and treatment are the same as for first-degree frostbite. It usually results in the death of tissue (e.g., blistering black skin or a loss of toes) with possible complications from gangrene.

- o *First Aid*

- Cover and protect the affected area.
- Provide extra clothes.
- Bring the victim indoors as soon as possible.
- Give the victim warm drink
- Rewarm frozen tissue quickly by immersing it in warm water (if thawed and refrozen, warm at room temperature).
- Do not rub; rubbing causes death of tissue.
- Do not apply heat.
- Do not break blisters.
- Do not allow victim to walk after feet thaw.
- Discontinue warming as soon as the frostbitten body part becomes flushed.
- Exercise the thawed body part.
- Separate fingers and toes with sterile gauze.
- Elevate frostbitten parts.
- Seek medical attention because of chance of infection or gangrene.

## **Hypothermia**

Hypothermia is a systemic lowering of the body temperature. Extreme cases (core temperature below 90°F) result in death. Hypothermia is the most common cause of death for persons involved in outdoor/wilderness activities. It does not require freezing temperatures and can occur in ambient air temperatures as high as 70°F. Wind and wetness greatly accentuate hypothermia by causing increased cooling. An example of a hypothermic condition is a rainy, windy day with 50°F air temperatures.

- o *Symptoms*

- First Stage—"goose bumps," shivering, feeling chilly
- Second Stage—violent shivering, blue lips, pale complexion, feeling extremely cold
- Third Stage—no longer feeling cold, lack of coordination, mild unresponsiveness, drowsiness, stumbling
- Fourth Stage—failing eyesight, almost total lack of responsiveness, inability to speak, inability to walk
- Fifth Stage—coma or rapid death

o *Treatment*

For all levels, remove wet, frozen, or restrictive clothing. Dry and rewarm the victim using an external heat source that completely envelops the victim (e.g., placing the victim in a warm vehicle, a warm room, a tub of warm water, or a sleeping bag with another person). Do not use a source of radiant heat that will warm only one side of the victim. Be prepared to administer cardiopulmonary resuscitation (CPR). Do not give the victim alcohol.

- First Stage

Put additional clothing on the victim such as a hat, shirt, or windbreaker; give food and drink; exercise tense muscles.

- Second Stage

Follow the same steps listed for the first stage, only more so; give warm drinks and provide means of rewarming if possible.

- Third Stage

Rewarm the victim; give warm food and drink. **Note: In hypothermia beyond the second stage, the victim can no longer warm himself and must have an external heat source.**

- Fourth Stage

Remove wet or cold clothing and gradually rewarm the victim so that blood trapped in extremities is rewarmed before it is circulated back into the inner body, in order to prevent *afterdrop*. Afterdrop is a further lowering of the body core temperature that results from recirculation of cold blood. Avoid hot, radiant heat sources that will warm surface blood before the inner blood has been warmed. Do not give warm drinks that can fool the body internally into feeling it is warm. Fourth stage hypothermia victims are best treated by supervised, experienced medical help because complications can cause death. Place the victim in a warm vehicle and evacuate immediately to a medical facility.

- Fifth Stage

Gradually rewarm the victim. Requires sophisticated medical help to prevent death from *aftershock* (a recirculation of chilled blood causing heart fibrillation).

# APPENDIX F OVERHEAD OBSTRUCTIONS



## Guideline - *Overhead Obstructions*

### Purpose

To prevent heavy equipment or its load from contacting overhead obstructions.

### Key Terms

The following definitions apply to terms used in this procedure:

**Qualified electrical person:** one who is thoroughly knowledgeable in the construction and operation of specific electrical equipment or a specific electrical task and the hazards associated with that equipment or task.

**High clearance load:** material or equipment carried by truck, trailer or otherwise whose vertical dimension relative to the clearance elevations of onsite overhead obstructions is such that there is potential for hitting an overhead obstruction.

**Overhead obstruction:** electric lines, communications lines, pipe lines and supports, bridges, guy wires, etc.

**Heavy equipment:** dump trucks, roll-off trucks, cranes, drill rigs, excavators and other types of construction equipment able to reach overhead obstructions.

**Proximity permit:** written authorization to perform work with heavy equipment in proximity to overhead obstructions. Proximity permits are used for equipment which operate by use of a boom, derrick or bucket. See figures 1 and 2.

**Overhead Obstruction Plan (OHOP):** a written plan by which heavy equipment is managed to prevent contact with overhead obstructions. Trucks whose beds can be raised and trucks or trailers carrying high clearance loads are managed with an OHOP. See the Appendix.

### Responsibilities

The **Project Director** is responsible for:

- Assuring that appropriate controls are put in place to prevent heavy equipment from striking overhead obstructions.
- Assuring that this procedure and control methods required by this procedure are implemented.

The **Site Supervisor and Site Safety Officer** are responsible for:

- Implementing or requiring the contractor to implement the controls required by this procedure.
- Auditing to assure the requirements of this procedure are implemented.
- Taking corrective action immediately to address inadequacies in the implementation of controls.

### Application

This procedure is to be followed at work locations that CRG manages/coordinates whenever there is potential for contacting overhead obstructions with heavy equipment. It does not apply to vendor or contractor haulage of oversized loads on public roadways.

## Procedure Methodology

An overhead obstructions plan (OHOP) is used as a tool to identify and manage specified heavy equipment in transit or operation within proximity to overhead obstructions. The OHOP requires controls for:

- operation of equipment with raised bed capability (dump trucks & roll-off trucks)
- movement of trucks/trailers/equipment with high clearance

The DuPont Site Representative (DSR) will prepare the OHOP (see appendix). The Site Safety Officer and, whenever feasible, a contractor representative should participate. Consult with the Project Director for involvement of plant resources.

A proximity permit will be used as a special control for equipment that uses a boom, bucket or derrick when operating near overhead obstructions. See Table 3.1.1 below for requirements. For work of this type, the basic question must be asked: Is it possible through operator error or equipment malfunction for the equipment to contact OHOs? The proximity permit should put in place to prevent such contact.

*Table of Requirements*

Equipment Type	Obstruction	
	Electrical (1)	Non-Electrical
Boom/Bucket in Operation (2)	Permit within 15 ft. (3)	Permit within 15 ft. (4)
Drilling	Permit within 20 ft.	Permit within 20 ft.
High Clearance in Transit	OHOP Maintain 4 ft. clearance	OHOP
Raisable Bed (operating on an transit)	OHOP Maintain 4 ft. clearance	OHOP

### *Notes to table*

- Operating heavy equipment around uninsulated or unprotected energized electrical lines at a distance closer than 10 feet is an unsafe practice that exposes workers to potentially serious electrical shock. Work of this nature will not normally be performed. Qualified electrical personnel must be involved.
- Includes cranes, excavators, dozers, manlifts, and similar type equipment.
- Avoid lifting over cable tray. Protect the contents when work is necessary.
- Lifting over pipelines containing hazardous materials should be avoided. Shut down the line if possible.

### *Audits*

- If an OHOP is required for a a project then OHO's shall be the initial audit focus for the project. Overhead obstructions will also be the focus for long-term projects on a monthly basis.

- During the OHO focused audit, compliance with the specific provisions of the proximity permit or the OHOP should be reviewed.

#### *HASP Review*

- The project site HASP and associated OHOPs will be reviewed on a monthly basis by the DSR / SSO determine that overhead obstructions are being managed per the plans. At the same time, site conditions will be assessed to determine if the HASP/OHOP should be amended to address new or changing conditions that could result in contact with an overhead obstruction.

#### *Special Considerations/Requirements/Equipment*

- Contractor shall be made aware of the following requirements described below for preventing construction equipment from coming in contact with overhead obstructions.
- All dump trucks and other equipment having raisable beds, including that of tier subcontractors and vendors making deliveries to the project site, shall not be operated without use of a spotter. The spotter must confirm to the driver that the body or bed is fully down before the driver will be permitted to leave the work area.
- In lieu of using a spotter, the Contractor may propose, in writing, alternate control methods to the PD for consideration in order to meet this condition.
- For all other equipment (cranes, and other heavy equipment) capable of contacting an overhead obstruction while in operation, and working within 15 feet, a proximity permit (Figure 1) is required before initiation of work. For drill rigs capable of contacting an overhead obstruction and working within 20 feet, a proximity permit is required. Contact the DSR for issuance of the permit."

#### **References**

- DuPont Policies/Guidelines/Standards S31G, Electrical Safety Management
- DuPont Engineering SHE Procedure B-1.18, Use of Mobile Equipment Near Exposed Electric Lines
- OSHA 29 CFR 1926.550(a)15, Cranes and Derricks

# APPENDIX G UNEXPECTED OCCURRENCE REPORTING

## Guideline - *Unexpected Occurrence Reporting*

### Purpose

To ensure that unexpected occurrences are investigated and communicated as a means of preventing similar occurrences, promoting safety awareness, sharing learnings, and collecting data for trend analysis.

### Key Terms

The following definitions apply to terms used in this guideline:

**Unexpected Occurrence (UO's):** Any unplanned event or action that has the potential to cause one or more of the following:

- Injury or illness to an employee, contractor, or a member of the public.
- An environmental release.
- Property damage, to include any damage to company/rental equipment or vehicles and theft.
- A business/project work interruption.

Multiple unexpected occurrences not reported as single events, but indicative of a pattern such as multiple respirator cartridge breakthrough.

**Environmental Deviations:** Any deviation from an environmental regulatory requirement, or the terms or conditions of a permit, that was reported to or was found by a regulator.

- This includes emissions, leaks, spills, monitoring, record keeping, reporting, testing, sampling, etc.
- This is NOT limited to permit deviations. It includes any situation where a regulatory requirement has not been met that must be reported (RCRA, TRI, Wastewater, TSCA, etc.).
- This includes federal, state and municipal government requirements.

### Responsibilities

Each CRG employee, including CRG contractors, is responsible for reporting any UO in which they are involved to the appropriate DuPont contact.

If a field UO occurs, the DuPont site rep (DSR) must contact the PD and the PM as soon as practical.

The PD is responsible for contacting CRG Health and Safety (H&S), and the Remediation Team Manager (RTM), and the affected employee's administrative manager (AM) as soon as feasible subsequent to the occurrence.

For office occurrences, the employee must contact his/her AM as soon as feasible subsequent to the occurrence. If the AM is not immediately available, the employee should contact CRG H&S.

CRG H&S, along with the project team, or AM will decide if company-wide reporting is needed using the UO definition above.

The PD, or the AM (as appropriate) or designee is responsible for completing and sending a preliminary communication, using the H&S Database template, to the organization within eight hours after discussion with H&S.

The RTM will notify the CRG Director who will then determine if communications to Line Management is needed.

The PD or PM (as appropriate) is responsible for setting up the UO investigation within the next working day and preparing the draft report, with sufficient lead time that it may be reviewed, edited

by H&S and issued within 7 working days of the occurrence. Note: See Figure 1 for an example of the UO report format.

CRG H&S is responsible for consistent classification of UO's, assisting in the investigation, reviewing reports for content and issuing final reports. Additionally CRG H&S has the responsibility for reporting to the necessary DuPont SHE contacts.

**Note:** If a fatality occurs or three or more employees are hospitalized, CRG H&S must report to the regional Occupational Safety and Health Administration (OSHA) office within eight hours of the injuries. In addition, reporting to DuPont must be consistent with the US & Canada Injury, Illness and Incident Reporting Requirements.

## Application

This guideline will be followed for all on-the-job UO's. Off-the-job injuries to CRG employees will be reported if lost time results or if the incident can promote safety awareness or communicate key learnings. Note: Contractors are not required to report off-the-job incidents.

## Procedure Methodology

Figure 2 outlines the reporting sequence to be followed in the event of a UO. The DSR or SSO will first stabilize the situation, and notify the PM for field related UO's and the employee will notify their AM. The employee will provide the following basic information:

- Request assistance if needed.
- Time and location of occurrence.
- Occurrence information known at the time
  - Who
  - What
  - When
  - How to contact the field people if more information is needed

**Note:** If hospitalization or fatality occurs, CRG H&S must be notified as soon as possible.

## References

The following sources were used in developing this procedure:

- Managing Occupational Injuries and Illness S35 G
- Process Safety, Fire, Distribution, and Environmental Incident Classification and Reporting S8Y

## FIGURE 1

### CRG UNEXPECTED OCCURRENCE REPORT

REPORT NO.: UO- YY- No.

**TITLE:**

**LOCATION:**

**DATE & TIME:**

**DESCRIPTION:**

(The description should be a concise statement in one to three sentences of what happened.)

**KEY LEARNINGS:**

**SUMMARY OF INVESTIGATION:**

(Include bullet items of the incident findings.)

The landfill mowing crew met around 7:30 AM at the plant to attend site orientation.

The crew was made up 2 Parsons employees and 2 contractors.

The plant orientation ended at 11:30 AM and the team broke for lunch.

Upon returning from lunch the Safety analysis & Work Permit were reviewed and completed.

Inspection of the tractor was made.

Field team walked the landfill to inspect for foreign objects that might turn into flying debris.

At 1:30 PM the landfill mowing commenced.

At 2:00 PM the Contract operator stopped mowing because of the tractor went over the crest of the upper berm. One of the wheels of the tractor started slip.

The operator attempted to backed the tractor as it began to lose traction.

Next he tried to pull the tractor forward then tractor became unstable.

He then stopped and talked to the Parsons team about the tractors unstable condition. The decision was made to call the Ken Stuart to discuss the issue. Around 2:45 PM the team called Ken Stuart and notified him that the tractor was stuck on the slope. The team then notified Dennis West of the Invista May Plant -Safety Team about the incident. I called Rob Howell (Project Manger) and left a message that described the events. Then I notified Austin Anderson and we conference in Nate Sipe to talk about the situation. The team decided to use a tractor trailers towing truck to move the tractor off the slope and for Shamrock to get a larger tractor to complete the mowing event. In conversation with the Dennis West he (the plant) approved the use of the tow truck. Nate called 3:30 PM to say that the towing truck on the way back to the landfill. The truck arrived at the landfill around 3:50 PM and a inspection of the tow truck was made. Nate Sipe said that the tow truck was in very good condition. The tow truck had the tractor off the slopes by 4 PM. The tractor was undamaged and the berm was undamaged from the activities. Nate Sipe collected pictures of the berm and will download them when he return to the office. The team mobed from the site around 5 PM and the landfill mowing will be rescheduled when a larger tractor can be found.

**ROOT CAUSE:**

(List the underlying cause of the UO.)

**RECOMMENDATIONS/RESPONSIBILITY:**

(What should be done to prevent a recurrence or other relevant path forward items, with assignment to an individual or the team and the completion date? Be specific and concise.)

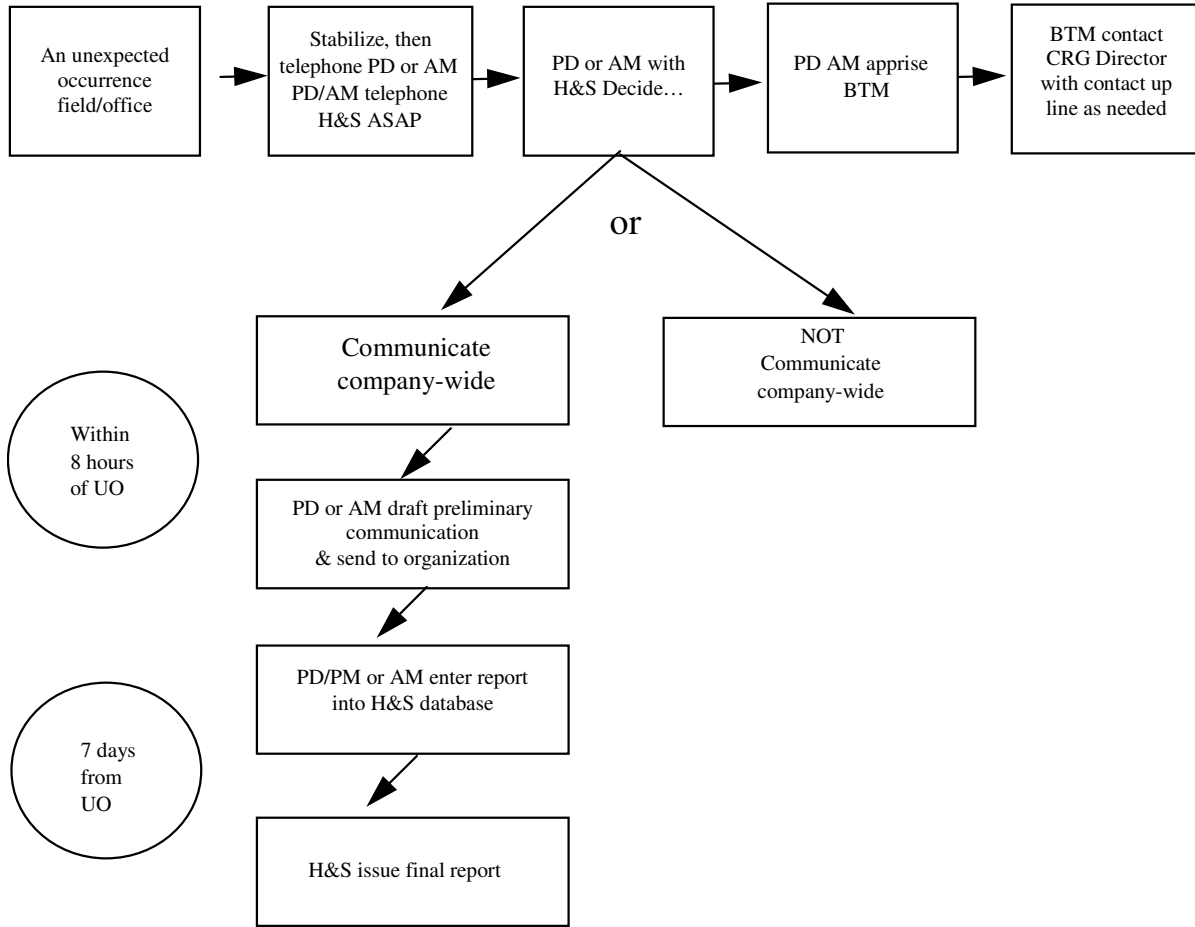
**UO INVESTIGATION TEAM:**

(Mary Glowacki,



# FIGURE 2

## Unexpected Occurrence Flow Chart



# APPENDIX H SOIL DISTURBANCE PROTOCOL

# **PARSONS COMMERCIAL TECHNOLOGY GROUP MANDATORY SUBSURFACE SOIL DISTURBANCE PROTOCOL**

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## **1. INTRODUCTION**

Intrusive investigation or excavation of the subsurface in areas developed for commercial, industrial or residential use exposes Parsons to the risk of causing damage to underground utilities and structures on a daily basis.

The potential consequences of causing damage to an underground utility or structure include, but are not limited to the following:

- Injury or loss of life
- Financial responsibility for repair, lost time, and/or loss of service
- Loss of client
- Federal investigation of job site work practices
- Litigation (third party lawsuits)

The mandatory protocol and checklists provided herein are intended as tools to aid in the management of risk, and ensure that a responsible standard is consistently applied at project sites where intrusion of the subsurface will occur.

## **2. PURPOSE**

The purpose of this mandatory protocol is the prevention of potential injury and/or loss of life; and damage to subsurface utilities and structures. Parsons' staff will identify and evaluate the hazards associated with underground utilities and other structures prior to conducting any intrusive subsurface operation including but not limited to drilling/boring, test pitting, excavation and other subsurface intrusive activities.

## **3. SCOPE**

Parsons' staff will employ sound investigative and work practices, and will use appropriate measures to avoid damage to subsurface utilities and structures. Furthermore, Parsons requires that these procedures be implemented by all of Parsons' employees and subcontractors, as appropriate. Subcontractors will have a copy of the procedures set forth in Section 6 of this document as an appendix to their contracts.

## **PARCOMM Subsurface Activity Protocol**

### **4. POLICY**

Parsons' policy requires that the project manager follow all local, state, and federal laws applying to intrusive subsurface work (i.e. obtain permits, inform agencies, obtain utility clearances, etc). The project manager shall review, as available, all current and historical site drawings and plans from the client, facility owner or tenant, utility providers, municipal government offices (i.e. city engineer or building department) and third parties as appropriate.

The attached Pre-Drilling/Subsurface Checklist for Intrusive Fieldwork (**Attachment A**) shall be completed prior to initiating fieldwork. Note: *The checklist includes a site visit as a requisite to meet with knowledgeable staff as appropriate (current or former site/owner personnel, utility representatives, municipal representatives, etc.), and review site conditions and features relative to the proposed locations for intrusive work. The checklist should be turned in to the Parsons Project Manager and a copy placed in the project file.*

The procedure described under Section 6 of this document is mandatory at all sites where any intrusive subsurface activities will take place, including but not limited to drilling, augering, boring, excavating, test pitting, trenching or direct push (Geoprobe) technology.

Variance from the Subsurface Activity Protocol is allowed only with the written approval of the Client and the appropriate Parsons' Program Manager or Sector Leader and the completion of the Utility Variance Request Checklist (Attachment B). GBU, Division or Project Safety personnel should be consulted as needed. Failure to obtain a variance in writing is grounds for disciplinary action. Copies of all variances will be maintained in the project files.

The Project Manager is encouraged to find locations that are acceptable to the project team to perform intrusive subsurface work that are not within right-of-ways, streets, highways, or near municipal or third party-owned utility corridors. When it is necessary to conduct work within these areas, the Project Manager should obtain approval from either the Program Manager or Sector Leader and submit the existing work plan to the GBU or Division Safety Manager for review.

### **5. RESPONSIBILITY**

It is the responsibility of the Project Manager to ensure that the Subsurface Activity Protocol Intrusive Subsurface and Variance checklists are followed. If a variance is sought, it is the responsibility of the Project manager to gain written approval of the Client and the appropriate Parsons' Program Manager or Sector Leader.

### **6. PROCEDURE: SUBSURFACE SOIL DISTURBANCE PROTOCOL**

The Parsons' Project Manager will be responsible for fulfilling the objectives of this protocol by ensuring that the procedures are carried out by Parsons' employees, subcontractors, and any other person acting on behalf of Parsons. The Parsons' Project Manager will ensure that all individuals working on drilling and other subsurface exploration projects are adequately trained and supervised. Parsons will practice sound investigation and work practices and employ

## **PARCOMM Subsurface Activity Protocol**

all necessary measures to avoid damage to subsurface systems and structures. The Parsons' Program/Project Manager, Sector Leader, and the Client will be contacted and advised in advance of beginning field work in the event that a variance to this protocol is requested by the Parsons' Project Manager or designee. The following tasks/subtasks will be completed at every site and documented on the checklist.

### **6.1 PRE-INVESTIGATION TASKS**

The objective of these tasks is to gather all relevant information about the site to assist in identifying exploration locations and obtaining necessary permits. Please note that in some instances the following information will be obtained or gathered by a subcontractor, which meets this objective.

#### **6.1.1 Obtain Site Plans**

Obtain as-built drawings and/or existing site plans as available. NOTE: As-built drawings may not accurately depict the locations of improvements and subsurface features and should therefore not be solely relied upon to determine acceptable locations for intrusive subsurface activities.

#### **6.1.2 Obtain Permits**

The project staff will observe all local, state, and federal laws, obtain all necessary permits and utility clearances, and secure site access permission. NOTE: Some permits/clearances require this step to be completed after the exploration locations have been identified and marked in the field. If this is required, proceed with Items 6.2 and 6.3 prior to obtaining permits.

#### **6.1.3 Utility Mark-outs**

Parsons' project staff will request a utility mark-out through the local utility locating one-call system for the work site, and document a reasonable degree of effort to locate all main electrical, gas, telephone and all other subsurface utilities. The Parsons' Project Manager must be notified of the status of locating underground utilities before field work progresses. If locating utilities becomes problematic, the Parsons' Project Manager should update the client and discuss potential alternative methods for locating or reducing risk of damage to underground utilities/structures for consideration (i.e. subcontract a private locating service, re-evaluate risk/reward of specific locations or utilize intrusive non-destructive methods as described in Section 6.5.6). Site plans will be updated as appropriate to include utility mark-out information. On third party sites, close coordination with the site owner's representatives for mark-outs, review of as-builts, and other information reviews should be conducted prior to work. NOTE: Some utilities require the exploration locations to be identified and marked in the field prior to performing mark-outs. If this is required proceed with Items 6.2 and 6.3 prior to obtaining permits.

## **PARCOMM Subsurface Activity Protocol**

### **6.2 SITE VISIT**

A site visit is required to compare the site plan to actual conditions, document all findings, and update the site plan. Parsons will obtain information needed to prepare a vicinity map of the area that may include significant neighboring addresses, land use, surface water bodies, and other natural as well as manmade features of note, as appropriate. The site visit should be scheduled concurrent with, or soon after the utility mark-out. The inspection should include the following activities at a minimum.

#### **6.2.1 Utilities**

Note the location of all utility mark-outs and aboveground utilities:

- Area lights
- Phones
- Drain lines
- Overhead lines
- Fire hydrants
- Fiber optic cable signage
- Catch basins
- Manholes
- Junction boxes
- Natural gas
- Other utilities
- Observe paving scars such as areas of new pavement or saw cuts

#### **6.2.2 Plant/Property Systems**

If possible, speak with someone having historical site knowledge to gain information about the site (locations of former tanks, lines, etc.). For UST systems:

- Inspect for the presence of a dispenser pan and, if possible, determine whether product piping is rigid or flexible.
- Visually inspect the location of the tank field, observation wells (if present), dispensers and vent stack(s).

## **PARCOMM Subsurface Activity Protocol**

- Note the orientation, arrangement, location, sizes, etc. of the tanks and manholes. Estimate the burial depth of the tank field.
- Observe paving scars (i.e. fresh asphalt/concrete patches, scored asphalt/concrete). Note that this may not indicate location of product piping.

### **6.2.3 Existing Remediation Systems**

Visually inspect the location of aboveground components. Note the locations of well manholes, sparge points, etc.

### **6.2.4 Safety**

For UST systems, note the location of the emergency shut off switch and become familiar with its use.

## **6.3 SELECTION OF DRILLING/TEST PIT LOCATIONS**

### **6.3.1 Critical Zones**

Establish pre-drilling critical zones appropriate to the project site. These are zones where no drilling (if possible and if client concurs) will be conducted. As an example, the following critical zones could be applied at a UST site:

- 10ft (3m) distance from the furthest edge of any operating tank
- 10ft (3m) distance surrounding operating dispenser islands
- At active service station sites, the entire area between the tank field and the dispenser islands.
- The zone between 0 and 5-feet of utility markings

### **6.3.2 Select Drilling Locations**

The information collected to this point will be utilized in combination with regulatory requirements and investigation objectives to select drilling locations. It is recommended that alternate drilling locations be selected in case additional explorations are required or obstructions are encountered. The effort to investigate a specific proposed drilling location should be to clear a minimum five-foot radius circle around the location.

### **6.3.3 Review Selected Locations with the Client**

At a minimum, offer to review the selected and alternate drilling locations with the client's project manager or designated representative. When completing Geoprobe<sup>tm</sup> (or similar) investigations in which some boring locations are not selected in advance, but partially

## **PARCOMM Subsurface Activity Protocol**

determined in the field based on field screening results, the client should approve the areas in which work will be performed. Do not proceed with the investigation until the plan has been discussed with the client, and approval to proceed has been granted. If relocation of a boring outside approved limits is necessary at any time and for any reason, contact the client prior to proceeding. **CLIENT APPROVAL MUST BE DOCUMENTED.** Verbal approval is acceptable if followed with written approval. Documentation may include a notation in the field book, email or written correspondence.

### **6.4. REQUIRED NOTIFICATIONS**

Affected parties must be notified at least 48-hours (longer if possible) in advance of planned intrusive fieldwork. An exception would be in the event of an emergency response situation. Parsons' staff will avoid scheduling conflicts with facility activities at the site. The Parsons' Project Manager or designee will notify the following persons as applicable:

- The oversight regulatory agency (includes local fire, police and municipal contacts as appropriate).
- Property owner for private properties. This should include neighboring third party property owners if a potential exists for causing inconvenience as a result of the scheduled fieldwork.
- Client specific notifications as appropriate (i.e. facility maintenance, retail and/or real estate managers as appropriate)

### **6.5. ON-SITE SUBSURFACE ACTIVITIES**

#### **6.5.1 Safety**

A Project Safety Plan (PSP) must be available on site at all times and all Parsons' staff, contractors and subcontractors must be familiar with it. Parsons' employees are to acknowledge their review of the PSP by signing the signature form contained within the PSP. The Parsons' field team leader is tasked with conducting a tailgate meeting at the start of each day to review project specific health and safety items with staff and subcontractors. Subcontractors, however, are responsible for their own health and safety. All work areas shall be secured with safety cones, safety tape, construction fence, barricades, or signs as appropriate.

A copy of this entire subsurface activity protocol and completed checklist must be appended to the health and safety plan.

#### **6.5.2 Supervision**

A Parsons' on-site representative will be responsible for overseeing subsurface activities. This representative will ensure that the work is performed with due caution and will be alert for warning signs that could indicate the presence of underground tanks, lines, or other subsurface structures.



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### **6.5.3 Warning Signs**

The following warning signs may indicate the presence of a subsurface structure such as tanks or lines:

- Pea Gravel/Sand/Non-indigenous Material.
- The absence of soil recovery in the hand auger. This could indicate pea gravel that has spilled out of the auger.
- Any unexpected departure from the native soil or groundwater conditions as established in other on-site digging.
- Obstructions encountered

If any of the above warning signs or a suspicious condition is encountered, intrusive subsurface activities in this area should immediately cease and the Parsons' Project Manager shall be contacted.

### **6.5.4 Drill Boring Sequence**

If possible, the boring sequence should be planned such that the boring furthest from any suspected underground improvements is carried out first. This is done to determine the natural subsurface conditions and to allow the field geologist/scientist to recognize native versus fill conditions. Also, least impacted locations should be done first if possible to prevent possible cross contamination.

### **6.5.5 Surface Removal for Paved Areas**

Sufficient paving or surface improvement should be removed to allow clear visibility of the subsurface conditions during hand augering/digging, and allow excavation with hand tools. Drilling in an area of high risk may warrant a larger pavement opening.

- Monitoring Well Installations: 2-ft x 2-ft (60cm x 60cm) minimum removal is suggested (assumes for example: 6.25-inch hollow stem auger (HSA) or smaller).
- Soil Borings: 8-inch (20cm) diameter minimum removal is suggested (assumes for example: 3.25-inch HAS or smaller).
- Direct Push Samplers: 4 to 6 inch (10 to 15 cm) diameter minimum removal is suggested (assumes for example: 2-inch diameter sample tube).

The technique used should not pose a threat to subsurface structures. Final completion for holes in pavement shall be neatly saw-cut or cored unless otherwise directed by the client.

### **6.5.6 Clearing the Subsurface for Utilities and Other Structures**

Parsons' staff must ensure that no subsurface utilities, structures, or improvements exist where intrusive subsurface activities will occur. Locations will be cleared using results of historical data research and with geophysical methods (see below for details) at a zone 5 feet in radius around the proposed location. Staff (or personnel supervised by Parsons) will also utilize intrusive, non-destructive procedures such as hand digging to a depth of 5 feet and a diameter or width equivalent to the outside dimensions of the auger to investigate the boring location.

The method used to delineate the subsurface should be compatible with the inherent risk associated with the type of facility/property and the location of the drilling. Proactive investigative methods to clear specific drilling locations will include the following non-invasive and invasive non-destructive methods:

**Non-Invasive Geophysical Remote Sensing:** Multiple appropriate instruments (ground penetrating radar, electromagnetic detector, magnetometer, metal detector) can be used for this work. Survey an area around the location to a distance of 5 feet using geophysical methods to identify potential subsurface utilities or facilities. Move the borehole location, if necessary, within the cleared circle to avoid an object identified by the geophysical instrument. Examples of geophysical methods are provided below:

- Electromagnetic and radio frequency;
- Ferrous metal or magnetic locators;
- Ground probing radar (GPR).

**Important note:** A combination of two or more non-invasive instruments may be required to properly clear a subsurface area. For example, a ferrous metal detector may not detect metals pipes embedded in concrete duct banks, PVC pipes, FRP pipes, or other non-ferrous materials.

**Intrusive Non-Destructive Procedures:** Delineate the subsurface at the borehole location by probing or digging. Several acceptable methods are discussed below. In some cases, these intrusive procedures may not be practical due to the subsurface conditions or requirements of the explorations.

- Vacuum/Air Knife Digging: Vacuum digging has proven to be a very effective and safe means of digging and is recommended instead of probing and digging with hand tools.
- Probing: The probe should have a blunt or rounded tip and should be advanced by hand in a triangular pattern around the bore location without excessive force.
- Hand Digging: Should be performed with a small hand garden spade.

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- Hand Augering: The auger is to be turned slowly and not forced through the soil. It is recommended that an auger without sharp points (some augers have rounded edges) be used.
- Post Hole Digging: Can be used for soil removal only in soil that has been probed and cannot be used to advance the hole beyond the depth or width of probing.

The area to be cleared for underground utilities or structures for augering shall exceed the diameter of the largest tool (hand auger, drill auger, sampling tube, etc.) to be advanced and sufficiently large to allow for visual inspection of any obstructions encountered. The first 1 - 2ft (0.3 - 0.6m) can be cleared by hand digging to remove the soil. Slowly and carefully probe (i.e. triangular pattern), vacuum, or hand auger throughout the area to be cleared to ensure that no obstructions exist anywhere near the potential path of the drill auger or push type sampler. The soil in the area to be cleared shall be fully removed during this step. If probing is utilized, then alternate probing with soil removal as necessary, until the first 5-ft (1.5m) has been delineated.

### 6.5.7 Refusal

Where natural subsurface conditions (e.g. cobbles/rocks, fill material, and/or bedrock) may prevent adequate probing and augering, a practical and sensible evaluation by the Parsons' Project Manager will be the basis for determining if continuation of probing and augering is feasible. In all cases Parsons must employ all means necessary to prevent damaging subsurface utilities, product lines, tanks, or other structures. **When conventional means of probing and augering cannot be utilized, the Parsons' field representative believes that additional probing/augering is not feasible, or if the probing/augering poses additional hazard to personnel because of the physical demands of performing the task, work in that specific area will cease.** The Parsons' Project Manager will contact the client's project manager or designee to discuss alternatives. If Parsons' staff suspects, based on past information or boring logs, that hand augering is infeasible, then alternatives such as vacuum clearing or non-invasive procedures should be evaluated in advance.

### 6.5.8 Event Notification

If any portion of a tank, pipe, utility or other subsurface structure is encountered, or if there is any doubt it has been encountered, the work is to cease in that area and the Parsons' Project Manager notified immediately. If there is reason to believe that the structure has been damaged, if applicable, the emergency shut-off switch should be activated (if applicable) and the appropriate municipality and client notified immediately. The Parsons' Project Manager and/or client will decide if additional uncovering by hand is required. If it is confirmed that a UST system has been encountered, a tightness test(s) should be considered. Under no circumstances is the area to be backfilled without notifying the Parsons' Project Manager, unless risk of personal injury or damage warrants a temporary backfilling.

In case of refusal or if an unknown subsurface object is encountered during intrusive subsurface activities, then the following specified resolution process must take place.

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- Additional and deliberately careful excavation by hand will be conducted in an attempt to define the cause of refusal or identify the subsurface object.
  - a. If the cause CAN be readily and correctly defined as not destructive or hazardous, the field task manager should call the PM to discuss the situation.
  - b. If the cause CAN be readily and correctly defined as potentially destructive or hazardous, the field task manager should call the PM to discuss the situation. The specific location must be re-evaluated.
  - c. If the cause CANNOT be readily and correctly defined, the field task manager should call the PM to discuss the situation. The specific location must be re-evaluated.
- In case “a,” drilling may proceed ONLY after consultation with the PM.
- In cases “b” and “c,” drilling MUST STOP so that location re-evaluation can take place. The client, the utility owner (if applicable) and if required, the appropriate regulatory agency, must be advised of the situation and consulted to determine if (1) the location is necessary, which may require additional effort to clear a new location, or (2) the location is not necessary, and can be deleted from the program.

### 6.5.9 Scheduling

Since clearing locations for augering, drilling, excavation and similar intrusive field work can be time consuming, it may be appropriate to perform the surface removal subsurface delineation prior to the arrival of subcontractors and their equipment on site. If these activities are conducted prior to the actual day of intrusive field work, then the cleared locations must be adequately covered with plates and/or backfilled, or barricaded to protect pedestrians and other surface traffic. Care must be taken to prevent settlement of the material used to cover the holes.

# APPENDIX I EXCAVATION SAFETY

## 1. DESCRIPTION

This element of the CSHM details Parsons safety requirements for any man-made cut, cavity, trench, or depression in an earth surface formed by earth removal. This element applies to all Parsons personnel and subcontractors working on Parsons projects at any location worldwide, regardless of country of operation and/or GBU.

This element does not provide specific engineering requirements for shoring systems.

## 2. DEFINITIONS

Term	Description
Activity Hazards Analysis (AHA)	A procedure, described in Parsons SHARP Manual, used to identify the hazards or potential hazards associated with each step of a job or work plan to uncover hazards and then eliminate, control, or remove them before the work is started.
Adjacent Structure Stability	The stability of the foundation of adjacent structures whose location may create surcharges, changes in soil conditions, or other disruptions that could extend into the failure zone of the excavation.
Aluminum Hydraulic Shoring	A manufactured shoring system consisting of aluminum hydraulic cylinders (cross braces) used with vertical rails (uprights) or horizontal rails (wales). Such a system is designed to support the sidewalls of an excavation and prevent cave-ins.
Bell-bottom Pier Hole	A type of shaft or footing excavation, the bottom of which is made larger than the cross section above to form a belled shape.
Benching or Benching System	A method of protecting employees from cave-ins by excavating the sides of an excavation to form one or more horizontal steps, usually with vertical or near-vertical surfaces between levels.
Competent Person	A person trained to identify unsafe hazards or working conditions in the workplace or working conditions with authority to have the hazards eliminated or controlled.
Cross Braces	The horizontal members of a shoring system installed from side to side of the excavation. The cross braces bear against either uprights or wales.
Excavation	Any man-made cut, cavity, trench, or depression in an earth surface formed by earth removal.
Faces or Sides	The vertical or inclined earth surfaces formed as a result of excavation work.
Hazardous Atmosphere	An atmosphere that is explosive, flammable, poisonous, corrosive, oxidizing, irritating, oxygen deficient, toxic, or otherwise harmful, and that may cause death, illness, or injury.
Kickout	The accidental movement or failure of a cross brace.
Protective System	A method of protecting employees from cave-ins, from material that could fall or roll from an excavation face into an excavation, or from the collapse of adjacent structures. Protective systems include support systems, sloping and benching systems, shield systems, and other systems that provide the necessary protection.
Ramp	An inclined walking or working surface that is used to gain access to one point from another. A ramp may be constructed from earth or from structural materials such as steel or wood.



Term	Description
Sheeting	The members of a shoring system that retain the earth in position and in turn are supported by other members of the shoring system.
Shield or Shield System	A structure used in an excavation to withstand cave-ins and that protects employees working within the shield system. Shields can be permanent structures or portable units moved along as work progresses.
Shoring or Shoring System	A structure that is built or put in place to support the sides of an excavation to prevent cave-ins.
Sloping or Sloping System	Sloping the sides of the excavation away from the excavation to protect employees from cave-ins. The required slope varies with soil type, weather, and surface or near surface loads that could affect the soil in the area of the trench (e.g., adjacent buildings, or vehicles near the edge of the trench).
Stable Rock	Natural solid mineral material that can be excavated with vertical sides that will remain intact while exposed.
Structural Ramp	A ramp built of steel or wood, usually used for vehicle access. Ramps made of soil or rock are not considered structural ramps.
Support System	A structure such as underpinning, bracing, or shoring that provides support to an adjacent structure, underground installation, or the sides of an excavation.
Surface Encumbrances	Underground utilities, foundations, streams, water tables, transformer vaults, and geologic anomalies.
Surcharge	An excessive vertical load or weight caused by spoil, overburden, vehicles, equipment, or activities that could affect stability.
Trench	A narrow excavation (in relation to its length) made below ground surface.
Unconfined Compressive Strength	The load per unit area at which soil will fail in compression.
Underground Installations	Utilities, tunnels, shafts, vaults, foundations, and other underground fixtures or equipment that might be encountered during excavation work.
Uprights	The vertical members of a trench shoring system placed in contact with the earth and usually positioned so that individual members do not contact each other. Uprights that are placed so that individual members are closely spaced, in contact with or interconnected to each other, are often called sheeting.
Wales	Horizontal members of a shoring system placed in the direction of the excavation face whose sides bear against the vertical members of the shoring system or earth (uprights or sheeting).

### 3. RESPONSIBILITIES

Role	Responsibility
Corporate Health and Safety	<ul style="list-style-type: none"> <li>Reinforce the need to comply with requirements.</li> <li>Provide structure for safety programs and training.</li> </ul>



Role	Responsibility
GBU Safety Director	<ul style="list-style-type: none"> <li>Responsible for providing support to ensure the success of the project excavation plan.</li> <li>Audit effectiveness of the project excavation plan.</li> </ul>
Project Manager	<ul style="list-style-type: none"> <li>Responsible for developing, approving, implementing, and enforcing the project excavation plan.</li> <li>Conduct pre-excavation walkthrough.</li> <li>Review and approve excavation permits.</li> <li>Designate competent person, persons to conduct activities within the excavation plan, and an observer.</li> <li>Respond to possible cave-ins.</li> <li>Conduct unscheduled field checks on the implementation of the excavation plan.</li> </ul>
Project Engineer	<ul style="list-style-type: none"> <li>Approve and/or design necessary protective measures, including sloping or benching greater than 20 feet deep.</li> <li>Examine damaged protective structures.</li> <li>Evaluate hazards to adjacent structures.</li> <li>Review and approve excavation permits, if necessary.</li> </ul>
Records Custodian	<ul style="list-style-type: none"> <li>Document and maintain employee training.</li> </ul>
Superintendent	<ul style="list-style-type: none"> <li>Review subcontractor's excavation plan.</li> <li>Schedule excavations.</li> <li>Facilitate compliance with and enforce the project excavation plan.</li> <li>Maintain excavation equipment and support.</li> </ul>
Site Safety and Health Officer (SSHO)	<ul style="list-style-type: none"> <li>Initiate and lead development of the project excavation plan. Conduct a search for drawings, and hold a constructability meeting.</li> <li>Conduct orientations for subcontractors and new employees.</li> <li>Determine training needs, coordinate employee training, and ensure that employees involved in excavation are informed.</li> <li>Provide the regulatory expertise to ensure that the project excavation plan is in compliance with the applicable codes, standards, and regulations.</li> <li>Determine the required PPE.</li> <li>Ensure that underground installations are identified.</li> <li>Review and approve excavation permits.</li> <li>Assist and oversee the competent person.</li> <li>Ensure that confined space procedures are followed, when necessary.</li> <li>Review the subcontractor's excavation plan and provide comments to subcontractor.</li> <li>Review inspections and monitor excavation activities.</li> </ul>
Foreman/Supervisor	<ul style="list-style-type: none"> <li>Supervise and enforce the project excavation plan.</li> <li>Conduct daily safety huddles reviewing excavation-related AHAs, when applicable.</li> </ul>





Role	Responsibility
Competent Person	<ul style="list-style-type: none"> <li>• Determine probing methods.</li> <li>• Determine the degree of slope reduction.</li> <li>• Select, conduct design of, and monitor protective systems.</li> <li>• Conduct daily inspections of the excavation.</li> <li>• Correct or eliminate potentially hazardous conditions.</li> <li>• Monitor water control and removal equipment.</li> <li>• Attend use of rescue equipment.</li> <li>• Complete and submit excavation permit.</li> </ul>
Designated Person	<ul style="list-style-type: none"> <li>• Classify the soil before digging and excavation.</li> <li>• Mark open excavations and underground obstructions.</li> </ul>
Observer	<ul style="list-style-type: none"> <li>• Watch for obstructions during excavation.</li> </ul>
Affected Employees	<ul style="list-style-type: none"> <li>• Comply with the project excavation plan and maintain awareness of hazards in work area.</li> </ul>
Subcontractor	<ul style="list-style-type: none"> <li>• Comply with all Parsons requirements.</li> <li>• Develop, implement, submit, and enforce subcontractor lockout/tagout program.</li> <li>• Maintain and inspect subcontractor excavations.</li> <li>• Train subcontractor employees.</li> </ul>

## 4. PROJECT EXCAVATION PLAN

The SSHO leads the development and implementation of a project excavation plan in accordance with state and local regulations and the CSHM. The approved project excavation plan is included in the project safety plan in accordance with the Parsons SHARP Manual.

During the design phase, the SSHO conducts a search for drawings of all areas requiring excavation. All pertinent drawings are included in the excavation plan.

As early in the design stage as possible, the SSHO holds a constructability meeting with the client representative and Parsons personnel.

The project manager reviews and approves the program. If required, the project engineer approves the excavation plan.

The project manager facilitates implementation and compliance with the program. The project manager designates a competent person to oversee excavations, complete permits or notification forms, and perform necessary inspections of the excavation. The project manager designates person(s) to conduct activities within the plan.

The SSHO audits the activities of Parsons employees and subcontractors to ensure compliance.

The project excavation plan must include site-specific provisions for the following:

- ◆ Excavation permits for each excavation
- ◆ Design requirements for protective systems
- ◆ Identification of underground installations



- ◆ Warning system for mobile equipment
- ◆ Activity hazards analysis (AHA)

## 5. EXCAVATION PERMITS

- ◆ Before excavation is started, the SSHO ensures that required permits and geophysical investigation (scanning) reports are obtained and maintained at the excavation site.
- ◆ Before digging and excavation, the designated person classifies the soil using a minimum of one visual analysis and one manual testing to classify soil and rock deposits.
- ◆ The competent person identifies and marks underground installations.
- ◆ The competent person must submit a completed excavation permit (Attachment CSHM-33-01) and a state permit (if required) to the SSHO and project manager.
- ◆ Designs for protective systems by the project engineer must be submitted to the project manager as an attachment to the excavation permit.
- ◆ Before starting the excavation, the project manager conducts a prejob walkthrough.
- ◆ The project manager verifies the information, signs the excavation permit, returns a copy to the supervisor, and informs the SSHO. When the supervisor receives the signed permit, work may begin.
- ◆ The SSHO, project manager, and project engineer (if applicable) must sign the permit.

## 6. SURFACE ENCUMBRANCES

Remove all surface encumbrances that might create a hazard to employees or support them as necessary, to safeguard employees.

Do not store excavated or other material closer than 2 feet from the edge of any excavation; if possible, do not store such material closer than 4 feet from the edge of any excavation.

Ensure that remaining surface items are visible to the equipment operator and are tagged with high-visibility tape or a reflectorized flag mounted above the object(s). Inform equipment operators of the location of these surface items before operating their equipment and provide a flag person provided when necessary.

## 7. BARRIER TAPE IDENTIFICATION

Barrier tape is required so that any employee working on the site, regardless of employer, can recognize and avoid the open excavation hazard. The designated person ensures that open excavations on the construction site are identified with barrier tape as long as the hazard is present.

Barriers must be erected far enough back from the hazard to allow for adequate warning and protection.

Barriers must be constructed to withstand adverse weather conditions and construction traffic.



If the hazard is of a magnitude that requires additional protection, the superintendent's must provide additional protection, as well as the barrier tape.

## 8. UNDERGROUND INSTALLATIONS

During the course of excavation work, serious injuries and significant property damage have resulted from insufficient or inadequate identification of underground installations. To control hazards associated with coming in contact with such installations, the competent person identifies and marks underground installations.

The competent person must be present when excavating around a known marked utility.

### 8.1 IDENTIFICATION

Before opening an excavation, the competent person locates utility installations such as sewer, telephone, fuel, electric, water lines, or any other underground installations that might be expected to be encountered during excavation work.

The precise location of underground facilities that have been marked will be maintained by adequate refreshing. Parsons makes no assumptions regarding the locations of utilities.

As a guideline for the uniform identification of underground installations, Parsons has adopted the American Public Works Association's (APWA's) *One-Call Systems International Directory 2002 Excavator's Damage Prevention Guide*. The updated directory is maintained online at:

<http://www.apwa.net/Documents/About/TechSvcs/One-Call/02OCDirFINALProof.pdf>.

- ◆ Before the start of actual excavation, management will contact the utility companies or owners within the established or customary local response times, advise them of the proposed work, and ask them to locate the underground utility installation.
- ◆ Before approving an excavation permit, the SSHO has the following responsibilities:
  - Ensure that subsurface scanning for underground obstructions has been completed no more than 3 months prior to the work is conducted.
  - Ensure that ground markings identifying underground obstructions are present.
  - Evaluate the work area for potential hazards that have not been addressed by the scanning ground markings.
- ◆ Use the preferred method of locating a marked utility and continue until the entire utility is located within the limits of the excavation. Do not take chances.
- ◆ When the excavation approaches the estimated location of an identified underground installation, determine the exact location by a safer means (e.g., hand excavation or pot-holing).

### 8.2 MARKING

Use color-coded surface marks (paints or similar coatings) to indicate the type, location, owner, and route of buried installations.



- ◆ Parsons has adopted the APWA Utility Location and Coordination Council (ULCC) Uniform Color Code, which is located online at:  
[http://www.apwa.net/Documents/About/TechSvcs/One-Call/RecommendedMarking\\_Guidelines.pdf](http://www.apwa.net/Documents/About/TechSvcs/One-Call/RecommendedMarking_Guidelines.pdf)
- ◆ As illustrated on the Uniform Color Code Card (Attachment CSHM-33-02), the colors and corresponding installation type are as follows:
  - WHITE: Proposed excavation
  - RED: Electric power lines, cables, conduit and lighting cables
  - PINK: Temporary survey markings
  - YELLOW: Gas, oil, steam, petroleum or gaseous materials
  - ORANGE: Communication, alarm or signal lines, cables or conduit
  - BLUE: Water, irrigation, and slurry lines
  - GREEN: Sewers and drain lines
  - PURPLE: Reclaimed water, irrigation, and slurry lines
- ◆ To increase visibility, use color-coded vertical markers (temporary stakes or flags) to supplement surface marks.
- ◆ All marks and markers must indicate the name, initials, or logo of the company that owns or operates the installation and the width of the installation if it is greater than 2 inches.
- ◆ If the surface over the buried installation is to be removed, use supplemental offset marking. Offset markings must on a uniform alignment and must clearly indicate that the actual installation is a specific distance away.
- ◆ Before re-energizing, mark the energized direct-buried cable uncovered by excavation with red tape or red paint. Resume excavation using caution and a spotter.

## 9. PROBING AND EXPLORATORY TRENCHING

In virgin soil, a probing and exploratory trenching procedure normally is not necessary. However, many Parsons projects involve chemical and refining construction in existing facilities. Extreme caution must be taken to ensure the safety of employees and the client's property. Underground utilities and other obstructions present a very real danger and every effort must be taken to determine that excavation operations are performed safely.

If subcontractors are used, the subcontractor supervisor and the SSHO review in detail any pertinent drawings and as-built drawings that are available to determine the location of the piping or other underground obstacles.

If any underground obstructions are encountered, the SSHO must immediately notify the designated client representative who in turn, notifies the proper personnel to assist in identifying of the obstruction and its possible removal or re-routing.

The competent person may elect to use either a dry probing or a water probing system. When using water jetting, the SSHO must require all employees to wear safety glasses and face shields. The person who actually performs the probe must wear both a face shield and goggles.



Before and during excavations, the following requirements must also be met:

- ◆ Sweep area to be excavated must be swept with a metal detector.
- ◆ When excavating with mechanical equipment or other means, probing is required every 4-inches on center over the total area to be excavated.
- ◆ Use exploratory trenching at the perimeter of an area to be excavated by probing and trenching on 4-inch centers.
- ◆ Determine the depth of the trench according to the depth needed to accommodate the footings, supports, pipe, etc., to be placed inside the perimeter area.
- ◆ While the excavation is open, protect, support, or remove underground installations as necessary to safeguard employees. However, do not support from the shoring without approval from a qualified engineer.
- ◆ De-energize underground electrical cables if the exact locations are not known or the service is direct-buried cable not protected by a rigid-steel raceway, concrete encasement, or polyvinyl chloride (PVC) pipe. Refer to CSHM-24, Electrical, for procedures for handling red concrete/live circuits.
- ◆ If pipe or other obstacles are encountered, or when excavations occur within 2 feet, (vertically or horizontally) of a direct-buried electrical or communication cable, perform exploratory hand trenching to authenticate the actual location of the cable
- ◆ Use only a nonconductive hand shovel to remove soil or an air lance to loosen soil within 18 inches of energized electrical utilities that are not protected by a rigid steel raceway or concrete encasement.
- ◆ The depth of probing must always exceed the depth of excavating by at least 1 foot. The selected depth of probing must be consistent; that is, if one hole is probed at 3 feet, all holes must be probed at 3 feet.
- ◆ Air-operated clay spades may be used during hand excavations, provided extreme care is taken and required PPE is used. During hand excavations, if a person's head is below the top of the excavation or if the trench is deeper than 4 feet, shoring is required.

## 10. ACCESS AND EGRESS

If where employees are working in trenches 3 feet deep or more, each trench must have ladders to provide safe exits. Lateral travel distance to the nearest ladder must be no more than 25 feet.

If employees or equipment must cross over an excavation greater than 4 feet deep, provide a walkway or bridge with standard guardrails.

A competent person must design and conduct daily inspections on structural ramps that are used solely by employees as a means of access or egress from excavations.

Structural ramps used for access or egress of equipment must be designed by a competent person qualified in structural design, and will be constructed in accordance with the design:

- ◆ Ramps and runways constructed of two or more structural members must have the structural members connected together to prevent displacement.



- ◆ Structural members used for ramps and runways must be of uniform thickness.
- ◆ Cleats or other appropriate means used to connect runway structural members must be attached to the bottom of the runway or must be attached in a manner to prevent tripping.
- ◆ Structural ramps used in lieu of steps must be equipped with cleats or other surface treatments on the top surface to prevent slipping.

## 11. EXPOSURE TO VEHICULAR TRAFFIC

Employees exposed to public vehicular traffic must be provided with, and must wear, warning vests or other suitable garments marked with or made of reflectorized or high-visibility material. Temporary traffic control may be necessary where normal traffic routes are disrupted.

## 12. EXPOSURE TO FALLING LOADS

No employee is permitted underneath loads handled by lifting or digging equipment. Employees are required to stand away from any vehicle being loaded or unloaded to avoid being struck by any spillage or falling materials.

Operators may remain in the cabs of vehicles being loaded or unloaded when the vehicles are equipped with overhead cab protection.

## 13. WARNING SYSTEM FOR MOBILE EQUIPMENT

Operations of mobile equipment near excavations are conducted in accordance with CSHM-25, Motor Vehicles and Equipment, and the following guidelines:

- ◆ When mobile equipment is operated adjacent to an excavation, or when such equipment is required to approach the edge of an excavation, and the operator does not have a clear and direct view of the edge of the excavation, use a warning system such as barricades, hand or mechanical signals, or stop logs.
- ◆ If possible, the grade will slope away from the excavation.
- ◆ During excavations with a backhoe, observer must be present at all times to watch the backhoe bucket. This observer is stationed adjacent to the excavation to avoid the operations of the hoe. The observer is responsible for visually identifying any obstruction while the bucket is excavating and for alerting the operator immediately if any obstructions are observed. If the observer leaves the excavation area, excavation efforts must be stopped immediately until the observer returns.

## 14. HAZARDOUS ATMOSPHERES

If an oxygen-deficient atmosphere (less than 19.5% oxygen) or a hazardous atmosphere exists or could reasonably be expected to exist, (e.g., such as in excavations in landfill areas or excavations in areas where hazardous substances are stored nearby), the excavation is presumed to be a permit-required confined space, unless determined otherwise by the SSO, in accordance with CSHM-15, Confined Space. Take adequate precautions to prevent employee exposure in



accordance with CSHM-13, Hazardous Materials; CSHM-6, Personal Protective Equipment; and CSHM-8, Respiratory Protection. The following minimum requirements apply:

- ◆ Before employees enter potentially hazardous excavations greater than 4 feet deep, test the atmosphere for oxygen, sulfur dioxide, carbon monoxide, and flammable gas.
- ◆ Take adequate precautions to prevent employee exposure to atmospheres containing:
  - Less than 19.5% oxygen
  - Concentrations of a flammable gas is greater than 10% of the LFL of the gas
  - Concentrations of hazardous air pollutants exceeding of OSHA PELs.
- ◆ Precautions may include providing proper respiratory protection or ventilation for each excavation before employees enter the excavation.
- ◆ When using controls that are intended to reduce the level of atmospheric contaminants to acceptable levels, conduct atmospheric monitoring as often as necessary to ensure that the atmosphere remains safe.

## 15. RESCUE EQUIPMENT

Emergency rescue equipment, such as breathing apparatus, a safety harness and line, or a basket stretcher, must readily available where hazardous atmospheric conditions exist or may reasonably be expected to develop during work in an excavation. This equipment must be attended by the competent person when in use.

Employees entering bell-bottom pier holes or other similar deep and confined footing excavations must wear a harness with a lifeline securely attached to it. The lifeline must be separate from any line used to handle materials, and must be individually attended at all times while the employee wearing the lifeline is in the excavation.

## 16. PROTECTION FROM HAZARDS ASSOCIATED WITH WATER ACCUMULATION

Employees cannot work in excavations in which water has accumulated, or in excavations in which water is accumulating, unless adequate precautions have been taken to protect employees against the hazards posed by water accumulation.

The precautions necessary to protect employees adequately vary with each situation, but they could include special support or shield systems to protect from cave-ins, water removal to control the level of accumulating water, or use of a safety harness and lifeline.

If water removal equipment is used is controlled or prevented from accumulating by the use of water removal equipment, the water removal equipment and operations will be monitored by a competent person to ensure proper operation.

If excavation work interrupts the natural drainage of surface water (such as streams), diversion ditches, dikes, or other suitable means must be used to prevent surface water from entering the excavation and to provide adequate drainage of the area adjacent to the excavation.



Excavations subject to runoff from heavy rains require inspection by the competent person.

## **17. STABILITY OF ADJACENT STRUCTURES**

Support systems such as shoring or underpinning must be provided for sidewalks, pavements, and adjacent structures that may be undermined by excavation operations. Excavations below the level of the base or footing are normally not permitted unless:

- ◆ A support system (e.g., underpinning) is used.
- ◆ The excavation is in stable rock.
- ◆ The project engineer has determined that the structure is sufficiently removed from the excavation to avoid cave-ins.
- ◆ The project engineer has determined that no other hazard exists.

## **18. PROTECTION OF EMPLOYEES FROM FALLING DEBRIS**

Provide adequate protection to protect employees from loose rock or soil that could pose a hazard by falling or rolling from an excavation face. Such protection consists of:

- ◆ Scaling to remove loose material
- ◆ Installing protective barricades at intervals as necessary on the face to stop and contain falling material
- ◆ Other means that provide equivalent protection.

Employees must be protected from excavated or other materials or equipment that could pose a hazard by falling or rolling into excavations. Such protection is provided by:

- ◆ Placing and keeping such materials or equipment at least 2 feet from the edge of excavations.
- ◆ Using retaining devices that are sufficient to prevent materials or equipment from falling or rolling into excavations.
- ◆ A combination of the above, if necessary.

## **19. PROTECTIVE SYSTEMS**

Employees working in excavations must be protected by shoring, sloping, or benching. The competent person must determine the exceptions to this requirement as follows:

- ◆ Excavations made entirely in stable rock.
- ◆ Excavations less than 4 feet deep and where examination of the ground by a competent person provides no indication of potential cave-in.

Protective systems must have the capacity to resist without failure all loads that are intended or could reasonably be expected to be applied or transmitted to the system. The competent person determines the degree of slope reduction below the maximum allowable level when equipment, material, or personnel loads are imposed.





The competent person selects and constructs the design of protective systems in accordance with the requirements of Support Systems (Attachment CSHM-33-03), manufacturer's specifications, other tabulated data, or a design approved by the project engineer.

When it is not feasible to attain required slope configurations in accordance Option 1, Option 2, or Option 3 of Support Systems (Attachment CSHM-33-02), the project engineer must design all protective systems for excavation sites.

A competent person must monitor the construction and maintenance of the recommended protective systems and their use in excavations.

Ensure that support materials used are in good condition and free from damage or defect. When material or equipment used for protective systems are damaged, the competent person ensures that these systems are examined by the project engineer to evaluate its suitability for continued use. If the project engineer can not assure that the material or equipment can support the intended loads or is otherwise suitable for safe use, then such material or equipment must be removed from service. The project engineer must evaluate and approve the materials before returning them to service.

## 19.1 SLOPING AND BENCHING

The project engineer must approve sloping or benches greater than 20 feet deep. The OSHA Technical Manual ([http://www.osha.gov/dts/osta/otm/otm\\_toc.html](http://www.osha.gov/dts/osta/otm/otm_toc.html)) contains the requirements for soil classifications and sloping and benching to be used by registered engineers in determining sloping and benching for a particular excavation site.

The competent person selects and constructs slope and configuration of sloping and benching systems in accordance with applicable federal and state regulations.

Employees are not permitted to work above other employees on the faces of sloped or benched systems except when employees at the lower levels are protected from the hazard of falling, rolling, or sliding material or equipment.

## 19.2 SHORING OR SHIELDING

Install and remove support systems so that employees are protected from cave-ins, structural collapses, and from being struck by members of the support system.

- ◆ Employees are not allowed in shields when shields are being installed, removed, or moved vertically.
- ◆ Material may be excavated to a maximum of 2 feet below the bottom of the members of a support system if the system is designed to resist the forces for the full depth of the excavation and there is no indication of soil loss from behind or below the bottom of the support system.
- ◆ Construct the support system to support the vertical portion of a trench and extend above the bottom of the sloped portion at least 18 inches, to prevent material from sliding into the trench. Clear the surface of the slope of boulders, stumps, and hard masses of earth, tools, equipment, and other surface encumbrances.



- ◆ Place timber cross braces or trench jacks in a true horizontal position, spaced vertically, and secured to prevent sliding, falling, or kickouts. Place wales with the greater dimension horizontal.
- ◆ When engineering-approved portable trench boxes or sliding trench shields are selected as the protective system, use them in accordance with the manufacturer's recommendations.

## 20. FALL PROTECTION

Fall protection is required for employees working at the edge of excavations greater than 6 feet deep if excavations are not readily seen because of plant growth or other visual barrier, or if they require employees to enter and be on the vertical wall of the excavation, on the protective system, or on any other structure in the excavation.

Walkways and bridges over excavations must be equipped with standard guardrails in accordance with CSHM-18, Walking/Working Surfaces. Adequate barriers must be provided at all excavations. All wells, pits, shafts, etc., must be barricaded or covered.

Upon completion of exploration and similar operations, all wells, pits, shafts, etc., must be backfilled.

## 21. INSPECTIONS

A competent person must conduct daily inspections of excavations, access ramps, adjacent areas, and protective systems in accordance with the Daily Excavation Inspection (Attachment CSHM-33-04) for evidence of:

- ◆ Situations that could result in possible cave-ins
- ◆ Failure of protective systems
- ◆ Hazardous atmospheres or conditions

The competent person conducts inspections when employee exposure can be reasonably anticipated:

- ◆ Prior to the start of work
- ◆ As needed throughout the shift
- ◆ After every rainstorm or other hazard-increasing condition

If the competent person finds evidence of a situation that could result in a possible cave-in or any hazardous condition, he immediately notifies the project manager of such conditions, and all employees will immediately respond accordingly. Exposed employees must be evacuated until precautions can be taken to ensure their safety.

The competent person is responsible for taking whatever measures are appropriate to correct or eliminate potentially hazardous conditions associated with the excavation before any additional work in that section of the excavation begins.



The competent person submits the completed inspection forms to the SSHO each month. The SSHO reviews the inspection forms and monitors excavations on projects.

## 22. TRAINING

Parsons trains affected employees and the competent person at the time of their initial assignment. Subcontractors must train their own employees. However, the SSHO must ensure that all workers involved in the task receive all known information.

The SSHO arranges employee awareness training for affected employees who conduct work within or in the vicinity of excavations. Employees are trained on the following topics:

- ◆ Requirements of the standards
- ◆ Requirements of the project excavation plan
- ◆ Hazards relating to excavation work
- ◆ Methods of protection for excavation hazards
- ◆ Use of PPE
- ◆ Procedures regarding hazardous atmospheres
- ◆ Emergency and nonentry rescue procedures

The SSHO arranges training for the competent person. The SSHO evaluates the competent person annually in accordance with the Competent Person Assessment Checklist (Attachment CSHM-33-05). Training includes the following topics:

- ◆ Methods of evaluating the site and conducting inspections in accordance with this CSHM element
- ◆ Evaluation and selection of protection methods
- ◆ Ensuring compliance with this CSHM element
- ◆ Requirements under additional applicable elements such as Confined Space (CSHM-15) and Fall Protection (CSHM-22)

During daily huddles, supervisors review the relevant AHAs with excavation workers and brief them on details of the following:

- ◆ Type of excavation to be performed
- ◆ Location, depth, and overall size of the excavation
- ◆ Shoring/shielding/sloping requirements
- ◆ Means of entry and egress
- ◆ Special conditions and permits anticipated (such as confined space)
- ◆ Existing buried utilities and hazards
- ◆ Remaining surface items located near the excavation
- ◆ Equipment to be used
- ◆ Provisions for disposal of spoilage
- ◆ Work to be performed in the excavation

Employees are retrained every 3 years or when there are inadequacies in the employee's knowledge or use of excavations. The retraining re-establishes the employee's proficiency.



Using an acceptable training form, the records custodian maintains a record of all training or instruction given to employees.

## 23. DOCUMENTATION

The records custodian documents all excavation instruction, training, and retraining records. Records verifying completion of training are kept in the employee's individual training files.

All information regarding the identification of underground installations is transferred to the appropriate drawings and/or prints and must be available on site. Drawings and/or prints are maintained for the life of the project.

The project engineer's recommended protective systems must be documented in sufficient detail to establish compliance with OSHA excavation requirements. The recommendations must be signed by the project engineer, and the report must be maintained at the jobsite.

When manufactured support systems are used, the manufacturer's written specifications, recommendations, and limitations must be maintained at the jobsite.

The SSHO maintains the project records (including designs, permits, notices, and completed inspections) at the site for the duration of the project and archives them at project closeout.

## 24. REFERENCES

29 CFR 1926, Subpart P

29 CFR 1910.146, 1910.120(a), 1910.23(e)(7)(i)

EM 385-1-1 Safety–Safety and Health Requirements, Section 25, Excavations; Section 32.A.06, Airfield Operations: General

Parsons SHARP Manual

Utility Location and Coordination Committee, One-Call System International Directory, 2002, and Excavator's Damage Prevention Guide

## 25. ATTACHMENTS

CSHM-33-01	Excavation Permit
CSHM 33-02	Uniform Color Code Card
CSHM-33-03	Support Systems
CSHM-33-04	Daily Excavation Inspection Form
CSHM 33-05	Competent Person Assessment Checklist



Supervisor(s): \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Permit No. \_\_\_\_\_  
 Date/Time Issued: \_\_\_\_\_ / \_\_\_\_\_  
 \_\_\_\_\_

Date/Time Expires: \_\_\_\_\_ / \_\_\_\_\_

Location of Excavation: \_\_\_\_\_

Excavation Dimensions: \_\_\_\_\_

Soil Type: \_\_\_\_\_

Nature of Work\*: \_\_\_\_\_

*\*If the nature of work is subject to change, a new permit must be issued.*

Safety Requirements/Precautions	Yes	No	N/A
1. Surface Encumbrances Identified/Secured	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Underground Utilities Identified/Located	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Utilities Protected	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. System Lockout/Tagout (Tag ID No. _____)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Access and Egress	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Protection From Vehicular Traffic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Equipment/Tool Grounding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Manual Digging	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Protection From Water Accumulation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Warning System For Mobile Equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Stability of Adjacent Structures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Site Inspections	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Confined Space Permit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Atmospheric Testing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Additional Safety Requirements/Precautions _____			
_____			
_____			

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**Atmospheric Testing Results**

**1. Oxygen Test**

Note: Safe Range of 20.5% to 22% required

Initial Testing Required \_\_\_\_\_ Periodic Testing Required \_\_\_\_\_  
 Test Time \_\_\_\_\_ % Oxygen \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**2. Combustible Test**

Note: Safe range < 10% LEL

Initial Testing Required \_\_\_\_\_ Periodic Testing Required \_\_\_\_\_  
 Test time \_\_\_\_\_ % LEL \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**3. Toxicity Test**

Substance Tested For \_\_\_\_\_

Time Tested \_\_\_\_\_ PEL/TLV \_\_\_\_\_ Exposure Level \_\_\_\_\_

Person Taking Sample: \_\_\_\_\_

**\*\*\* IN CASE OF EMERGENCY, CALL EXTENSION \_\_\_\_\_ \*\*\***

**Protective System**

- |                                   |        |   |   |   |   |
|-----------------------------------|--------|---|---|---|---|
| 1. Sloping and benching           |        |   |   |   |   |
| 2. Support System (Shoring) _____ | OPTION | 1 | 2 | 3 | 4 |
| 3. Shield System _____            | OPTION | 1 | 2 | 3 | 4 |
| _____                             | OPTION | 1 | 2 | 3 | 4 |

Date/Time Work Start: \_\_\_\_\_ Date/Time Completed: \_\_\_\_\_ / \_\_\_\_\_

Approval: \_\_\_\_\_ Date/Time: \_\_\_\_\_ / \_\_\_\_\_

Approval: \_\_\_\_\_ Date/Time: \_\_\_\_\_ / \_\_\_\_\_


Owner Representative \_\_\_\_\_ Date/Time: \_\_\_\_\_ / \_\_\_\_\_

Parsons Supervisor \_\_\_\_\_ Date/Time: \_\_\_\_\_ / \_\_\_\_\_









Parsons Engineer \_\_\_\_\_ Date/Time: \_\_\_\_\_ / \_\_\_\_\_

Parsons Safety Representative \_\_\_\_\_ Date/Time: \_\_\_\_\_ / \_\_\_\_\_



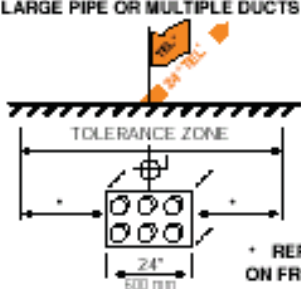


## UNIFORM COLOR CODE

	WHITE - Proposed Excavation
	PINK - Temporary Survey Markings
	<b>RED</b> - Electric Power Lines, Cables, Conduit and Lighting Cables
	<b>YELLOW</b> - Gas, Oil, Steam, Petroleum or Gaseous Materials
	<b>ORANGE</b> - Communication, Alarm or Signal Lines, Cables or Conduit
	<b>BLUE</b> - Potable Water
	<b>PURPLE</b> - Reclaimed Water, Irrigation and Slurry Lines
	<b>GREEN</b> - Sewers and Drain Lines

### TYPICAL MARKING

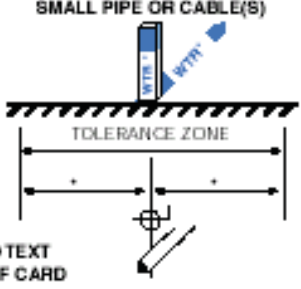
**LARGE PIPE OR MULTIPLE DUCTS**



TOLERANCE ZONE

24"  
600 mm

**SMALL PIPE OR CABLE(S)**



TOLERANCE ZONE

\* REFER TO TEXT ON FRONT OF CARD

Customize with your center's phone and address information

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The competent person selects the design of support systems, shield systems, and other protective systems to be constructed in accordance with one of the following options.

### Option 1: Designs Using OSHA Criteria

Use timber shoring and aluminum hydraulic shoring in accordance with OSHA criteria. If this option is selected, contact SSHO to coordinate design and implementation of these systems.

### Option 2: Designs Using Manufacturer's Tabulated Data

Construct support systems, shield systems, or other protective systems (e.g., trench boxes) drawn from manufacturer's tabulated data and use them in accordance with all specifications, recommendations, and limitations issued or made by the manufacturer.

Deviation from the specifications, recommendations, and limitations issued or made by the manufacturer are allowed only after the manufacturer issues specific written approval.

Manufacturer's specifications, recommendations, and limitations—and manufacturer's approval to deviate from the specifications, recommendations, and limitations—must be kept in written form at the jobsite during construction of the protective system. After that time, this data may be stored off the jobsite, but a copy must be available to EHSS upon request.

### Option 3: Designs Using Other Tabulated Data

Select the designs of support systems, shield systems, or other protective systems in accordance with tabulated data, (e.g., tables and charts) and construct them accordingly. The tabulated data must be in written form and must include all of the following information:

- Factors that affect the selection of a protective system drawn from such data
- Limits of use of the data
- Information needed by the user to select the correct protective system from the data

At least one copy of the tabulated data, identifying the registered professional engineer who approved the data, must be maintained at the jobsite during construction of the system. After that time the data may be stored off the jobsite, but a copy of the data must be made available to EHSS upon request.

### Option 4: Design by a Registered Professional Engineer

Support systems, shield systems, and other protective systems not using the options detailed in options 1, 2, or 3 above must be approved by a registered professional engineer.

Designs must be in written form and must include the following:

- A plan indicating the sizes, types, and configurations of the materials to be used in the protective system
- The identity of the registered professional engineer approving the design

At least one copy of the design must be maintained at the jobsite during construction of the protective system. After that time, the design may be stored off the jobsite, but a copy of the design must be available to EHSS upon request.





## Materials and Equipment

Materials and equipment used for protective systems must be free from damage or defects that might affect their proper function.

Manufactured materials and equipment used for protective systems must be used and maintained in accordance with the recommendations of the manufacturer, and in a manner that prevents employee exposure to hazards.

If material or equipment used for protective systems is damaged, the competent person must ensure that these systems are examined by a qualified person to evaluate its suitability for continued use. If the competent person cannot assure the material or equipment can support the intended loads or is otherwise suitable for safe use, then such material or equipment must be removed from service. These materials or equipment must be evaluated and approved by a registered professional engineer before they are returned to service.

## Installation and Removal of Support

Members of support systems must be securely connected together to prevent sliding, falling, kickouts, or other potential hazards.

Support systems must be installed and removed in a manner that protects employees from cave-ins, structural collapses, or from being struck by members of the support system.

Individual members of support systems cannot be subjected to loads that are greater than those they were designed to withstand.

Before temporary removal of individual support members begins, additional precautions must be taken as directed by the competent person to ensure the safety of employees. These precautions could include the installation of other structural members to carry the loads imposed on the support system.

Removal of support systems must begin at, and progress from, the bottom of the excavation. Members must be released slowly. If there is any indication of possible failure of the remaining members of the structure or possible cave-in of the sides of the excavation, the work must be halted until it can be examined by the project manager.

Backfilling must progress together with the removal of support systems from excavations.

Additional requirements for support systems for trench excavations are as follows:

- Excavation of material to a level no greater than 2 feet below the bottom of the members of a support system is allowed, but only if the system is designed to resist the forces calculated for the full depth of the trench. While the trench is open, there must be no indication of a possible loss of soil from behind or below the bottom of the support system.
- Installation of a support system must be closely coordinated with the excavation of trenches.

## Shield Systems

Shield systems cannot be subjected to loads that are greater than those they were designed to withstand.

Shields must be installed in a manner that restricts lateral or other hazardous movement of the shield that could occur during cave-in or unexpected soil movement.



Employees must be protected from the hazard of cave-ins when entering or exiting the areas protected by shields.

Employees are not allowed in shields when shields are being installed, removed, or moved vertically.

In trench excavations, excavation of material to a level no greater than 2 feet below the bottom of the shield system is allowed, but only if the system is designed to resist the forces calculated for the full depth of the trench. While the trench is open, there must be no indication of a possible loss of soil from behind or below the bottom of the shield system.



Date: _____		Job No: _____		Location _____	
Competent Person: _____			Gas Monitor Ser No.: _____		
Inspect excavations throughout the work period. If conditions change, complete a new inspection form.					
Time: _____	<input type="checkbox"/> a.m. <input type="checkbox"/> p.m.	Weather: _____			
Time: _____	<input type="checkbox"/> a.m. <input type="checkbox"/> p.m.	Weather: _____			
Time: _____	<input type="checkbox"/> a.m. <input type="checkbox"/> p.m.	Weather: _____			
Time: _____	<input type="checkbox"/> a.m. <input type="checkbox"/> p.m.	Weather: _____			
<b>Locates</b>	Date: _____	Confirmation No.: _____	Locates visible <input type="checkbox"/> Y <input type="checkbox"/> N		
<b>Jobsite Hazards</b>			<b>Work Practices</b>		
<input type="checkbox"/> Vehicular Traffic	<input type="checkbox"/> Mobile Equipment	Traffic Control: <input type="checkbox"/> Signs	<input type="checkbox"/> Cones	<input type="checkbox"/> Barricades	
<input type="checkbox"/> Overhead Obstructions	<input type="checkbox"/> Underground Installations	Ladders: <input type="checkbox"/> Within 25 ft	<input type="checkbox"/> Extends 3 ft	<input type="checkbox"/> Accumulation	
<input type="checkbox"/> Falling Loads	<input type="checkbox"/> Hazardous Atmosphere	Dewatering: <input type="checkbox"/> CP monitors	<input type="checkbox"/> Proper operations	<input type="checkbox"/> Supplied Air	
<input type="checkbox"/> Adjacent Structures	<input type="checkbox"/> Surface Encumbrances	Atmosphere: <input type="checkbox"/> Ventilation	<input type="checkbox"/> Monitoring	<input type="checkbox"/> Other	
		Equipment: <input type="checkbox"/> >2 ft from edge	<input type="checkbox"/> Warning device		
<b>Soil Stability</b>					
<input type="checkbox"/> Previously disturbed by underground structures or utilities			<input type="checkbox"/> Soil subject to thawing conditions		
<input type="checkbox"/> Soil subject to vibration from adjacent area or from equipment used in the excavation?			<input type="checkbox"/> Soil subject to surcharge from spoils, materials, or equipment?		
<b>Perform a Visual and a Manual Test</b>					
<b>Y N</b>		<b>Visual Test</b>		<b>Y N</b>	
<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> Soil spill from excavator bucket in cohesive clumps or granular stream?		<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> Particle sizes of predominate soils are fine grained, course grained, or gravel?	
<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> Soil exist in layered system Layers slope: _____ % Slope		<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> Soil is fissured?	
<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> Presence of rock?		<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> Rock is stable?	
<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> Accumulating runoff?		<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> High groundwater table?	
<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> Seeping from sides?		<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> Submerged in surface water (creeks, etc.)?	
<b>Manual Test</b>					
Penetrometer Readings (Minimum of five test must be completed)					
1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____ 7. _____ 8. _____ 9. _____ 10. _____					
Average tsf: <input type="checkbox"/> <0.5 tsf = Type C <input type="checkbox"/> 0.5 – 1.5 tsf = Type B <input type="checkbox"/> >1.5 tsf = Type A					
Plasticity Test					
Length of 1/8" thread that can be held horizontally inches <input type="checkbox"/> <2" = Granular <input type="checkbox"/> >2" = Cohesive					
<b>Thumb Penetration Test</b>					
All tests should be run on:		<input type="checkbox"/> Great effort/not at all		<input type="checkbox"/> Effort	
<ul style="list-style-type: none"> <li>• Large clump of spoil material</li> <li>• As soon as excavated</li> <li>• Later after wetting</li> <li>• Reclassified</li> </ul>		<input type="checkbox"/> Can only indent		<input type="checkbox"/> Easy	
<b>TYPE A</b>		<b>TYPE B</b>		<b>TYPE C</b>	
<b>Soil Test Classification</b>			<b>Personnel Protective System Chosen</b>		
Results of Testing: Soil Type <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C			Protection Chosen: <input type="checkbox"/> Sloping <input type="checkbox"/> Shielding <input type="checkbox"/> Shoring		
<b>Trench Box Information</b>					
<b>Y N</b>		<b>Y N</b>			
<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> Trench box drawings available		<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> PE Stamped drawings available for special shoring	
<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> Stack locking Pins available and used		<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> Spreader bar pin installed and safety pinned	
<b>Comments:</b>					
<b>N O T E</b>	All unsafe conditions must be corrected before trench entry. If any hazardous conditions are observed, the trench must be immediately evacuated and no one allowed to re-enter until corrective action has been taken.			(To be completed by the designated competent person) <b>Excavation Entry Authorized By:</b> _____ <b>Competent Person</b>	

V:\CSHM MANUAL\33-04 DAILY EXCAVATION INSPECTION.DOC\071006



Employee Name: \_\_\_\_\_

Interviewed by: \_\_\_\_\_

QUESTION	RESPONSE	P	NP
Prior to excavating, how are underground utilities located?	Call AWWA One Call	<input type="checkbox"/>	<input type="checkbox"/>
Who can design structural ramps use for access or egress from excavations?	The competent person.	<input type="checkbox"/>	<input type="checkbox"/>
How far apart must ladders, stairways, or ramps be spaced when used as a means of egress from trench excavations?	No more than 25 feet of lateral travel for employees.	<input type="checkbox"/>	<input type="checkbox"/>
When is atmosphere testing required prior to entry into an excavation?  Give two examples.	Where oxygen deficiency or a hazardous atmosphere exist or could reasonable be expected to exist in excavations greater than 4 feet. <ul style="list-style-type: none"> <li>• Operating gas-powered equipment in an excavation.</li> <li>• Striking a utility such as a gas line.</li> <li>• Natural decay products.</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>
What precautions can be taken to prevent employee exposure to oxygen-deficient atmosphere?	Continuous ventilation.	<input type="checkbox"/>	<input type="checkbox"/>
Can an employee work in an excavation where there is an accumulation of water?	Only when adequate precaution has been taken to protect employees against the hazards posed by water accumulation. (i.e., trench-box, water removal, or use of safety harness and life-line.	<input type="checkbox"/>	<input type="checkbox"/>
Who monitors the water removal operations?	The competent person.	<input type="checkbox"/>	<input type="checkbox"/>
What are some methods used to prevent materials (loose rock or soil) from falling into an excavation?	<ul style="list-style-type: none"> <li>• Scaling</li> <li>• Protective barricades</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>
How far from the edge of an excavation should materials and equipment be placed?	Material and equipment must be stored at least 2 feet from the edge of an excavation if no protective barricade is in place.	<input type="checkbox"/>	<input type="checkbox"/>
How frequently does an excavation must be inspected?	Every day at the beginning of the work shift, throughout the day, and after every rainstorm or other hazard causing event.	<input type="checkbox"/>	<input type="checkbox"/>
How does the competent person document these inspections?	On the daily excavation inspection form.	<input type="checkbox"/>	<input type="checkbox"/>
What is the competent person evaluating when he/she conducts the daily inspections?	Adjacent areas, protective systems, evidence of a situation that could result in possible cave-ins, indications of failure in protective systems, hazardous atmospheres, or other hazardous conditions.	<input type="checkbox"/>	<input type="checkbox"/>
When is fall protection required when working in or around excavations?	Where walkways extend over an excavation >4 feet deep.	<input type="checkbox"/>	<input type="checkbox"/>
What are some means of adequate barrier physical protection for excavations?	Warning lines, physical barriers, manhole covers, guard rails, plywood with the word HOLE painted on it.	<input type="checkbox"/>	<input type="checkbox"/>
How does the competent person verify capacity of protective systems?	<ul style="list-style-type: none"> <li>• Tabulated data stamped by registered engineer readily available onsite.</li> <li>• Competent person should demonstrate ability to read and understand specifications.</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>
How far can material be excavated below the bottom members of a support system?	2 feet maximum.	<input type="checkbox"/>	<input type="checkbox"/>



QUESTION	RESPONSE	P	NP
Can an employee be inside of a trench box while it is being: <ul style="list-style-type: none"> <li>• Installed?</li> <li>• Removed?</li> <li>• Moved vertically?</li> </ul>	No	<input type="checkbox"/>	<input type="checkbox"/>
What are the four types of soil?	Solid rock and Type A, B, and C	<input type="checkbox"/>	<input type="checkbox"/>
By what criteria does the competent person classify the soil prior to excavation?	<ul style="list-style-type: none"> <li>• One manual</li> <li>• One visual</li> <li>• One of each is the minimum criteria for classifying soil</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>
Explain the types of manual tests that are acceptable to meet the regulatory requirements.  All are found in the OSHA Regulations, Appendix A	<ul style="list-style-type: none"> <li>• Pocket penetrometer</li> <li>• Shear vane</li> <li>• Thumb test</li> <li>• Play dough test (roll into 1/8 inch) log and let a 2-inch piece dangle (also known as plasticity)</li> <li>• Crumble a dry ball of excavated material</li> <li>• Drying test</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>
Explain the types of visual tests that are acceptable to meet the regulatory requirements.	<ul style="list-style-type: none"> <li>• Soil that remains in clumps</li> <li>• Crack-like openings such as tension cracks could indicate fissured material</li> <li>• Evidence of existing utility and other underground structures</li> <li>• Identify layered systems</li> <li>• Sources of vibration</li> <li>• Sources of water</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>
What is the maximum allowable slope for the following: 1. Stable rock 2. Type A soil 3. Type B soil 4. Type C soil	1. Vertical (90°) 2. 3/4 : 1 (53°) 3. 1 : 1 (45°) 4. 1 1/2 : 1 (34°)	<input type="checkbox"/>	<input type="checkbox"/>
What are the requirements for type A, B, and C soils?	See definitions in the OSHA Regulations, Appendix A.	<input type="checkbox"/>	<input type="checkbox"/>
Slopes and configurations of sloping and benching systems are selected and constructed by the employer or employer's designee and must be in accordance with what four requirements?	<ul style="list-style-type: none"> <li>• Configuration and slopes</li> <li>• Determination of slopes and configurations using Appendixes A and B</li> <li>• Designs using other tabulated data</li> <li>• Design by a registered professional engineer</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>
What is the maximum bench (simple or multiple) on an excavation < 20 feet with Type A soil?	4 feet maximum	<input type="checkbox"/>	<input type="checkbox"/>
On an excavation > 8 feet and < 12 feet, what is the maximum allowable vertical sides without a protective system? Slope?	<ul style="list-style-type: none"> <li>• 3 1/2 feet maximum</li> <li>• 1 : 1</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>



# APPENDIX J SIGNS, BARRICADES AND TRAFFIC CONTROL

## 1. DESCRIPTION

This element of the Parsons CSHM explains Parsons requirements for signs, labels, barriers, signals, and traffic control. This element applies to all Parsons personnel and subcontractors working on Parsons construction projects at any location worldwide, regardless of country of operation and/or GBU.

This element does not address MUTCD, U.S. Department of Transportation (DOT), or state and local transportation or traffic control requirements.

## 2. DEFINITIONS

Term	Description
Activity Hazards Analysis (AHA)	A procedure, described in Parsons SHARP Manual, used to identify the hazards or potential hazards associated with each step of a job or work plan to uncover hazards and then eliminate, control, or remove them before the work is started.
Barricade	An obstruction to deter the passage of persons or vehicles.
Emergency	An unforeseen occurrence endangering life, limb, or property.
MUTCD	Federal Highway Administration's Manual on Uniform Traffic Control Devices.
Signs	A warning of a hazard, temporarily or permanently affixed or placed, at locations where hazards exist.
Signals	A moving sign provided by workers (e.g., flaggers) or by devices (e.g., flashing lights) to warn of possible or existing hazards.
Tags	A temporary sign, usually attached to a piece of equipment or part of a structure, to warn of existing or immediate hazards.

## 3. RESPONSIBILITIES

Role	Responsibility
Corporate Health and Safety	<ul style="list-style-type: none"> <li>Reinforce the need to comply with requirements.</li> <li>Provide structure for safety programs and training.</li> </ul>
GBU Safety Director	<ul style="list-style-type: none"> <li>Responsible for providing support to ensure the success of this element.</li> <li>Audit the effectiveness of this element.</li> </ul>
Project Manager	<ul style="list-style-type: none"> <li>Responsible for implementing and enforcing this element.</li> <li>Facilitate implementation and enforce the project traffic control plan.</li> <li>Designate person(s) to conduct activities within the traffic control plan.</li> <li>Determine barricade requirements for heavy equipment.</li> <li>Add work requiring traffic control to the schedule.</li> </ul>
Records Custodian	<ul style="list-style-type: none"> <li>Document and maintain records of employee training.</li> </ul>
Superintendent	<ul style="list-style-type: none"> <li>Facilitate compliance with and enforce this element.</li> <li>Notify the project manager of any work requiring traffic control to be conducted during the 2-week look-ahead.</li> </ul>



Role	Responsibility
Site Safety and Health Officer (SSHO)	<ul style="list-style-type: none"> <li>• Monitor and assist in implementation of this element.</li> <li>• Facilitate implementation and enforce the project traffic control plan.</li> <li>• Conduct orientations for subcontractors and new employees.</li> <li>• Determine training needs and coordinates employee training.</li> <li>• Review subcontractor traffic control plan and provide comments to subcontractor.</li> <li>• Provide the regulatory expertise to ensure that activities are conducted in compliance with applicable codes, standards, and regulations.</li> <li>• Maintain and archive project records.</li> </ul>
Foreman/Supervisor	<ul style="list-style-type: none"> <li>• Supervise work and enforce this element.</li> <li>• Notify the project manager of any work requiring traffic control to be conducted during the 2-week look-ahead.</li> <li>• Conduct daily safety huddles emphasizing the recognition and avoidance of hazards delineated using signs and barriers.</li> </ul>
Qualified Person(s)	<ul style="list-style-type: none"> <li>• Develop and implement the project traffic control plan.</li> </ul>
Designated Person(s)	<ul style="list-style-type: none"> <li>• Specify requirements to enter barricaded areas.</li> <li>• Warn or direct traffic during emergencies.</li> <li>• Develop and implement flagger warning method.</li> <li>• Oversee and ensure compliance with the project traffic control plan.</li> </ul>
Employees	<ul style="list-style-type: none"> <li>• Comply with the requirements of this element.</li> </ul>
Subcontractors	<ul style="list-style-type: none"> <li>• Comply with all Parsons requirements.</li> <li>• Develop and implement a written traffic control plan.</li> <li>• Train subcontractor employees.</li> </ul>

## 4. SIGNS AND LABELS

- ◆ Signs must point out a hazardous condition, notify persons to proceed with caution, or provide instruction, direction, or information.
- ◆ Entrances to hazardous areas (i.e., spills, leaks, wet floors, fumes, or x-rays) require signage.
- ◆ Use correct signs for each situation or condition, and remove them when the hazard is eliminated.
- ◆ Post legible traffic signs at points of hazard in construction areas. Post acceptable speed limits at all curves.
- ◆ Use signs in the following instances, in accordance with applicable CSHM sections:
  - Aerial lift operation
  - Asbestos and lead abatement
  - Blasting locations
  - Closed roads
  - Concrete lift-slab





- Confined spaces
- Energized circuits or power lines
- Equipment under repair
- Exits
- Flammable storage
- Heavy equipment work areas
- High noise areas
- Powder actuated tools
- Pressure vessel test areas
- Underground access openings
- Unstable excavations
- Waste disposal vertical drop areas

◆ Signs must adhere to the following requirements:

- Use danger signs where an immediate hazard exists. Danger signs have red as the predominant color with the word “DANGER” printed on them.



- Use caution signs to warn against potential hazards or to caution against unsafe practices. Caution signs have yellow as the predominant color with the word “CAUTION” printed on them.



- Informational signs have blue as the predominant color.
- Exit signs must have the word “EXIT” in plainly legible letters greater than 6 inches high. Every exit sign must be distinctive in color and provide contrast with decorations, interior finish, or other signs.
- Safety instruction signs are white with a green upper panel with white letters to convey the principal message. Any additional wording on the sign is in black letters on the white background.
- The wording of any sign must be concise and easy to read.
- Signs required to be seen at night must be lighted or reflectorized.



- ◆ Use accident prevention tags as a temporary means of warning employees of an existing hazard, such as defective tools, equipment, etc. They are not used in place of signs.
- ◆ Identify piping systems (including pipes, fittings, valves, and pipe coverings), and identify asbestos-containing materials and/or presumed asbestos-containing materials, in accordance with CSHM-35, Asbestos and Lead.
- ◆ Use specific hazard-warning signs or labels to identify radio frequency (RF) radiation hazards, lasers, and ionizing radiation sources.
- ◆ Label, tag, or mark hazardous material containers in accordance with CSHM-10, Hazard Communication.

## 5. BARRICADES

- ◆ Designated persons responsible for erecting the barricades must specify the authorized personnel and/or necessary PPE to enter the barricaded area.
- ◆ Barricades must completely enclose areas of a more hazardous nature and must cover enough space to properly protect personnel.
- ◆ Place barricades no less than 6 feet from the hazard.
- ◆ When a hazardous condition develops that warrants a barricade, post designated persons at area entrances to warn or exclude traffic until the area can be properly posted.
- ◆ Use warning signs in conjunction with barricaded areas.
- ◆ Do not use material provided as barricade equipment for any other purposes.
- ◆ Use tape or rope colors for the following barricade categories:
  - Red tape: imminent danger areas (keep out)
  - Yellow tape or rope: use caution before entering (proceed with caution)
  - Purple and yellow tape: radiation area (keep out)

### 5.1 FENCING

- ◆ Provide temporary project fencing for all projects located in areas of active use by the public. Also, consider those areas near family housing areas and/or school facilities.
- ◆ Post signs warning of the presence of construction hazards and requiring unauthorized persons to keep out of the construction area on all fenced sides and space them at one sign every 300 feet.
- ◆ For areas of minimal public exposure, fencing is not required; post signs warning of construction hazards.

Barricaded areas, or areas where “keep out” signs are posted, are to be entered only with specific permission from those working in the area, supervision responsible for work, or from persons posted as a “Safety Guard.” When personnel are given permission to enter a barricaded area, they must follow these practices:

- ◆ Observe carefully for hazards.
- ◆ Wear prescribed protective equipment.



- ◆ You are responsible for your own safety.
- ◆ Take extra precaution while in the area.
- ◆ Leave the barricaded area as quickly as possible.
- ◆ Never remove barricades or signs without permission from the designated person.

## 5.2 HEAVY EQUIPMENT BARRICADES

When the level of the rotating superstructure of a crane, excavator, pile driving rig, or other similar equipment is less than 7 feet above the support mats or ground level, barricade the swing radius in a manner to visually alert an employee of the hazard of being struck or crushed by the equipment.

Use the barricade as a warning of the hazardous condition. It is not necessarily a physical barrier intended to prevent entry; it is a warning of a hazard, and all employees are trained to respect it as such.

- ◆ All crane barricades conform to a standard handrail height of 42 inches as often as is practical.
- ◆ If the project manager determines that a crane, excavator, or pile driving rig is to be stationed at one location for a long period, a semipermanent guardrail built of lumber or steel is the most suitable and requires the least maintenance.
- ◆ For cranes, excavators, backhoes, and pile driving rigs that frequently move to different locations, it is recommended that barricades be attached to the body of the equipment. This guarantees that the barricade is always available and eliminates the time-consuming collection and erection of barricades each time the equipment is moved.

## 6. SIGNALING AND FLAGGERS

Use flaggers or other appropriate traffic controls when signs, signals, and barricades do not provide necessary protection from traffic at operations on, or adjacent to, a highway or street.

Use certified flaggers only when other reasonable traffic control methods do not adequately control traffic in the work zone. Personnel who have not completed a flagger training course may be assigned duties as flaggers only during emergencies and only until a certified flagger can be put into the position.

Flagger signaling must conform to the guidelines of the Federal Highway Administration's MUTCD. Use approved sign paddles or lights for flagger hand signaling. During emergency situations, red flags may be used to draw a driver's attention to particularly hazardous conditions.

A flagger must wear the following required PPE:

- ◆ High-visibility fluorescent vest
- ◆ High-visibility hard hat
- ◆ High-visibility pants (at night or when snow or fog limits visibility)



## 6.1 FLAGGER PROTECTION

When it is not possible to position flaggers to eliminate traffic exposure, the designated person develops and implements a method to ensure that flaggers have adequate warning of traffic and equipment approaching from behind. The following are nonmandatory examples of methods that may be used to warn flaggers:

- ◆ Mount a mirror on the flagger's hard hat
- ◆ Use a motion detector with an audible warning
- ◆ Use a spotter
- ◆ Use "jersey" barriers

For all flagging operations, a three-sign advance warning sequence is required on all roadways with a speed limit below 45 mph. A four-sign advance warning sequence is required on all roadways with a speed limit of 45-mph or higher. The following table shows the required spacing for advance warning sign placement.

Road Type	Distances Between Advance Warning Signs (feet)			
	A	B	C	D
Urban low speed	200	200	200	NA
Urban high speed	350	350	350	350
Rural	500	500	500	500
Expressway/freeway	1,000	1,600	2,600	2,600

- ◆ Flagger workstations must be illuminated by floodlights during hours of darkness:
  - In no case can floodlighting be permitted to create a disabling glare for drivers. The adequacy of floodlight placement and elimination of potential glare can best be determined by driving through and observing the floodlit area from each direction on the main roadway after initial floodlight setup.
  - Emergency situations are exempt from illumination requirements. For this rule, "emergency" means an unforeseen occurrence endangering life, limb, or property.
- ◆ Flagger are not assigned other duties while engaged in flagging activities.
- ◆ Flagger do not use devices (e.g., cell phones, pagers, radio headphone) that may distract their vision, hearing, or attention. Devices used for communications between flaggers to direct traffic or ensure flagger safety are acceptable.
- ◆ Flagger must receive frequent breaks from flagging so they can remain attentive and alert.

## 7. PROJECT TRAFFIC CONTROL PLAN

When flaggers are used on a job that lasts more than 1 day, enact a project traffic control plan. The purpose of this plan is to help move traffic through or around the construction zone in a way that protects the safety of the traveling public, pedestrians, and workers.



- ◆ The project traffic control plan is included in the project safety plan in accordance with the Parsons SHARP Manual.
- ◆ A qualified person develops and implements the traffic control plan in accordance with federal, state, and local regulations and this CSHM element.
- ◆ The project manager and SSHO facilitate implementation and compliance with the plan.
- ◆ The designated person is responsible for overseeing the project traffic control plan and monitors the employees and subcontractors to ensure compliance.
- ◆ Before beginning work on a Parsons project site, subcontractors must develop and implement a written traffic control plan and submit it to the project subcontracts manager for approval.
- ◆ During the 2-week look-ahead, superintendents and supervisors notify the project manager of any work requiring traffic control to be conducted. The project manager adds the work to the schedule.
- ◆ Traffic control devices, signs, and barricades must be set up and used according to the guidelines and recommendations in MUTCD.
- ◆ Jobsite workers with specific traffic control responsibilities must be trained in traffic control techniques, device usage, and placement.
- ◆ At a minimum, the project traffic control plan must include the following information:
  - Name of the qualified person responsible for maintaining the program, and communicating program requirements to employees and other employers
  - Name of designated person(s)
  - AHAs and daily huddles
  - Provisions for inspections and surveillance
  - Provisions for training
  - Sign use and placement
  - Application and removal of pavement markings
  - Construction
  - Scheduling
  - Methods and devices for delineation and channelization
  - Placement and maintenance of devices
  - Placement of flaggers
  - Roadway lighting
  - Traffic regulations

## 8. TRAINING

Parsons trains employees in the caution and warning methods used during work. Subcontractors must train their own employees.

The SSHO arranges employee training at the time of initial assignment. Supervisors are responsible for identifying additional employee training needs during risk mitigation planning (2-week look-ahead) in accordance with the SHARP Manual. Training can be organized and presented to groups or on a work area by work area basis, depending on the operation.



Supervisors instruct all employees in the recognition and avoidance of hazards delineated using signs and barriers during daily safety huddles.

**8.1 FLAGGER TRAINING REQUIREMENTS**

Each flagger must be trained every 3 years on the MUTCD (in accordance with state certification requirements) and must carry a certification card.

The SSHO and/or supervisor in charge of work conducts an orientation that familiarizes the flagger with the jobsite each time the flagger is assigned to a new project, or when jobsite conditions change significantly.

**8.2 RETRAINING**

Retraining is provided for employees when there is a change in their job assignments or a change in equipment or processes that present a new hazard.

Additional retraining is conducted whenever there are deviations from, or inadequacies in, the employee’s knowledge or use of proper procedures. The retraining re-establishes employee proficiency and introduces new or revised control methods and procedures, as necessary.

Using an acceptable training form, the records custodian maintains a record of all training or instruction given to employees.

**9. DOCUMENTATION**

The records custodian documents all instruction and training. The SSHO maintains these records at the site for the duration of the project and archives the records at project close.

**10. REFERENCES**

29 CFR 1910.144, 1910.145, 1910.335(b), 1910.1201  
29 CFR 1926, Subpart G

EM 385-1-1, Safety – Safety and Health Requirements, Section 8, Accident Prevention Signs, Tags, Labels, signals, Piping System Identification, and Traffic Control

Federal Highway Administration’s Manual on Uniform Traffic Control Devices (MUTCD)

Parsons SHARP Manual



# APPENDIX K AIR MONITORING PLAN

# **EAST CHICAGO SITE - AIR MONITORING PLANS**

This air monitoring plan has been developed for the former Chemours East Chicago site to address community and worker protection. The plan consists of three elements: work area sampling for determining Site concentration levels of airborne particulate and target metals, personal air sampling for construction workers, and periodic real-time monitoring for dust levels that will aid in decision-making for implementing dust control measures.

## **1. WORK AREA AIR SAMPLING PLAN**

The East Chicago Site interim cleanup involves of a series of soil excavations in the eastern portion of the Site along the Buffer Zone to the Natural Area. Remediation activities consist of the excavation, moving, and storage of contaminated soils and have the potential to generate airborne dust that could migrate from the active work areas. While dust suppression measures such as water spraying will be in place to help control particulate concentrations in the air, work area air sampling will be implemented to document the actual particulate and metal concentrations levels that occur over the course of typical construction days. This plan describes the air sampling approach that will be implemented.

The objective of the work area air sampling is to determine the air concentrations of dust and contaminant metals downwind of an active work area but before potential particulate emissions migrate to the Site perimeter. This will be accomplished by sampling over an 8 to 10-hour period corresponding to a construction day for a representative number of days over the duration of the Site clean-up.

The target compounds for the work area sampling are those contaminants known to exist in the soil at the Site and have the potential to be released into the ambient air during remediation activities. Also included are contaminants generated by the corrective action activities themselves that have the potential to be released to the air and to migrate beyond the Site perimeter (i.e., dust). Therefore, the target compounds will consist of dust (PM<sub>10</sub>), along with the contaminant metals (arsenic, lead, and chromium). PM<sub>10</sub> is selected as the dust type to sample as it is invisible in the ambient air and is the basis for State and National ambient air quality 24-hour particulate standards.

To augment the work area sampling, as well as the real-time dust monitoring, meteorological data will be continuously recorded from the beginning to the end of the remediation work using an on-site meteorological monitoring station located in a central area of the Site. The station will record the following parameters:



- wind speed;
- wind direction;
- air temperature;
- relative humidity (RH);
- barometric pressure; and
- precipitation.

The meteorological station will be located in an area that is clear of buildings, trees, or other obstructions, at a height of approximately 10 feet above ground or more, in accordance with USEPA citing and exposure criteria (USEPA 2008).

## **1.1 Methods of Work Area Air Sampling**

The data collection method consists of time-integrated manual air sampling with off-site laboratory analysis of PM<sub>10</sub> and PM<sub>10</sub>-metals. The sections below provide a brief description of the types of instruments, detection limits, and any applicable procedures.

### **PM<sub>10</sub>**

PM<sub>10</sub> samples will be collected via a low-volume sampling method, coupled with pre- and post-sampling gravimetric analyses of the sample filters. The low-volume sampling method with use of a size-selective inlet with a cut point of 10 microns is a precise and accurate method that closely tracks the USEPA Federal Reference Method (FRM) for determination of PM<sub>10</sub> concentrations in the ambient air. This method is preferred as it offers a lightweight compact device that is highly portable and can operate on battery or solar power. An AirMetrics Model MiniVol TAS PM<sub>10</sub> Sampler (or equivalent) will be used for the program. Attachment 1 includes a data sheet for the Model MiniVol TAS.

The MiniVol TAS samplers allow for the collection of particle sizes less than 10 microns by using a unique aerodynamically designed sample air inlet (Mini Reference Impactor, or MRI) that size-fractionates the particles as they pass through the inlet enroute to the sample collection filter. A standard USEPA FRM 47mm cassette holding a Teflon filter is used for the PM<sub>10</sub> sampling system and will be manually set and retrieved for collection of each discrete sample. Teflon is selected as the filter media due to the requirement for inorganic chemical analysis for metals.

The MiniVol TAS PM<sub>10</sub> sampler will be mounted on elevated platforms such as posts, poles or tripods to provide sampling at an approximate "breathing zone" height of 1.5 to 2 meters above the ground.

## **Metals**

Trace metal concentrations will be determined by combining the low-volume sampling method with USEPA's IO-3 Method (Chemical Species Analysis of Collected Suspended Particulate Matter) for inorganic compounds. The exposed filters will be submitted to a laboratory for chemical analysis of lead, arsenic, and cadmium.

Since trace metal levels are determined through chemical analysis of collected PM<sub>10</sub> filter samples, the corresponding ambient concentrations (i.e., ug/m<sup>3</sup>) will also be measured and reported as 8- to 10-hour integrated averages.

The analytical detection limits for the metals must be low enough to measure trace background levels in the air samples and allow comparison to appropriate reference values. **Table 1** presents background concentrations reported in the literature for each target metal:

**TABLE 1  
REPORTED BACKGROUND AIR CONCENTRATIONS FOR METALS**

<b>Parameter</b>	<b>Concentration (µg/m<sup>3</sup>)</b>	<b>Source</b>
Lead (Pb)	0.01 - 0.28	USEPA
Arsenic (As)	<0.001 – 0.03	ATSDR
Cadmium (Cd)	< 0.01	ATSDR
Zinc (Zn)	< 0.01 – 0.16	ATSDR

**Table 2** gives the recommended minimum analytical detection limits based on the lower of the ambient air standards/guideline or typical background concentration values for each parameter:

**TABLE 2**  
**MINIMUM DETECTION LIMITS**

Parameter	Based on Standard/Guideline or Background Conc.	Detection Limit	
		( $\mu\text{g}/\text{m}^3$ )	( $\mu\text{g}/\text{filter}$ )*
Lead (Pb)	Low-end Background	0.001	1.6
Arsenic (As)	RBC – cancer (annual)	0.0000574	0.092
	Low-end Background	0.0001	0.16
Cadmium (Cd)	RBC – cancer (annual)	0.00014	0.22
	RBC – noncancer (annual)	0.001	1.6
Zinc (Zn)	Low-end Background	0.001	1.6

Notes:

\* Based on a typical high volume air sample volume of 1600 cubic meters.

Recommended detection limits are one-tenth of the desired minimum measurement value for each parameter.

### **Laboratory Analysis**

All laboratory analyses for this program will be performed by Bureau Veritas, located in Novi, Michigan. The analytical work includes gravimetric determination of particulate matter on filters (pre- and post-sampling weights) and instrumental analysis of particulate matter for the three target metals by ICP-MS.

### **Meteorological Conditions**

A meteorological monitoring station will be employed that consists of sensors capable of continuously measuring wind speed, wind direction, temperature, RH, barometric pressure, and precipitation. The system will meet USEPA specifications for air quality monitoring studies. A **Met One Instruments Automet Model 466A** meteorological monitoring station (or equivalent) will be used for the meteorological monitoring component of the sampling program. **Attachment 1** also includes vendor specifications for the meteorological station.

## **1.2 Sampling Locations**

One MiniVol PM<sub>10</sub> sampler will be located to meet the objectives of the work area air monitoring and consistent with forecast and/or observed winds for the construction day to ensure the collection of a downwind sample. For each sampling day, the sampler will be located in the downwind direction approximately 100 to 200 feet from the active work area. The sampler will be mounted on a tripod to ensure a sample collection in the breathing zone at a height of 1.5 to 2.0 meters. If winds change substantially during the construction day, then the sampler will be moved to the new downwind location at the same distance from the active work area.

## **1.3 Frequency and Duration of Sampling**

PM<sub>10</sub> sampling will be performed at a single downwind location on a once per week schedule. The sampling schedule will be rotated by day such that the first weekly sample will be collected on a Monday, followed by the next sample on Tuesday, and then Wednesday, Thursday, and Friday. This type of schedule will continue for the duration of the clean-up, which is expected to run for 5 to 6 months, and will result in a total of approximately 22 to 26 PM<sub>10</sub> samples that can be submitted for metals analysis.

## **1.4 Data Management and Reporting**

Data management begins with the assembly and initial review of all field materials including particulate filters and corresponding sampler run data, meteorological data, field log notes, and calibration forms. These data are reviewed prior to and subsequent to each sampling event.

At the conclusion of sampling, the particulate filter is returned to the laboratory for equilibrating and final weighing to determine the PM<sub>10</sub> concentration. The filter will then be used by the laboratory for analysis and determination of metals. The laboratory will provide analytical results to Parsons within 5 days of receipt of each filter.

Meteorological data will be downloaded on a daily basis from the monitoring station. Data will be reviewed for consistency and completeness. Upon completion of all sampling, meteorological data will be processed into a “reader-friendly” format suitable for reporting meteorological conditions with concurrent sampling and real-time dust results.

A final data summary will be prepared presenting the results of each sampling event and the data set as a whole including air quality and meteorological data summaries.

All records will be compiled by a safety representative from the contractor and be maintained in project files. Copies will be forwarded to Parsons for project documentation.

## **1.5 Quality Assurance**

### **Air Sampling Personnel**

Monitoring and sampling activities will be performed by appropriately trained and experienced individuals. Training will include completion of a 40-hour hazardous waste activities training course in compliance with OSHA Standard 29 CFR 1910, as well as an 8-hour refresher course within the last year. Monitoring personnel will also be experienced or trained in the calibration, operation, and routine maintenance of the specific monitoring equipment being used for the work area sampling.

### **MiniVol Air Sampler**

The PM<sub>10</sub> sampler will be fully calibrated prior to the start of the sampling program. The calibration procedures will conform to manufacturer's standard instructions (see Operations Manual in **Attachment 2**). This calibration will ensure that the samplers are functioning within the allowable tolerances established by the manufacturer and required on this program. Records of sampler calibration and instrument manuals will be maintained in a field notebook.

At the beginning and end of each sampling event the sampler will be flow checked for proper operation. This check is required not only to verify the proper flow but the readings will be input to the spreadsheet for calculating flow and total sample volume for each sample collected, and along with the lab-provided PM<sub>10</sub>/metals mass, the air concentrations for the sample collected.

### **Laboratory Instruments**

The laboratory will follow calibration procedures and schedules as specified in the relevant sections of the USEPA guidance documents or other established sampling methods and any subsequent updates that may apply.

### **Meteorological Monitoring System**

The meteorological monitoring station will be field-calibrated upon start-up. This consists of sensor-control calibration checks on the individual sensors and includes aligning the wind direction vane to true north. Once data collection begins, the system should not need to be moved.

The meteorological station is designed to run unattended in the field for long periods of time up to 6 months without requiring calibrations or maintenance. The duration of this program is expected to be up to 6 months, so end-of-period calibration checks will be required and performed once the clean-up is completed. Should a malfunctioning sensor be detected and replaced, the replacement sensor will be field-calibrated when placed into service. In addition, if the meteorological station does get moved from its original location or alignment, the wind vane will need to be realigned to true north.

## **2. AIR SAMPLING PLAN FOR WORKER'S PROTECTION**

As impacted lead and arsenic soil is excavated or otherwise disturbed during remediation activities dust can be generated. To minimize the generation of dust the soils will be sprayed with water. Throughout the excavation activities, dust generation will be monitored visually and by using direct-reading “real-time” particulate monitors and air sampling of field personnel. This information will be used to confirm the success of dust control measures and to evaluate the need to initiate actions to mitigate dust generation on a real-time basis, as remediation activities are performed. While dust suppression measures will be used, air monitoring will be performed to quantify levels of dust within disturbed areas. Occupation Safety and Health Administration (OSHA)–approved personal compliance monitoring (air sampling) of construction workers will be performed by subcontractor health and safety personnel for arsenic and lead concentrations to assess worker exposure levels.

### **2.1 Methods of Personal Air Sampling**

Personal air-sampling devices will be worn by select field personnel to evaluate the lead and arsenic levels within excavation zones and verify PPE levels are adequate. Arsenic and lead will be analyzed by an American Industrial Hygiene Association (AIHA) approved laboratory. Personnel working within the excavation zone will be equipped with Level C personal protection until data from personal air-sampling devices indicate that it is not needed.

Portable air-sampling pumps will be fitted with a filter cassette collection device and will be worn during the initial stages of excavation by a representative on the onsite work force. A typical air-sampling pump will be the GilAir5 (or equivalent) with an air flow rate range of 1 to 4 L/min. The filter cassette is a 37-mm, 5-micron, pre-weighed Poly Vinyl Chloride-type unit. The representative number of samples will be based on the number of workers involved in the excavation activity, the specific work tasks being performed, and the judgment of onsite Site Safety Officer in coordination with Chemours and Parsons safety. Air samples will be collected in the workers’ breathing zone for the duration of the excavation work. NIOSH Method 7300 will be used for arsenic and lead analysis. All samples will be collected from within the breathing zone.

### **2.2 Sampling Locations**

Homogeneous Exposure Groups (HEGs) will be identified as part of this excavation and materials-handling phase of the project. Establishing HEGs is a recognized exposure assessment method for personnel performing similar activities where exposure potential would be predicted

to be the same or reasonably equivalent. The contractor's safety representative or the SSC will identify personnel in each HEG to wear the personal monitoring devices.

### **2.3 Frequency of Sampling**

The contractor will be responsible for determining the frequency of sampling and administering the program in coordination with Parsons. In general, dust samples will be obtained once the initial intrusive activity commences and will continue for several days in order to characterize potential worker exposures. Periodic monitoring may be conducted when work begins on a different portion of the site, a different type of operation is being initiated, or if employees are working with materials known to contain lead and arsenic at locations where monitoring was not performed previously.

### **2.4 Recordkeeping**

All records will be compiled by a safety representative from the contractor and be maintained in project files. Copies will be forwarded to Parsons for project documentation.

Records will include the following:

1. Pre-calibration (before personal air sampling begins)
2. Post-calibration (after personal air sampling has been completed)
3. Field observations
4. Calculations and chain-of-custody forms
5. Analytical results Air sampling for lead and arsenic



### **3. REAL-TIME AIR MONITORING PLAN**

#### **3.1 Method of Air Monitoring**

Real-time measurements for dust particulates will be obtained using *personalDataRAM* for *Personal Data*-logging. The Thermo Electron Corporation *personalDataRAM* is designed to measure the concentration of airborne particulate matter (liquid or solid), providing direct and continuous readout as well as electronic recording of the information. In addition, it sounds an audible alarm whenever the user-defined action level is exceeded. This unit operates as a passive air sampler. The *pDR-1000* passively samples (i.e., without a pump) the air surrounding the monitor; air freely accesses the sensing chamber of the instrument by means of convection, diffusion, and adventitious air motion.

#### **3.2 Monitoring Locations**

Visual monitoring for airborne dust will be performed on an ongoing basis within each area where excavation and material-handling activities are being performed. The entire onsite work force will be held accountable for observing, reporting, controlling, and minimizing dust generation during all phases of the onsite work.

As many as two mobile real-time particulate air monitors will be placed onsite within 50 to 100 feet of active excavation areas where work may be occurring simultaneously. The *pDR-1000* will be placed downwind from the work areas based on the current and forecasted wind direction as indicated by daily weather reports. The location of the monitors may have to be modified on any given day if obstructed by the operation of the excavation equipment or other site limitations. The Site Safety Coordinator (SCC) will use appropriate discretion in locating these monitors in the event excavation activities are being conducted near the property boundaries or conditions otherwise do not permit placement of the monitors directly downwind of a work area. At various times the SCC will place a *pDR-1000* on an equipment operator and/or a construction workers working in the active areas. Real time reading will be collected in the worker breathing. The instrument will be attached to a shoulder harness.

#### **3.3 Frequency of Monitoring**

Monitoring for visible airborne dust emissions will be conducted continuously during excavation activities by the entire onsite work force and Construction Management Team personnel. The

real-time pDR-1000 will also be operated continuously during excavation and material-handling operations when potential lead and arsenic-containing dust may be generated. The real-time monitoring will not be conducted during inclement weather conditions (e.g., rain or heavy fog) because these conditions interfere with the equipment function and may damage the monitors. However, light precipitation will reduce the potential for the generation of dust so work can proceed under these conditions, even if the monitors cannot be operated. During these periods of operation, visual observations will be used to determine if dust emissions are being generated which require suppression measures.

### 3.4 Recordkeeping

All records will be maintained by site Health and Safety Officers. Records will consist of the following:

1. Field log notebooks
2. Downloaded electronic data from air monitor equipment
3. Inspection results
4. Hard copy figures and data tables

### 3.5 Action Levels

The air-monitoring program at the Former Chemours East Chicago site consists of a combination of work zone and personnel (worker) monitoring for particulates (dust) and air sampling for lead and arsenic.

**Table 3** outlines the various action levels to be adhered to during the East Chicago Remediation project. (Note: perimeter monitoring is not addressed in this document)

**TABLE 3  
ACTION LEVELS**

<b>Air-Sampling Instrument (Real Time)</b>	<b>Action Level</b>	<b>Action Taken When Action Level Is Met or Exceeded</b>
Work zone dust	0.5 mg/m <sup>3</sup> total dust or 0.2 mg/m <sup>3</sup> above upwind readings (1 hour average, collected at the breathing zone)	Additional dust control methods will be implemented and construction activities responsible for generating the dust may be temporarily suspended if dust control is not effective. Respirators may be worn by workers in the exclusion zone represented by the air-sampling results.

Lead	0.03 mg/m <sup>3</sup> (TWA 8 hours)	Results from personal lead sampling will be used to assess if respiratory protection for worker protection and safety is required. TWA, time-weighted average
Arsenic	0.01 mg/m <sup>3</sup> (TWA 8 hours)	Results from personal arsenic sampling will be used to assess if respiratory protection for worker protection and safety is required. TWA, time-weighted average

### **Action Level—Visible Monitoring**

The observation of airborne dust in the excavation area will be used as a primary action level by site project team personnel. If dust is visible in a localized area, dust suppression methods will be immediately implemented. Onsite personnel will then check the perimeter monitors to determine if a dust levels have exceeded the action level. If dust is visible from any active excavation area and is evident outside the active excavation area, engineering controls or alternate dust control methods will be initiated at once. As stated previously, the dust suppression primarily consists of using water to wet down an area of dust generation. Covering stockpiles with tarps, or wetting the stock pile with water are effective dust suppression methods.

### **3.6 Data Collection Requirements**

During all monitoring activities, it is essential that comprehensive data be collected relative to the tasks being performed. Observational data and periodic field readings of onsite monitors are to be recorded on the appropriate data record form, found in Appendix A, or in observation record books dedicated to this project. Applicable chain-of-custody procedures must be maintained for all samples sent to an offsite laboratory for analysis.

Data from the particulate aerosol monitors will be downloaded each day and stored on a server or other location that is regularly electronically backed up. Daily graphical summaries will be printed out from the particulate aerosol monitor. Filter cassette air sample laboratory results will be kept as hard copies.

### **Minimum Data Requirements**

The following lists the minimum data that are to be collected for sampling and/or monitoring. In some cases the data may be recorded electronically by the instrument, and in other cases the data may be recorded manually on a form or a field log notebook:

## Air pump/monitor data

Pump or instrument ID	Initial flow rate (L/min)
Final flowmeter setting	Calibration date
Final flow rate (L/min)	Calibrator type
Average flow rate (L/min)	Initial flow meter setting

## Sample media information (filter cassettes)

- Field sample ID                      Media type
- Lab ID #                                Type sample

## Sampling information

- |               |                    |
|---------------|--------------------|
| • Start date  | Sample time        |
| • Start time  | Sample volume (L)  |
| • End date    | Sample volume (m3) |
| • End time    | Analysis           |
| • Sample time |                    |

## Task description (for personal monitoring)

- |                                  |          |
|----------------------------------|----------|
| • Employee name/area description | Job task |
| • Employer                       | Activity |

## Results

Total mass ( $\mu\text{g}$ ) (arsenic/lead lab results Lab result only)	Lab comments
--	--------------

- |  |               |
|--|---------------|
| • Concentration ( $\mu\text{g}/\text{m}^3$ )       |               |
| • LOQ ( $\mu\text{g}$ ) (arsenic lab results only) | Analysis date |

- Other
- Operational conditions or other factors that might impact samples

## **Meteorological Data**

General weather conditions will be noted in the field log book on a daily basis. Weather data that will be recorded will include: air temperature for the morning and afternoon and wind speed and wind direction. Other special weather conditions will also be recorded. The weather information may be used in evaluating the results of the monitoring data.

## **3.7 Data Reporting**

### **Submitting of Particulate Air Monitoring Results**

The average daily total dust concentration will be submitted for each monitor location to the Project Director, Project Manager and Chemours and Parsons responsible Health and Safety personnel.

### **Documentation Summary**

The following documents will be maintained in the project files

- Calibration data
- Completed real time air monitoring and air sampling report
- Summary evaluation report of air sampling and air monitoring results