WORK PLAN
Groundwater Investigation
Riverview-Trenton Railroad Company
Former McLouth Steel Site
18251 West Jefferson Avenue
Riverview, Michigan

June 28, 2019

Prepared For:
Riverview-Trenton Railroad Company
12225 Stephens Road
Warren, Michigan 48089

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ASTI Project No. 10860

ASTI Environmental

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Table of Contents

Attachments

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1.0 Introduction

ASTI Environmental ("ASTI") prepared this Groundwater Investigation Work Plan ("Work Plan") on behalf of the Riverview-Trenton Railroad Company ("RTRR") as required by the Corrective Action Consent Order ("CACO") between RTRR and the Michigan Department of Environment, Great Lakes, and Energy ("EGLE"), Waste Management and Radiological Protection Division, dated November 1, 2018.

This Work Plan was completed in accordance with the CACO, Attachment A, Statement of Work ("SOW") for the RTRR property located at 18251 West Jefferson Avenue, Riverview and Trenton, Wayne County, Michigan ("Subject Property"). The Subject Property, referred to in the CACO as Site Identification Number: MIK420024889, consists of approximately 76.2 acre portion of the former McLouth Steel site in Trenton, Michigan. The Subject Property is contained in three parcels; 51009030001000, 54001010082300, and 54001990006704. The property is bounded by Trenton Channel of the Detroit River to the east; a portion of the McLouth Steel property referred to as the "County Property", a railroad line, and West Jefferson Avenue to the west; the Grosse Ile Toll Bridge and Monguagon Creek to the north; and a portion of the former McLouth Steel site known as the County Property to the south. Further east of the property, beyond the Trenton Channel, is Grosse Ile, further west, beyond West Jefferson Avenue, is a quarry, residential, commercial and industrial property and further north, beyond Monguagon Creek, is commercial and industrial property. Figure 1 provides a Site Location Map for the Subject Property and Figure 2 provides a Site Plan.

The purpose of this Work Plan is to implement the SOW by conducting a hydrogeological investigation to determine the vertical and horizontal extent of groundwater impacts. The objectives of this Work Plan are:

1. Install groundwater monitoring wells in the upper and lower aquifers to determine the horizontal and vertical extent of potential groundwater impacts on the Subject Property and assess the nature of any off-site sources,
2. Evaluate groundwater flow direction and hydraulic conductivity across the Subject Property, and
3. Determine groundwater flow from the Subject Property to the Detroit River and Monguagon Creek.

2.0 Background

The Subject Property originally consisted of wetlands and open water, with some uplands in the northwestern portion of the property, until sometime after 1936. During that time, the

Monguagon Creek bisected the property, emptying into the Trenton Channel of the Detroit River at about Sibley Road. Between about 1946 and 1952 much of the property had been filled to the current Detroit River bank, but open water remained in the original Monguagon Creek channel. By 1954 the mouth of the Monguagon Creek had been enlarged for docking, including an area of open water to the south. By 1967, the original Monguagon Creek channel had been filled, the creek was redirected along the northern property line, and no open water remained on the property.

The Subject Property was acquired around 1947 by the McLouth Steel Company ("McLouth"), and used for storage of raw materials, waste, and product to support the integrated production of steel and iron on the remainder of the property (known as "the County Property") from approximately 1952 to 1975. After about 1975, production decreased on the County Property, until McLouth ceased operations in April of 1996 after filing for Chapter 11 bankruptcy protection on September 29, 1995. Hamlin Holdings, Inc. acquired the Subject Property in July of 1996. Detroit Steel Company obtained title for the Subject Property in August of 1996. On June 2, 2000, Crown Enterprises purchased the Subject Property, and conveyed the property to RTRR in November of 2000.

Environmental investigations have been conducted on and around the Subject Property from 1997 to 2015. Those investigations included fill material and soil sampling, test pits, material sampling, and groundwater sampling. During that period the EPA identified five Waste Management Units ("WMUs") and five Areas of Concern ("AOCs") on the Subject Property ("Units"). Based on those investigations, groundwater concentrations have been observed in exceedance of the EGLE Part 201 Generic Non-Residential Cleanup Criteria ("GNRCC"), the Groundwater Surface Water Interface Criteria ("GSIC") and Drinking Water Protection criteria ("DWPC"). Based on these investigations, the chemicals of interest for the Subject Property as defined in Appendix 1 of the CACO are:

- Ammonia
- Arsenic
- Barium
- Chloride
- Chromium
- Copper
- Cyanide, Free
- Lead
- Manganese
- Mercury
- Nickel
- Selenium
- Silver
- Vanadium
- Zinc
- VOCs
- SVOCs
- PCBs
- pH
- Total Dissolved Solids

3.0 Site Description

All structures on the Subject Property have been removed, with the exception of a Quonset building on the southern portion of the property and the building slabs and foundations for the former EAF Storage Tanks and TSCA building (Figure 2). All pits have been backfilled and the Subject Property has been rough graded. The Subject Property was most recently used for container storage only, but is currently vacant.

The boundary between the Subject Property and the Trenton Channel consists of a mixture of steel and wood pilings, dock areas and shoreline. Nearly 300 feet of sea wall is located

near the northern end of the shore line at former dock. The condition of this northern seawall is unknown.

The materials reviewed indicate that there is one outfall at the Subject Property, located directly below Sibley Road. This outfall is a regional storm drain for properties west of the Subject Property and does not appear to have any connections on the Subject Property.

The Subject Property is generally flat, slopping downward from west to east toward the Trenton Channel, with a slight increase in elevation from the center of the property toward the Trenton Channel. Former railroad beds provide some elevation separation along the Detroit River and the Monguagon Creek.

The Subject Property is covered by fill material of unknown origin to a depth of four to 25 feet below ground surface ("bgs"). This fill most likely consists of slag placed between 1952 and 1996, underlain by materials of unknown origin placed in open water and wetlands prior to 1952, which is underlain by river sediments. Prior to 1964 additional materials of unknown origin were placed in the former Monguagon Creek bed.

3.1 Site Geology

Because much of the property was wetlands and open water prior to filling placement, the fill material is inferred to be underlain by sediments from the Detroit River over the eastern half of the Subject Property. This sediment is assumed to have originated upstream of the Subject Property and therefore may contain contaminants associated with upstream industrial operations.

Beneath the fill material and inferred sediments are low permeability clays and silts which mostly overly limestone bedrock. The underlying clay layer varies in thickness from 10 to 20 feet, thinning to the east. It has not been determined if the underlying clay layer is continuous over the entire Subject Property, but if so, it would separate the lower bedrock aquifer from surface impacts.

3.2 Site Hydrogeology

Based on previous studies reviewed, perched groundwater is encountered at 0 to 15 feet bgs, primarily in the fill material. The perched groundwater is approximately 5 feet to 15 feet above typical surface water elevations in the Trenton Channel. The perched zone generally flows east toward the Detroit River and, on the northern portion of the Subject Property, flows northeast toward the Monguagon Creek. The perched zone appears to be hydraulically connected to surface water.

3.3 Areas of Concern and Waste Management Units

As part of a RCRA Facility Assessment completed in 1999, the United States Environmental Protection Agency ("U.S. EPA") identified five WMUs and five AOCs on the Subject Property. Of the WMUs on the Subject Property, WMU27 (Equipment Storage Yard) and WMU29 (TSCA Storage Building) were the only Units identified in the SOW to be included in the Groundwater Investigation and are described below. The locations of the Units are included on Figure 3.

4.0 Proposed Work Plan Activities

This section provides a detailed description of each activity required for the groundwater investigation; including monitoring well installation, slug testing, well development, groundwater sampling, and decontamination procedures.

4.1 Monitoring Well Installation

Prior to conducting any site activities, ASTI will conduct a review of existing groundwater monitoring wells. Each identified well will be inspected and pumped to determine if they are accessible for monitoring. For each well that is accessible, a review of historical documentation will then be conducted to determine if well depth, screen packing and other well construction details can be obtained. If details of well construction are not available, the wells will not be used for groundwater monitoring. If well construction details are available, and the wells are in the required location, these existing wells will be surveyed and used as a substitute for the monitoring wells described below.

To achieve the objectives of this Work Plan a total of 12 groundwater monitoring wells will be installed on the Subject Property. Ten groundwater monitoring wells will be installed to determine upgradient and downgradient groundwater impacts. These groundwater wells will be installed along the property line, along the river, and within the former Monguagon Creek bed to assess the potential impacts from upstream sources within the sediments of the former creek bed. The well locations will be distributed across the Subject Property in order to evaluate groundwater impacts and to determine if the clay layer underlying the upper groundwater bearing zone is contiguous. Each of the ten groundwater monitoring wells will include nested well pairs; seven nested well pairs will screen the upper and lower aquifers, three nested well pairs will screen the upper and lower portion of the upper aquifer, and one nested well pair will screen both the lower and upper portion of the upper aquifer and additionally screen the lower aquifer. Two additional single monitoring wells will be installed into the upper aquifer; one immediately downgradient of WMU27 and one immediately downgradient of WMU29. Proposed well locations are shown in Figure 4.

A drill rig utilizing hollow-stem augers will be used to install the groundwater monitoring wells. An ASTI field scientist will oversee the monitoring well installation and visually log soils. No soil analytical samples will be collected for this scope of work. The depths and screen intervals of the groundwater monitoring wells will be determined in the field. Monitoring wells installed into the upper portion of the upper aquifer will consist of screens 10-feet in length. Wells installed in the lower portion of the upper aquifer and in the lower aquifer may consist of screen lengths of 5-feet or 10-feet, depending on lithology and water-bearing zones. Details of the well construction will be recorded in the field. In general, screen intervals in nested well pairs will be separated by a bentonite layer and a filter pack will be placed within the screened interval. Bentonite will be placed in the low-permeability zone between the upper and lower aquifers. Wells will be completed to grade or above grade, depending on site conditions, with a protective well casing, concrete collar, and lock.

After completion of well installations, the wells will be allowed to equilibrate for approximately 24-hours before development. Wells will be developed by pumping groundwater until the water appears free of sediment. If a well goes dry during development, the well will be allowed to recharge and the well will be pumped dry again. A well will be pumped dry up to five times if recharge occurs quickly enough to facilitate multiple pumping

events. Purge water will be discharged to the ground on an unpaved portion of the Subject Property immediately downgradient from the monitoring well.

A licensed surveyor will complete a top of casing elevation survey for each of the newly-installed groundwater monitoring wells, and will install a gauge on the Trenton Channel. The elevation data will be used, with measured depth to water, to calculate groundwater elevations across the Subject Property.

4.2 Aquifer Testing

ASTI will perform aquifer testing at the newly installed groundwater monitoring wells. Aquifer testing will be completed to determine the aquifer's hydraulic conductivity, which will be used to assist in calculation of the volume of groundwater flowing into the Detroit River and Monguagon Creek.

ASTI will perform slug tests at each of the newly-installed groundwater monitoring wells. Prior to slug testing, ASTI will collect a static depth to water measurement and insert a pressure transducer near the bottom of the well. The pressure transducer will be calibrated to the measured water level. Manual water level measurements may be substituted if the aquifer displays relatively low permeability (that determination will be made during well development). The slug test will consist of inserting a "slug" constructed of polyvinyl chloride (PVC) pipe of a known volume completely into the saturated portion of the well. The slug will remain in place until the water level falls to at least 90 percent of the initial pre-test measurement.

After the water level stabilizes within at least 90 percent of the pre-test measurement, additional confirmation testing will be completed by quickly removing the slug and recording the water level until it reaches at least 90 percent of the pre-test level. The pressure transducer will be connected to a laptop computer in the field to monitor slug-testing results in real time. This method will be used so that questionable data can be identified immediately and the tests can be repeated if required. For wells located in high permeability material, tests can be repeated quickly to provide additional data for verification of precision.

The Bouwer and Rice Method (Bouwer and Rice, 1976) will be used to calculate hydraulic conductivity in the portion of the aquifer near each well tested. In wells where the water table intersects the screened portion of the well, the rising head portion of the slug test is considered more reliable for calculation of aquifer properties. However, both the rising head test and the falling head test will be used to calculate hydraulic conductivity in these wells. If inconsistencies arise, the results from the rising head test will take precedent. The measured hydraulic conductivities from wells screened in the same aquifer material will be averaged using the geometric mean and that value will be used to represent each respective unit.

Based on previous investigations, the groundwater-surface interface pathway is considered relevant. Therefore, ASTI will determine the representative concentration for each contaminant detected in exceedance of relevant criteria and use that concentration, along with calculated groundwater discharge to the Trenton Channel to determine the contaminant mass flux to the channel. The point of compliance will be assumed to be at the groundwater

monitoring well locations along the river. Groundwater discharge to the Trenton Channel will be calculated using the following equation:

$$q = -K\, i\, A$$

Where: q = groundwater discharge (volume / time)
K = hydraulic conductivity (length / time),
i = hydraulic gradient (length / length), and
A = cross-sectional area of aquifer (length squared)

The hydraulic gradient will be determined from static depth to groundwater measurements made during quarterly sampling events. The difference in groundwater elevation for wells screened in the same water-bearing zone and perpendicular to groundwater flow will be used to determine the hydraulic gradient. The cross-sectional area is the area over which groundwater from each respective water-bearing unit discharges to the Trenton Channel. Representative concentrations of chemicals of interest from monitoring wells located along the river will be determined from results of quarterly groundwater monitoring events.

4.3 Groundwater Sampling

Four quarterly groundwater sampling events will be conducted for analysis of the analytes listed in Section 2. A total of 23 groundwater samples, one from each monitoring well, will be collected and analyzed in each sampling event. Prior to well purging, the depth to water will be measured in each well to determine groundwater elevation and flow direction across the Subject Property. In addition, the level of the adjacent Trenton Channel will be recorded. Groundwater elevation data for the upper and lower aquifers will be tabularized and depicted on figures included in the Groundwater Investigation Report.

Prior to sample collection, monitoring wells will be purged using low-flow techniques with the use of a peristaltic pump. Low-flow purging is intended to minimize groundwater drawdown during pumping to ensure that formation water is introduced into the well to minimize introduction of stagnant water from the well casing into the sample. Groundwater quality indicators (temperature, pH, specific conductance, turbidity, dissolved oxygen, and oxidation/reduction potential) will be measured and recorded during purging every three to five minutes. Depth to water will also be measured to ensure that groundwater drawdown does not occur. Purge water will be discharged to the ground on an unpaved portion of the Subject Property immediately downgradient from the monitoring well. Groundwater quality parameters are considered stabilized when the following conditions are met:

- Turbidity (10% for values greater than 5 Nephelometric Turbidity Unit [NTU]; if three turbidity values are less than 5 NTU, consider the values as stabilized),
- Dissolved oxygen (within 10% for values greater than 0.5 milligrams per liter [mg/L], if three dissolved oxygen values are less than 0.5 mg/L, consider the values as stabilized),
- Specific conductance (within 3%),
- Temperature (within 3%),
- pH (± 0.1 unit), and
- Oxidation/Reduction Potential (±10 millivolts).

If the water level cannot be maintained during low-flow purging, the well will be pumped dry and a sample will be collected within 24 hours or as soon as the water level has recovered

sufficiently to collect the volume needed for the required analytical samples. Groundwater sampling activities will be recorded on forms or in the project field logbook, as appropriate.
ASTI will collect a total of six quality assurance/quality control (QA/QC) during each quarterly groundwater sampling event. QA/QC samples will consist of two duplicate samples (one per every 20 samples collected), a laboratory trip blank, a field blank, and a matrix spike/matrix spike duplicate. Duplicate samples will be collected from locations designated by field personnel and at the same time as collection of the sample from that location. The laboratory will prepare a trip blank sample and this sample will reside with the sample coolers throughout the sampling process to determine if contaminates were introduced during the sampling process. The equipment blank sample will be collected by pumping deionized water through unused sample tubing. The field blank will be collected by pouring deionized water into laboratory-provided jars. The laboratory will also provide temperature blanks; which, will reside with the samples to determine the temperature of the samples upon arrival at the laboratory.

Groundwater samples will be collected into laboratory-provided jars appropriate for the required analysis. Upon collection, the sample jars will be labeled with a unique identification number and placed on ice and kept cool until arrival at the laboratory. Proper chain of custody procedures will be followed throughout the sample collection and shipment process.

Groundwater samples will be analyzed by an accredited laboratory for the chemicals of concern listed in Section 2. Groundwater sampling and analysis will be conducted in accordance with U.S. EPA and EGLE guidelines, and the Quality Assurance Project Plan (QAPP) and samples will be analyzed as indicated in the table below:

Analysis	Analytical Method
VOCs	5035 and 8260
SVOCs	8270
PCBs	8082A
Metals	6020
Mercury	7470
Cyanide, Free	9016
Chloride	9253
Ammonia	350.1
pH	9040B
Total Dissolved Solids	160.1

The laboratory analytical results for each sampling event will be summarized in the quarterly progress report, which will be submitted to EGLE by the 15th of the month following each quarter. For that report ASTI will provide a narrative summary of the groundwater sampling event, a tabularized summary of the groundwater analytical data, groundwater potentiometric surface elevation maps, and the laboratory analytical reports.

4.4 Decontamination Procedures

Augers and direct push rods used to advance the soil borings will be decontaminated after completion of each boring.

Groundwater sampling will be conducted with the use of a peristaltic pump and dedicated tubing for each well. No decontamination is necessary for groundwater sampling as there is no pathway for cross-contamination.

5.0 Site Health and Safety Plan

ASTI developed a Site-specific Health and Safety Plan (SHSP) for field activities performed for this project. The plan lists a safety coordinator, emergency telephone numbers, directions to the nearest emergency care facility, and emergency procedures. Field personnel will be required to review, sign and date the SHSP before beginning any site activities within each project phase. A copy of the SHSP is provided as Attachment B.

6.0 Project Staff

The following is a list of staff that will be involved with the groundwater investigation. This list can also be found in the Site Health and Safety Plan (Attachment B).

Project Manager: Mr. Greg Oslosky

Site Safety Officer: Mr. Brian Earl

Project Staff: Mr. Jeremy Efros, CPG, Mr. Brian Earl, Mr. John Schuitema, Ms. Kera Sharpe, and Mr. Mitchel Dykla.

7.0 Schedule

The project activities will be scheduled immediately following the approval of this Work Plan. Installation of groundwater monitoring wells, including well development, is expected to require 15 work days to complete. The quarterly groundwater sampling events are expected to require five work days each to complete. ASTI will notify EGLE in writing at least 14 days prior (or earlier) to beginning field work for well installation or sampling. The Groundwater Investigation Report will be completed approximately 35 work days after completion of the final quarterly groundwater sampling event.

8.0 Cost Estimate

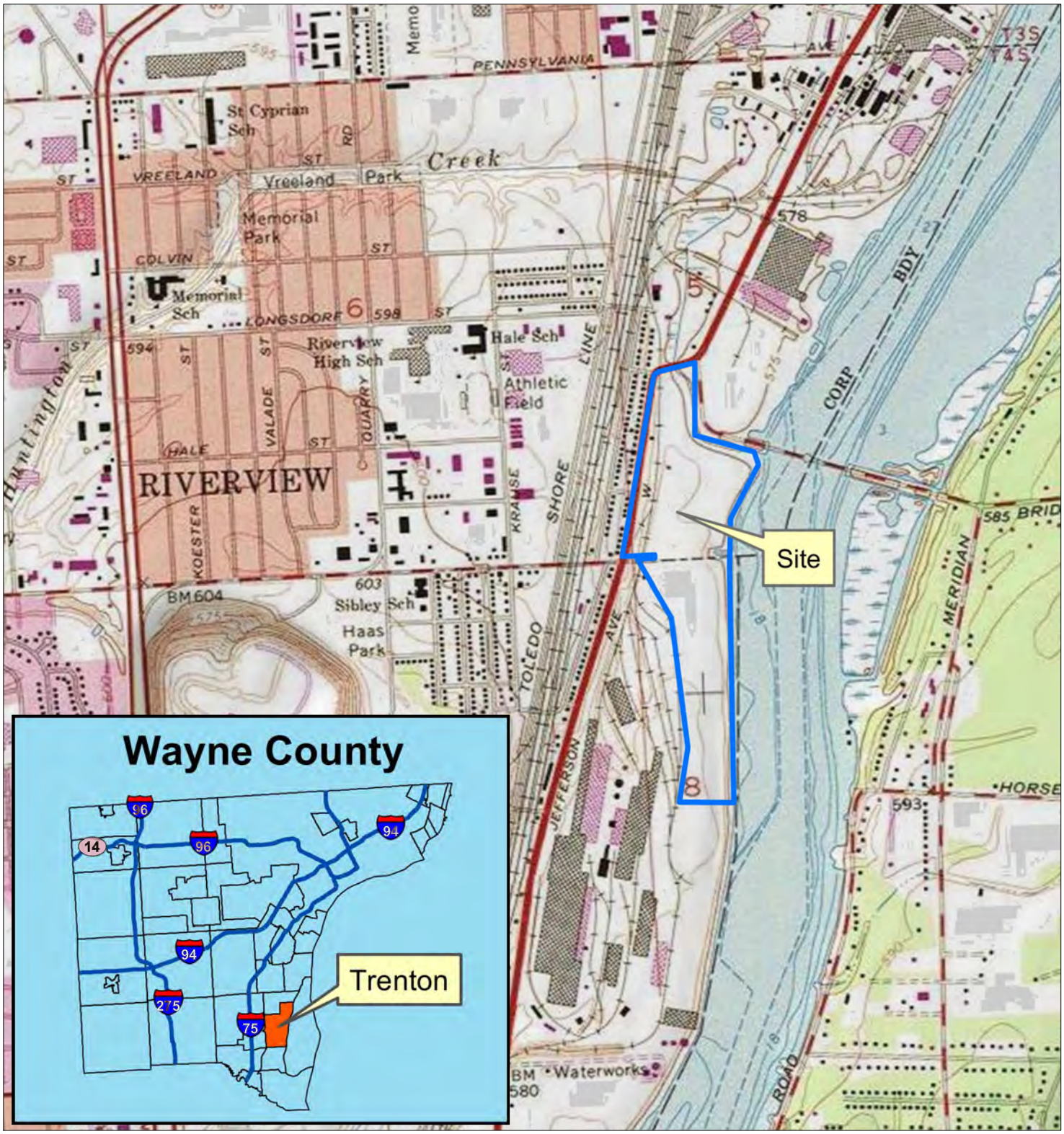
The following are the estimated costs to implement the tasks included in this Work Plan.

Groundwater Investigation	
Well Installation and Development	$24,300
Direct Costs	$29,200
First Quarter Monitoring	$6,700
Direct Costs	$4,200
Analytical Costs (23 samples and 6 QA/QC samples)	$26,900
Second Quarter Monitoring	$6,700
Direct Costs	$4,200
Analytical Costs (23 samples and 6 QA/QC samples)	$26,900
Third Quarter Monitoring	$6,700
Direct Costs	$4,200
Analytical Costs (23 samples and 6 QA/QC samples)	$26,900
Fourth Quarter Monitoring	$6,700

Direct Costs	$4,200
Analytical Costs (23 samples and 6 QA/QC samples)	$26,900
Investigation Report	$10,600
Total Above:	**$215,300**

Attachment A
Figures

Work Plan
GROUNDWATER INVESTIGATION



0 600 1200 1800

Approximate Scale in Feet

LEGEND

Property Line

N

RTRR Property

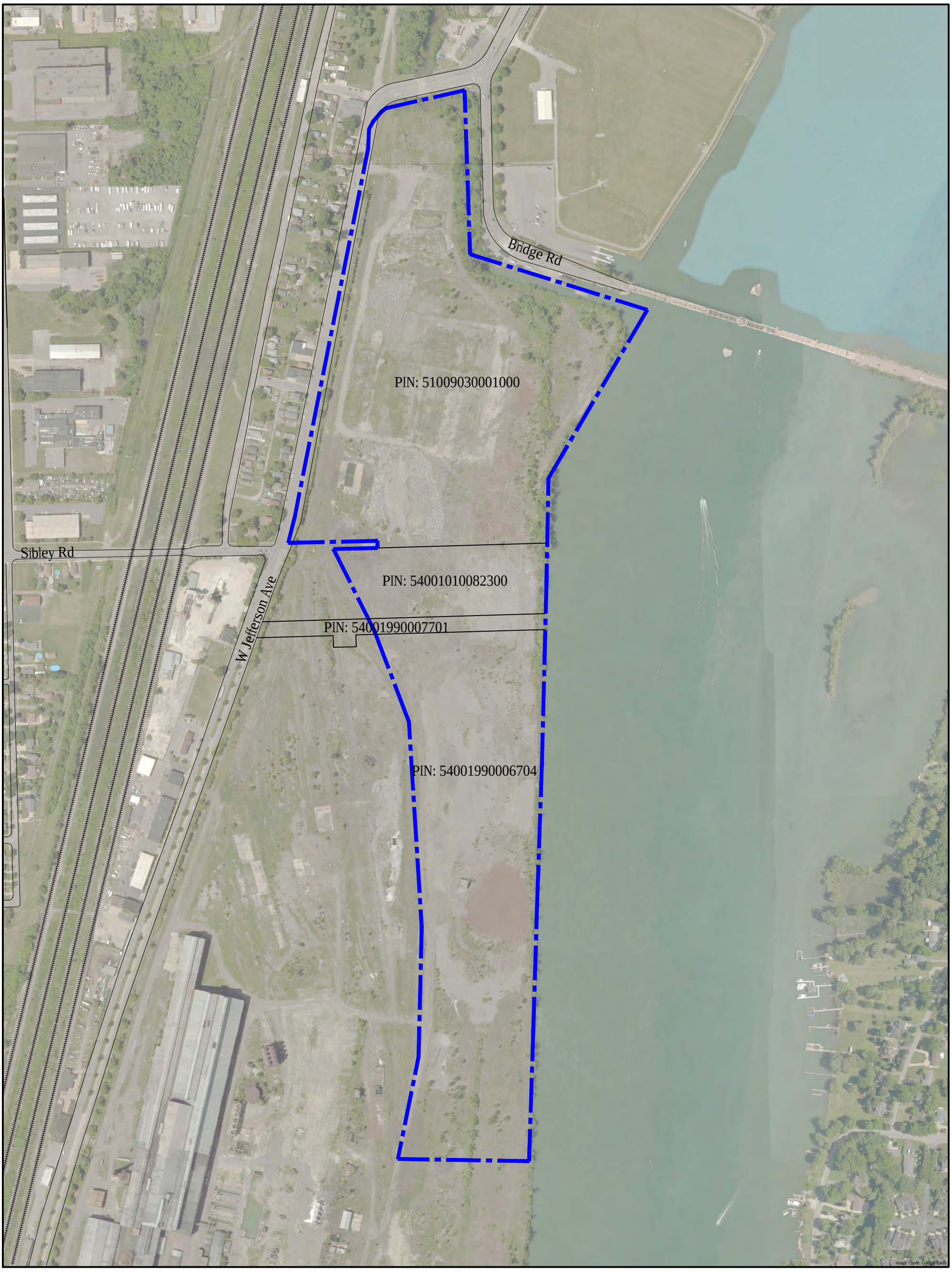
18251 West Jefferson, Trenton & Riverview, MI

ASTI Environmental

Created for: Riverview-Trenton Railroad Company

Figure 1 - Site Location Map

ASTI Project 10860, JRN, April 11, 2019



LEGEND

Subject Property

Approx. Parcel Boundary

0 400 800 1200

Approximate Scale in Feet

RTRR Property

18251 West Jefferson Avenue, Trenton, MI

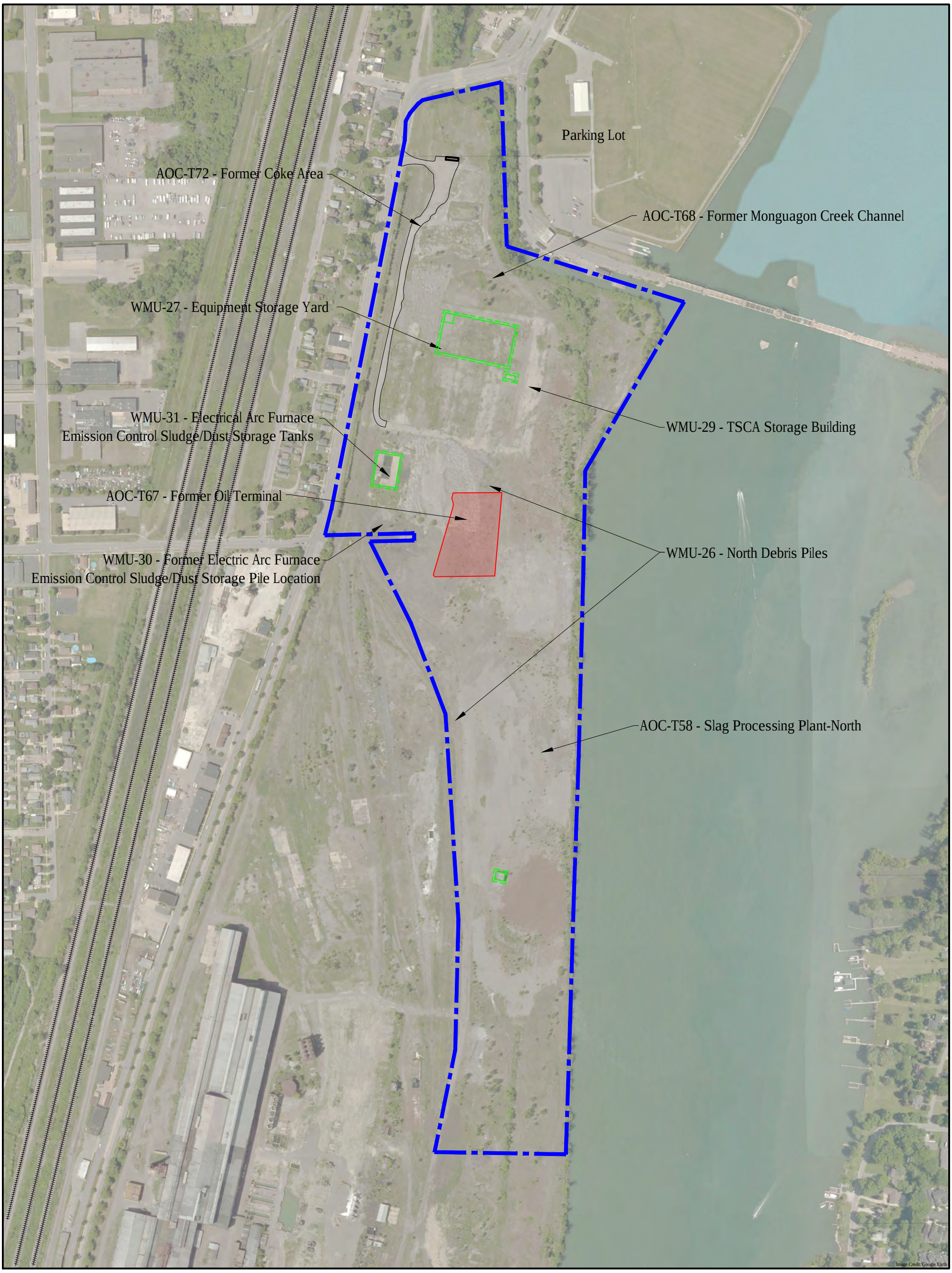
ASTI Environmental

N

Created for: Riverview-Trenton Railroad Company

Figure 2 - Property Site Plan (with parcels)

ASTI Project 10860, JMD, June 27, 2019



RTRR Property

18251 West Jefferson Avenue, Trenton, MI

Environmental

Created for: Riverview-Trenton Railroad Company

Figure 3 - Identified AOCs and WMUs

ASTI Project 10860, JRN/JMD, June 26, 2019

0 400 800 1200

Approximate Scale in Feet

LEGEND

Subject Property

U+U Screened in Upper & Lower portion of Upper Aquifer

U+L Screened in Upper & Lower Aquifers

Historic Creek Bed

RTRR Property

18251 West Jefferson Avenue, Trenton, MI

Created for: Riverview-Trenton Railroad Company

Figure 4 - Proposed Well Locations and Former Creek Bed

ASTI Project 10860, JMD, June 27, 2019

ASTI Environmental

N

Attachment B
Site Health and Safety Plan

Work Plan
GROUNDWATER INVESTIGATION

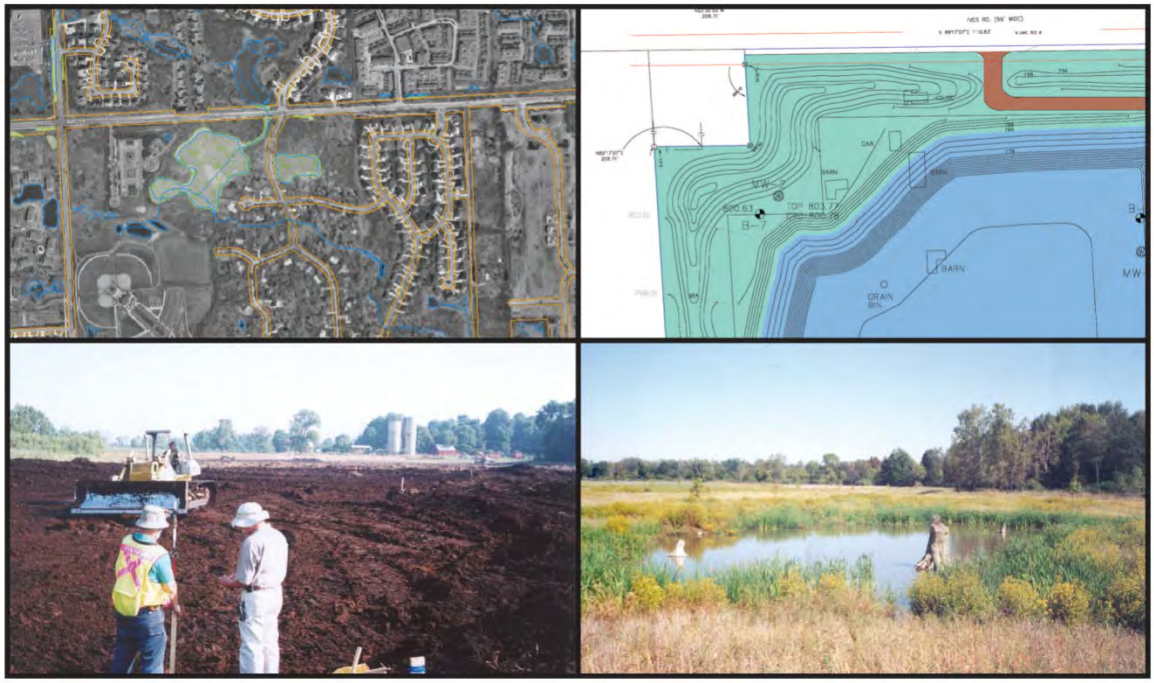
Health and Safety Plan

Riverview-Trenton Railroad Property
18251 West Jefferson Avenue
Riverview, Michigan 48193

Riverview-Trenton Railroad Company

April 1, 2019

ASTI ENVIRONMENTAL



ASTI ENVIRONMENTAL

Health and Safety Plan

Riverview-Trenton Railroad Company
1491 West Jefferson Avenue
Riverview, Michigan 48193

April 1, 2019

Prepared For:
Riverview-Trenton Railroad Company
12225 Stephens Rd.
Warren, MI 48089

Report Prepared By:
ASTI Environmental
10448 Citation Drive, Suite 100
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1-800-395ASTI

ASTI Project No. 10860

Report Prepared by:

Brian Earl, CP
Environmental Professional

Report Reviewed by:

Greg S. Oslosky
Director

ASTI ENVIRONMENTAL

TABLE OF CONTENTS

TABLE OF CONTENTS
(continued)

TABLES

FIGURES

APPENDICES

* Items to be posted prominently on site, or made readily available to personnel.

1.0 INTRODUCTION

Riverview-Trenton Railroad Company (RTRR), APPLIED SCIENCE & TECHNOLOGY, INC. dba ASTI Environmental (ASTI), and all subcontractors who are to perform on-site work (the Project Team) are committed to providing a safe and healthful work environment. The goal of the Project Team is zero incidents and zero near misses, meaning that we strive to complete every project without injury, illness, property damage, or environmental damage. Safety must always take precedence over expediency.

This Health and Safety Plan (HASP) has been developed by ASTI to comply with Occupational Safety and Health Administration (OSHA) Hazardous Waste Operations and Emergency Response regulations (Code of Federal Regulations (CFR) Standard 29 CFR 1910.120(b)(4)) and 29 CFR 1926.65. This HASP addresses all of the reasonably foreseeable activities to be conducted at the Former McLouth Steel Property – RTRR Property (Subject Property) located at 18251 West Jefferson Avenue, Riverview, Michigan 48193 (Parcel Nos: 51009030001000, 54001010082300, and 54001990006704). This HASP will be implemented by each of the Project Team's respective Health and Safety Managers ("HSM") during all site activities. Compliance with this HASP is required of all personnel. All site work will be conducted in accordance with OSHA 29 CFR, Parts 1904, 1910, and 1926 as well as the occupational health rules of the State of Michigan, MIOSHA STD 1101 Part 1, MIOSHA STD 1301 Part 1, and MIOSHA STD 1501 Part 11.

The management of the day-to-day site activities and implementation of this HASP in the field is the responsibility of each Contractor's HSM. Assistance in the implementation of this HASP will also be provided by the Project Manager. The content of this HASP may change or undergo revision based upon additional information made available to health and safety personnel, monitoring results, or changes in the scope of work.

2.0 SITE LOCATION AND BACKGROUND

2.1 Location

The RTRR Property is located at 18251 West Jefferson Avenue in the City of Riverview, Wayne County, Michigan. A Site Location Map is provided as **Figure 1.**

2.2 Background

The RTRR Property consists of approximately 76.2 acres. **Figure 2** provides a Site Plan of the RTRR Property. The property is bounded by Trenton Channel of the Detroit River to the east; a portion of the McLouth Steel property referred to as the "County Property", a railroad line, and West Jefferson Avenue to the west; the Grosse Ile Toll Bridge and Monguagon Creek to the north; and a portion of the former McLouth Steel site known as the County Property to the south. Further east of the property, beyond the Trenton Channel, is Grosse Ile, further west, beyond West Jefferson Avenue, is a quarry, residential, commercial and industrial property and further north, beyond Monguagon Creek, is commercial and industrial property.

The Subject Property originally consisted of wetlands and open water, with some uplands in the northwestern portion of the property, until sometime after 1936. During that time, the Monguagon Creek bisected the property, emptying into the Trenton Channel of the Detroit River at about Sibley Road. Between about 1946 and 1952 much of the property had been filled to the current Detroit River bank, but open water remained in the original Monguagon Creek channel. By 1954 the mouth of the Monguagon Creek had been enlarged for docking, including at least five above ground storage tanks located north of the mouth. By 1967, the original Monguagon Creek channel had been filled, the creek was redirected along the northern property line, and no open water remained on the property.

The Subject Property was acquired around 1947 by the McLouth Steel Company ("McLouth"), and used for storage of raw materials, waste, and product to support the integrated production of steel and iron on the adjoining County Property from approximately 1952 to 1975. Facilities on the Subject Property included a storage area for electric arc furnace air pollution control dust. After about 1975, production decreased on the County Property, until McLouth ceased operations in April of 1996 after filing for Chapter 11 bankruptcy protection on September 29, 1995. Hamlin Holdings, Inc. acquired the Subject Property in July of 1996. Detroit Steel Company obtained title for the Subject Property in August of 1996. On June 2, 2000, Crown Enterprises purchased the Subject Property, and conveyed the property to RTRR in November of 2000.

2.3 Current Purpose and Scope of Work

This HASP has been prepared to address activities associated with the groundwater investigation, investigation of five Waste Management Units (WMUs), and general field activities. These activities include groundwater monitoring well installation and completion of soil borings and soil sampling.

3.0 RESPONSIBILITIES AND LINE OF AUTHORITIES

The following briefly describes health and safety designations and general responsibilities which are to be employed during the Scope of Work. The personnel titles have been established to accommodate the site needs and requirements in order to ensure safe conduct during the Scope of Work. The number and type of health and safety (H&S) personnel for a given work location are to be based upon the particular H&S requirements relative to the proposed activities or operations.

3.1 Project Team Responsibilities

The following briefly describes the H&S designations and general responsibilities that will be employed for this site, until otherwise amended.

3.1.1 ASTI Project Manager (PM):

The ASTI Project Manager (PM) is Greg Oslosky (616-485-5743).

His responsibilities include:

- Ensuring that this HASP is developed and approved prior to on site activities.
- Updating the Health and Safety Program as dictated by changing conditions, jobsite inspection results, etc. and approving changes to this HASP.
- Conducting Jobsite Safety Inspections, Conducting Tailgate Safety Meetings (**Appendix A),** and assisting with communication of results and correction of shortcomings found.
- Maintaining records on personnel (training and certifications, accident investigation results, etc.).
- Conducting a pre-deployment operational readiness meeting to discuss the scope of work, staffing, equipment, etc.
- Ensuring that all the tasks in the project are performed in a manner consistent with this HASP.
- Participating in the development and implementation of this HASP.
- The management of the day to day site activities and implementation of this HASP in the field.
- Ensuring that all site personnel and visitors complete an initial H&S orientation, and know, understand and implement the applicable portions of this HASP.
- Resolving conflicts that may arise concerning safety requirements and working conditions.

- Knowing (and ensuring that all site personnel also know) emergency procedures, evacuation routes, and the telephone numbers of the ambulance, local hospital, poison control center, fire department, and police department.
- Establishing that all onsite Project Team personnel have completed a minimum of 40 hours of health and safety training, have appropriate medical clearance as required by 29 CFR 1910.120, and have been fit tested for the appropriate respirators (if applicable). Verifying that contractors and subcontractors (of any tier) meet minimum health and safety criteria.
- Conduct "twilight toolbox meeting" with field team members to discuss that day's activities & progress, any areas of improvement, behavior based safety observations (BBSOs), changes, and expectations for the following day.

3.1.2 Contractor Health and Safety Manager (CHSM):

ASTI shall have an on-site Contractor Health and Safety Manager (CHSM).

The CHSM's responsibilities include:

- Suggesting updates to the Health and Safety Program as dictated by changing conditions, jobsite inspection results, etc.
- Assisting the PM with implementation of the HASP.
- Performing Jobsite Safety Inspections (using Checklist (**Appendix B**)), and correcting any shortcomings in a timely manner.
- Seeing that their personnel (including subcontractors) are aware of the potential hazards associated with site operations.
- Ensuring that proper PPE is available, worn by their employees (including subcontractors) and properly stored and maintained.
- Controlling entry into and exit from the site contaminated areas or restricted zones.
- Monitoring their employees (including subcontractors) for signs of stress, such as heat stress, fatigue, and cold exposure.
- Monitoring site hazards and conditions.
- Knowing (and ensuring that their site personnel (including subcontractors) also know emergency procedures, evacuation routes, and how to access the telephone numbers of the ambulance, local hospital, poison control center, fire department, and police department.
- Correcting any work practices or conditions that may result in injury or unacceptable exposure to hazardous substances.

- Reporting all incidents, injuries and near misses to the Project Manager immediately. The Employee Near Miss/Injury Incident Report is provided in **Appendix C**.
- Establishing that their personnel (including subcontractors) are aware of the provisions of this plan, are instructed in the work practices necessary to ensure safety, and are familiar with planned procedures for dealing with emergencies.
- Establishing that all their onsite personnel (including subcontractors) have completed a minimum of 40 hours of health and safety training, have appropriate medical clearance as required by 29 CFR 1910.120, and have been fit tested for the appropriate respirators (if applicable).
- Verifying that their subcontractors (of any tier) meet minimum health and safety criteria.

Specific health and safety information for all Project Team members are listed in the table below, with reference to ASTI's Corporate health and safety plan. Each Project Team company shall adhere to this HASP as well as their company's HASP while working on-site.

Topic	Appendix	Title	Section/Page
Personal Protective Equipment	D	ASTI Environmental Health and Safety Plan	SECTION 5 PAGE 14
Confined Space Entry	D	ASTI Environmental Health and Safety Plan	SECTION 6 PAGE 20
Respiratory Protection Program	D	ASTI Environmental Health and Safety Plan	SECTION 7 PAGE 21
Extreme Working Conditions	D	ASTI Environmental Health and Safety Plan	SECTION 8 PAGE23
Emergencies	D	ASTI Environmental Health and Safety Plan	SECTION 9 PAGE28
Other Safety Procedures	D	ASTI Environmental Health and Safety Plan	SECTION 10 PAGE 30
Traveling	D	ASTI Environmental Health and Safety Plan	SECTION 10 PAGE 30
Drilling Activities	D	ASTI Environmental Health and Safety Plan	SECTION 10 PAGE 30
Sample Handling Procedures	D	ASTI Environmental Health and Safety Plan	SECTION 10 PAGE 30
Suspected Hazardous Sites	D	ASTI Environmental Health and Safety Plan	SECTION 10 PAGE 31
Known Hazardous Sites	D	ASTI Environmental Health and Safety Plan	SECTION 10 PAGE 31

Topic	Appendix	Title	Section/Page
Decontamination	D	ASTI Environmental Health and Safety Plan	SECTION 10 PAGE 31
Emergency Response	D	ASTI Environmental Health and Safety Plan	SECTION 10 PAGE 32
Water Safety	D	ASTI Environmental Health and Safety Plan	SECTION 10 PAGE 32
Building Safety	D	ASTI Environmental Health and Safety Plan	SECTION 10 PAGE 32
Working Alone	D	ASTI Environmental Health and Safety Plan	SECTION 10 PAGE 33
General Precautions When Working Alone in the Field	D	ASTI Environmental Health and Safety Plan	SECTION 10 PAGE 33
Specific Precautions When Working Alone in the Field	D	ASTI Environmental Health and Safety Plan	SECTION 10 PAGE 33
When Not to Work Alone	D	ASTI Environmental Health and Safety Plan	SECTION 10 PAGE 33
Working in Traffic Areas	D	ASTI Environmental Health and Safety Plan	SECTION 10 PAGE 34
Communication	D	ASTI Environmental Health and Safety Plan	SECTION 10 PAGE 35

3.2 Subcontractor Responsibilities

Each subcontractor utilized for this project shall develop and implement their own HASP, which identifies a lead individual as the Subcontractor's Safety Representative (SSR) who is responsible for H&S compliance for each of their employees, lower-tier subcontractors, and consultants. A copy of the subcontractor's HASP will be provided to the ASTI PM prior to conducting any site activities, and that HASP will be at least as stringent as this HASP. All subcontractor staff must be familiar with and abide by the requirements outlined in their own HASP. A subcontractor may elect to adopt this HASP as its own, provided that it has given written notification to the PM, but where this HASP excludes provisions pertinent to the subcontractor's work (e.g., confined space entry and relevant Job Safety Analysis (JSA)) the subcontractor must provide written addendums to this HASP. Additionally, the subcontractor must:

- Ensure their employees are trained in the use of all appropriate PPE for the tasks involved; and

- Notify the PM of any hazardous material brought onto the job site or site related area, the hazards associated with the material, and must provide a Safety Data Sheet (SDS) for the material which will be incorporated in to **Appendix E**; and
- Have knowledge of, understand, and abide by all current federal, state, and local health and safety regulations pertinent to the work; and
- Ensure their employees have received current HASP-required training, and training in the appropriate levels of 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response (HAZWOPER); and
- Ensure their employees have been medically cleared to work in Hazardous Waste Sites and to wear a respirator, if necessary; and
- If respirators are necessary, ensure their employees have been fit-tested within the year on the type of respirator they will wear;

During the subcontractor's activities onsite, the subcontractor's SSR will perform continuing work area inspections, participate in the development of Job Safety Analyses (JSAs) included in **Appendix F**, and conduct safety meetings and safety orientations for all new employees. The SSR will attend daily safety meetings with the CHSM. The SSR will also investigate accidents and overexposures involving subcontractor personnel, and report these to their respective CHSM and the PM.

The PM will provide a copy of this Health and Safety Plan to each site subcontractor in order to fulfill its obligation under 29 CFR 1910.120 to inform subcontractors of site hazards. Each subcontractor is to provide health and safety procedures that complies with 29 CFR 1910.120 and addresses the activities of its employees relative to this project.

4.0 BEHAVIOR BASED SAFETY (BBS)

Unsafe behaviors are often habitual in most people (i.e., we have done something the wrong way for so long that we are not conscious of the behavior). The objective of BBS is to replace all the unconscious unsafe behaviors with unconscious, or automatic, safe behaviors - or safe habits. To help create a BBS culture, the PM will create a **Safety Leadership Team** made of field team members. It will generally be a rotating core team of 3-5 staff, working together. This team will be responsible for planning, designing and executing the activities that will promote a culture of safety. The Safety Leadership Team will use regular positive reinforcement for safe behaviors to replace unsafe habits with safe habits.

At a minimum the PM will track the positive observations, positive interventions, “pauses”, JSAs, proactive behaviors, etc. each day. Note that a “pause” is a last minute risk assessment to identify immediate changes in the field due to internal or external factors. Examples can include visitors in work area, change of tools, changing weather conditions, etc.

The goals of BBS are to:

- Create a culture where safety is the responsibility of everyone equally
- Motivate everyone to take responsibility for the safety of coworkers in addition to themselves
- Create a mindset where safety is a discussion that takes place every day
- Develop a feedback-rich culture where safe and unsafe behaviors are recognized
- Eliminate unsafe conditions or acts and near misses
    - An unsafe act involves performance of a task or other activity in a manner that may threaten the health and/or safety of workers
    - Examples include:
        - Operating equipment without qualification or authorization
        - Lack of/or improper use of PPE
        - Operation of equipment at unsafe speeds
        - Failure to warn
        - Bypass or removal of safety devices
        - Using defective equipment
    - A near miss is an unplanned event that did not result in injury, illness, or damage - but had the potential to do so. Only a fortunate break in the chain of events prevented an injury, fatality or damage. An incident is the sequence of events or actions that produces that accident. All accidents are incidents. However the

definition of an incident is wider in that it also includes dangerous occurrences and near misses.

The responsibilities of each Project Team member include:

- Participate in daily tailgate meetings, audits, and trainings
- Review and sign-off on project HASP
- Complete and modify (if necessary) task-specific JSAs, Permits to Work
- Initiate field pauses, as necessary, positive observations, and positive interventions
- Ensure permits are issued for the tasks prior to commencing work
- Provide subcontractors oversight
- Ensure subcontractors are adhering to our safety principles
- Notify management of any changes proposed, or technical and safety issues requiring additional equipment or PPE

Each SSR's responsibilities include:

- Conduct and document Site-specific training for their employees new to the Site, subcontractors, and visitors.
- Complete and issue necessary work permits (i.e. hot work, working from heights, excavation/ subsurface intrusion, etc.), and JSAs
- Ensure field staff are completing daily equipment inspection documentation
- Ensure field team members have read and signed off on the project HASP
- Conduct & document daily tailgate meetings with field team members, where the task-specific JSAs, permits, and daily work plan are discussed
- An unsafe condition is a condition in the work place that is likely to cause property damage or injury. Examples include:
    - Defective tools, equipment or supplies
    - Inadequate supports or guards
    - Congestion in the workplace
    - Inadequate warning systems
    - Fire and explosion hazards
    - Poor housekeeping
    - Hazardous atmospheric conditions

At the end of each day, the team will report out positive observations and interventions:

<u>Positive Observations</u>

- Any observation of people or activities in which one party observes safe working practices
- This is tracked to identify what we are doing correctly, and to encourage those safe work practices
- Any “proactive items” addressed to correct conditions prior to them becoming an unsafe act or condition would also be considered a positive observation
    - e.g., applying salt to an icy walkway, or pre-marking “no parking zones” in anticipation of on-site truck traffic
- Using “pauses” throughout each day, as applicable

Positive Intervention

- Is a conversation between at least two people
- Should relate to a safe or an unsafe act
- Is a learning opportunity
- Includes open questions and active listening
- Focuses on what could go wrong and for whom
- Results in an immediate action
- Focuses on the behaviors, not the individual

5.0 GENERAL HAZARD ASSESSMENT

This section provides an assessment of the general hazards that may be encountered during field work activities at the site through a task by task risk analysis. Potential hazards, generally categorized as chemical exposure and physical hazards, are addressed below.

5.1 Chemical Exposure Hazards

Known and suspected chemical contaminant hazards that could be encountered during site activities are summarized in **Table 1**. An inventory of safety data sheets (SDS) for chemical products used on site can be found in **Appendix E**. The main route of exposure for chemicals on the Subject Property is (i) inhalation of vapors/dust, (ii) skin/eye contact, or (iii) absorption. Incidental ingestion is also a possible, but unlikely, route of exposure.

Previous investigations have identified the potential constituents of concern (COCs) as primarily polychlorinated biphenyls (PCBs), lead, and other metals in the soils. In the groundwater COCs include Ammonia, Arsenic, Barium, Chloride, Chromium, Copper, Cyanide (Free), Lead, Manganese, Mercury, Nickel, Selenium, Silver, Vanadium, Zinc, VOCs, SVOCs, PCBs, pH, and Total Dissolved Solids.

Potential exposures will be reduced or eliminated by following the work practices and using the PPE designated in this HASP. Control measures include avoiding the generation of dust during site activities as described in the Dust Control Plan, and including, but not limited to: changing work procedures when significant visible dust is present, mitigating dust generation by misting with water, wearing a dust mask (when applicable) to prevent inhalation of dust, wearing gloves during site activities to avoid dermal contact with soil, and avoiding consumption of food, drink, or tobacco in the vicinity of site activities.

5.2 Physical Hazards

Physical hazards, which may be encountered during site operations for this project, are detailed in **Table 1**. Caution should always be used around site activities and machinery.

Heat stress and cold exposures poses a hazard to personnel working under extreme temperatures. Guidelines to prevent ill effects of exposure are presented in **Appendix G**.

Slip, trip, or fall hazards may be present throughout the site, with increased risks when working around pits, sumps or lagoons, or on uneven terrain. Use caution when walking on the site. Secure footing to prevent falls into pits, sumps or lagoons.

5.3 Biological Hazards

Biological hazards that are common to overgrown vacant lands occur at the site. Deer ticks, which are known to be carriers of the Lyme disease virus, are reported to be found in the vicinity of the site, and deer are present onsite.

Common “allergy causing” plants, such as poison oak, poison ivy, giant hogweed, and animals, such as black widow spiders, brown recluse spiders, bees, wasps, and eastern massasauga rattlesnake may be present at the site. Stay alert for wildlife habitats. Animals may become aggressive if a threat is perceived. Maintain safe working distance.

Guidelines for potential biohazards are presented in **Appendix H**.

5.4 Task By Task Risk Analysis

Through information gathering, inspection, and monitoring, hazards that are potentially present have been determined for each specific task described in **Table 1**. This table provides a summary of chemical exposure and physical hazards that could potentially be encountered by personnel during each task effort.

5.5 Job Safety Analysis

A Job Safety Analysis (JSA) is a process to identify existing and potential hazards associated with each job or task so these hazards can be eliminated, controlled or minimized. A JSA will be performed at the beginning of each work day, and will be updated during the shift if new or different tasks or unanticipated hazards are encountered, or if the control measures are inadequate. All JSAs must be developed or reviewed by all parties involved. A blank JSA form and documentation of completed JSAs are in **Appendix F**. The completed forms are to be maintained on site until the completion of the project, at which time they are to be placed in the project files.

5.6 Disciplinary Action

Any behaviors or actions on the part of project personnel or subcontractors that jeopardize the safety of others or are deemed harmful to human health or the environment will result in the immediate removal of those individuals from the project.

6.0 TRAINING REQUIREMENTS

The general training requirements for site personnel are discussed in the following sections.
The site access personnel categories and required training levels are:

A. Site Employees with Access to Active Work Areas – will require the Basic Training (below) and Site-Specific Training (below)
B. Site Management and Staff without Access to Active Work Areas – Site-Specific Overview (below)
C. Vendors/Delivery Personnel, Waste and Salvage haulers – Site-Specific Training (below)
D. Subject Property Owner, their representatives and special guests, visitors, regulatory personnel – Site Specific Overview (below)

6.1 Basic Training Required

Completion of an initial 40 hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training program as detailed in 29 CFR 1910.120(e), is required for all employees who will perform work in areas where the potential for a toxic exposure exists. Annual eight-hour refresher training is also required to maintain competencies to ensure a safe work environment. Training records will be maintained by PM.

6.2 Site-Specific Training

Prior to field implementation, all site personnel will undergo project orientation, which includes implementation and execution of policies, including, but not limited to, Risk Assessment and JSA's, Change Management, and elements of this HASP. All site personnel will participate in documented daily health and safety tailgate meetings to discuss site conditions, hazards, hazard controls, applicable HASP requirements and JSAs. Training will be provided to specifically address the activities, procedures, monitoring, and equipment for site operations at the beginning of each field mobilization and the beginning of each discrete phase of work. The training will include the site and facility layout, hazards, and emergency services at the site, and will detail all the provisions contained within this HASP.

Required Training - All site personnel must have the following training:

- HASP Orientation;
- Permit to Work(refer to Section 10);

- Operators/ laborers also need task specific training such as operator's certification for operation of heavy equipment, lifting/hoisting, ground disturbance, aerial lift training, etc., as applicable for the site activities.

Compliance with all HASP rules is mandatory for everyone while on the Subject Property, and failure to comply will result in disciplinary action, which may include leaving the Site and banishment from additional work.

6.3 Tailgate Safety Briefings

Before starting work each day and as needed thereafter, the PM or a SSR designated by the PM will conduct a brief tailgate safety briefing meeting to assist site personnel in conducting their activities safely. Tailgate meetings will be documented in the form included in **Appendix A**. Briefings will include the following:

- Scope of work for the day,
- Review of safety information relevant to planned tasks and environmental conditions,
- New activities/task being conducted,
- Results of Jobsite Safety Inspection Checklist,
- Changes in work practices,
- Safe work practices, and
- Discussion and remedies for noted or observed deficiencies or near misses.

The Tailgate Safety Briefing will include a focused discussion using a "pause" as well as a discussion of a past lessons learned relevant to the work being performed. Further, a twilight toolbox meeting will be held at the conclusion of field activities for the day, to review any safety or progress related items, and discuss the following days proposed activities.

6.4 Site Specific Overview

The Site Specific Overview will provide information and awareness of site conditions, activities, hazards and evacuation procedures. This overview will cover individuals that will be on-site temporarily and are not performing work activities. Individuals in this category are Subject Property Owner and their representatives, visitors, regulatory personnel, elected officials, etc. All personnel in these categories will be escorted at all times while in the work zone of the Subject Property. The work zone is all areas of the property other than Office Trailer and Laydown Area located in the southwest corner of the property.

7.0 PERSONNEL PROTECTION

7.1 Definitions

The following levels of personnel protective equipment (PPE) are defined for the site activities performed on the Subject Property by site personnel:

- Level C operations are not anticipated but will use all of the items listed under Modified Level D plus the addition of a full or half face piece and a respirator equipped with appropriate cartridges or canisters.

- Modified Level D is not anticipated but my be required for specific tasks. Modified Level D includes:
    - Hardhat
    - Safety glasses with side shields (or impact resistant goggles)
    - Approved safety shoes
    - Ear protection in vicinity of noisy equipment
    - Work gloves and/or chemical-resistant gloves
    - Reflective safety vest ANSI Class 2 for work near roads or heavy equipment (Class E apparel is required for work at night or during periods of poor visibility)
    - Tyvek outer clothing for work with liquids
    - Nitrile outer gloves and latex inner gloves for work with liquids
    - Rubber boot covers for work with liquids

- Level D, the minimum PPE for site personnel includes:
    - Hardhat
    - Safety glasses with side shields (or impact resistant goggles)
    - Approved safety shoes
    - Ear protection in vicinity of noisy equipment
    - Work gloves and/or chemical-resistant gloves
    - Traffic safety vest in the vicinity of heavy equipment

7.2 Personnel Protection Requirements

Each contractor/subcontractor will provide PPE to their staff to protect them from the specific hazards they are likely to encounter on site. Selection of the appropriate PPE must take into consideration: (1) the work being conducted; (2) identification of the hazards or suspected hazards; (3) potential exposure routes; and, (4) the performance of the PPE construction (materials and seams) in providing a barrier to these hazards.

Based on anticipated site conditions and the proposed work activities to be performed at the site, Level D Protection will be used. The upgrading/downgrading of the level of protection will be based on the type of work performed. The decision to modify standard PPE will be made by the CHSMs after conferring with the PM.

7.3 Respirator Fit Test

Use of respirators is not anticipated for the current scope of work; however, if that requirement changes, all project employees who may be required to wear Level C PPE must be in possession of a full or half face piece, air purifying respirator and have been successfully fit tested within the past year. Fit test records must be provided by the respective contractors and will be maintained by the PM.

7.4 Site Communication Plan

Verbal communication will be the primary method of communication used at the site during the site activities. Handheld radios (i.e. walkie-talkies) may be used when practical. In the instances where verbal communication cannot be used, such as when working in respiratory protective equipment (if required), hand signals will be used. Hand signals will be covered during site specific training. Hand signals and their messages are defined in the subsequent table:

Hand Signal	**Meaning**
Hand gripping throat	Out of air; cannot breathe
Grip partners wrists or place both hands around waist	Leave immediately without debate
Hands on top of head	Need assistance
Thumbs up	OK; I'm alright; I understand
Thumbs down	No; negative
Simulated "stick" break with fists	Take a break; stop work

Use of cell phones on site will be limited to the cell phone areas designated by the PM.

7.5 Work Zones

Work zones will be established as described below:

- Exclusion Zone – An approximately 25-100 foot (as practical) circle around the work area will be defined before work starts. The encircled area will constitute the “Exclusion Zone.” This zone is where potentially hazardous contaminants and physical hazards to the workers will be contained. Plastic sheeting (visqueen) and/or tarps may be used as

necessary to control contaminated materials that are either airborne or spilled to the ground during site operations, but in all cases each Exclusion Zone will be clearly demarcated. The size of the Exclusion Zone may be altered to accommodate site conditions and to ensure contaminant containment. No personnel or site visitors will be permitted into the Exclusion Zone unless they are in full compliance with the PPE requirements of this Plan.

- Contamination Reduction Zone (CRZ) – A corridor leading from the Exclusion Zone to the Support Zone will be defined and demarcated. All decontamination activities will occur in the CRZ. A waste container will be placed at the end of the corridor so contaminated disposable equipment can be placed inside and covered. Surface/soil contamination in this area will be controlled using plastic sheeting. No personnel or site visitors will be permitted into the Contamination Reduction Zone unless they are in full compliance with the PPE requirements of this Plan.
- Support Zone – A Support Zone, the outermost part of the any work area, will be defined for each field activity. Support equipment will be located in this area. Level D is appropriate in the Support Zone. The location of this zone depends on factors such as accessibility, wind direction (upwind of work area), and resources (i.e., roads, shelter, utilities, etc.).

7.6 The Buddy System

When working in teams of two or more, workers will use the "buddy system" for all work activities to ensure that rapid assistance can be provided in the event of an emergency. This requires work groups to be organized such that workers can remain close together and maintain visual contact with one another. Workers using the "buddy system" have the following responsibilities:

- Provide his/her partner with assistance,
- Observe his/her partner for signs of chemical or heat/cold exposure,
- Periodically check the integrity of his/her partner's PPE, and
- Notify the CHSM/PM or other site personnel if emergency service is needed.

7.7 Nearest Medical Assistance

The address and telephone number of the nearest hospital and Urgent Care facility:

Trenton Total Healthcare (Urgent Care) 1.2 miles
1675 Kingsway Ct #1
Trenton, MI 48183
Telephone: (734) 676-8530
Approximately 0.2 miles west of Fort St., then left onto Kingsway Court.

Beaumont Hospital, Trenton 4.2 miles
5450 Fort St.
Trenton, MI 48183
Telephone: (734) 671-3883
Approximately 0.75 miles south of Van Horn Road, the hospital is located on the right.

A map with directions to the hospital/urgent care are shown on **Figure 3 and Figure 4, respectively**. This information will be posted prominently at the site and will be available to all personnel all of the time. The location and directions to the hospital and urgent care facility will be reviewed in a daily safety meeting.

8.0 CONFINED SPACE ENTRY

Confined space is not anticipated as part of this project. If confined space entry becomes necessary, this HASP will need to be revised prior to beginning any confined space work. Confined space work should only be conducted by those with the proper training and qualifications and after all pre-work documentation has been completed by a competent person.

9.0 EMERGENCY RESPONSE

9.1 General

Because of the hazards that may be present at the site and the conditions under which operations are conducted, it is possible that an emergency situation may develop. Emergency situations can be characterized as injury or acute chemical exposure to personnel, fire or explosion, environmental release, or hazardous weather conditions.

9.2 Responsibilities

Site Emergency Coordinator

The PM, or their alternate, will serve as the Site Emergency Coordinator and shall implement emergency procedures whenever conditions warrant such action. The PM will be responsible for assuring the evacuation, emergency treatment, emergency transport of site personnel, and notification of emergency units and the appropriate management staff. Emergency response instructions will be provided by the PM as part of every employee's training prior to the start of work.

Employees

All employees at the site will be familiar with emergency response procedures for this work location.

9.3 Evacuation

In the event of an emergency situation, an air horn or vehicle horn will be sounded three times indicating the initiation of evacuation procedures. Loud voice command, if appropriate, can also be used. All personnel will evacuate and assemble at the site entrance. No one, except the emergency responders, will be allowed to proceed into the area once the emergency signal has been given. The site H&S officer will ensure that access for emergency equipment is provided and that all sources of combustion (e.g., operating machinery, etc.) have been shut down once the alarm has been sounded. Wind direction will be taken into consideration for evacuation plans. Evacuation plans will be discussed at the initial Site Specific Training and as needed at the regular safety briefings.

In all situations, when an onsite emergency results in an evacuation, personnel shall not re-enter until:

- The conditions resulting in the emergency have been corrected, and

- The hazards have been reassessed, and
- This HASP has been reviewed for changes, and
- Site personnel have been briefed on any changes to this HASP, and
- The PM has indicated that work can continue.

9.4 Emergency Contacts/Notification System

The fire department and other emergency response groups will be notified by telephone of the emergency as soon as possible. An emergency telephone numbers list is presented as **Table 2** in this HASP. This list will be posted prominently at the Site Office Trailer.

9.5 Emergency Medical Treatment

Personnel Injury

In case of injury to personnel, a First Aid Trained person will immediately administer emergency first aid. The ambulance/rescue squad will also be contacted as necessary. Some situations may require transport of the injured parties by automobile. Therefore, maps/directions to the nearest hospital are provided as **Figure 3.**

Personnel Exposure

Emergency first aid procedures to be followed are:

- Skin Contact: Use copious amounts of soap and water. Wash/rinse affected areas thoroughly, and then provide appropriate medical attention. Rinse eyes with water for at least 15 minutes.
- Inhalation: Move to fresh air and/ or, if necessary decontaminate and transport to emergency medical facility or request the assistance of emergency medical professionals.
- Ingestion: Decontaminate and transport to emergency medical facility or request the assistance of emergency medical professionals.

Puncture/ Laceration: Decontaminate, if possible, and transport to emergency medical facility or request the assistance of emergency medical professionals.

9.5.1 Hospital Directions

From Main Entrance at the McLouth Steel Property to Beaumont Hospital, Trenton at 4540 Fort Street., Trenton, Michigan 48183; phone (734) 671-3883:

- Exit onto West Jefferson Ave. southbound (left)
- Turn west (right) onto King Rd. to Fort St.
- Turn south(left) onto Fort St. and proceed to 5450 Fort St. on the right (4.2 miles).

A map with directions is provided on **Figure 3**.

9.6 Occupational Health Clinic Directions

To reach the occupational health clinic from the main entrance at the McLouth Steel Property to Trenton Total Healthcare at 1675 Kingsway Court #1, Trenton, Michigan 48183; Phone (734) 676-8530:

- Exit onto West Jefferson Ave. southbound (left)
- Turn west (right) onto King Rd. to Kingsway Court
- Turn south (left) onto Kingsway Court and proceed to 1675 Kingsway Court # 1(1.2 miles).

A map with directions is provided on **Figure 4**.

9.7 Fire or Explosion

Appropriate fire extinguishers will be made available at the site for trained personnel to use on insipient stage fires without endangering the safety and health of those nearby. If the use of fire extinguishers will not extinguish the fire, immediately notify the fire department, sound the evacuation signal, and then evacuate the area, assembling at the site entrance to be accounted for and to receive further instruction.

9.8 Spills/Leaks

The best emergency spill plan is planning to avoid and prevent spills. In the event of accidental spillage, the following spill response protocol will be implemented as follows:

1. First Aid shall be administered to the extent practical by qualified personnel to injured/contaminated persons. Any employee who observes a spill shall act immediately, to the extent practical, to protect injured/contaminated persons from any life-threatening situation. First Aid and/or decontamination procedures will be implemented as appropriate.

2. Warn unsuspecting persons of the hazard and isolate the spill area. Personnel shall act to prevent any unsuspecting persons from coming in contact with spilled materials by alerting other nearby persons and by obtaining assistance of other personnel who are familiar with spill control and cleanup techniques.

3. Stop the spill at the source, if possible, without taking unnecessary risks. Deploy spill response equipment.

4. Using available personal radio communications or other rapid communication procedures, the PM and the SSR will be notified of the spill, including information on material spilled, quantity, personnel injuries, and immediate life-threatening hazards.

5. Spill assessment and primary containment. The SSR/PM will make a rapid assessment of the spill and direct primary containment measures which may include, but are not limited to:
    a. Construction of a temporary containment berm using on-site absorbent pads and booms or earth.
    b. Digging a sump, installing a polyethylene liner and diverting the spilled material to the sump.

6. Spill clean-up. Personnel will clean-up spills following the spill clean-up plan developed by the SSR or PM. The SSR will be present during clean-up operations. Most equipment, materials, and supplies necessary to remediate a discharge should be readily available on site. Such items may include, but are not limited to: front end loader, shovels, rakes, absorbents, polyethylene, personal safety equipment (respirators, gloves, boots, protective coveralls, hard-hats, eye shields etc.), steel drums, pumps, and miscellaneous hand tools.

7. The PM will notify the Subject Property Owner.

8. The PM will notify the On-Site Coordinator for the Michigan Department of Environment, Great Lakes, and Energy (EGLE).

9.9 Adverse Weather Conditions

In the event of severe weather (rain, heat, cold, etc.), conditions will be assessed on site to determine if the work can proceed safely. If it is determined that the weather poses a significant

hazard, site operations will be stopped and rescheduled. Some of the items to be considered prior to determining if work should continue include:

- Potential for heat stress and heat related injuries.
- Potential for cold stress and cold related injuries.
- Treacherous weather related working conditions.
- Limited visibility.
- High winds.
- Threat of wildfires

If lightning is spotted, all work must cease until 30 minutes have passed since the last sighting.

9.10 Underground Utilities

The following safe work practices must be followed by Project Team personnel before and during subsurface work:

- Obtain available utility drawings from the Subject Property Owner.
- Provide available utility drawings to the subcontractors.
- In the field, mark the proposed area of subsurface disturbance (when possible).
- Ensure that the MISSDIG (811) system has been notified within the proper response time.
- Ensure that the utility companies have responded to the utility locate notification prior to beginning subsurface work.
- Discuss subsurface work locations with the subcontractor.
- Obtain approval from the Subject Property Owner for proposed subsurface work locations.
- Use safe digging procedures when applicable.
- Stay at least 10 feet from all equipment performing subsurface work.

9.11 Site Safety Inspection

The PM or alternate will check the work area daily, at the beginning and end of each work shift or more frequently to ensure safe work conditions. The PM or alternate must complete the Jobsite Safety Inspection Checklist, found in **Appendix B**, at least weekly or before completion of work, whichever is shorter. Any deficiencies shall be discussed at the daily tailgate meeting.

9.12 Documentation

Immediately following an incident or near miss, unless emergency medical treatment is required, either the employee(s) or a coworker must contact the PM to report the incident or

near miss. For emergencies involving personnel injury and/ or exposure, the PM and affected employee(s) will complete an Employee Exposure/ Injury Incident Report (**Appendix C**).

"Near Miss" reports are to be submitted to the PM using the Near Miss Report included in **Appendix C**.

9.13 Operation Shutdown

If known or possible hazardous situations are present, there is a change in significant conditions, or if work tasks are unclear, any project staff may request that site operations be temporarily suspended while the underlying hazard is corrected or controlled. All project staff are encouraged to exercise "stop work" authority as part of applying principles of the behavior based safety culture. Following the identification of a change in conditions resulting in a "stop work" request, the following steps must be completed prior to resuming work:

- **Stop Work**
- **Communicate** – Identify the hazard or change in condition that needs to be addressed. If the situation is related to emissions, during operation shutdown, all personnel will be required to stand upwind to prevent exposure to fugitive emissions.
- **Mitigation Action** – The CHSM and PM will determine the mitigation action appropriate to address the identified hazard.
- **Resume Work** – Implement any mitigation action determined necessary for the safe implementation of work.

The PM will have ultimate authority for operations shutdown and restart.

10.0 PERMIT TO WORK SYSTEM

The following list of activities will require a task-specific work permit. Multiple activities which require permits may take place at one time and each must be permitted as appropriate. The System of Work Permits is included in **Appendix I**.

- Excavation/Trenching – Excavation work is not currently anticipated for this project. In the event that excavations are conducted, an Excavation Permit will be used when performing any excavation activity. This will be completed daily during the project earthwork activities.
- Hot Work (not anticipated) - A Hot Work Permit will be completed prior to performing hot work activities such as grinding, or other heat generating activities. No product storage tanks are located at the site and no explosive or flammable materials are stored onsite.
- Welding, Burning and Cutting (not anticipated) – A Welding, Burning, and Cutting permit will be completed prior to performing any activity that includes welding, burning or cutting.

Permits may only be issued by authorized personnel who are not performing the work. Upon completion of the permitted activity or at the end of each work day, the permit must be closed out by the same person who issued it, and copies will be maintained by the site S&H officer.

11.0 PERSONNEL DECONTAMINATION PROCEDURES

INFORMATION IS AVAILABLE IN APPENDIX D

All personnel, equipment, and samples leaving a contaminated area of the site must be decontaminated. Decontamination for this operation is achieved through physical removal and chemical detoxification/disinfection/sterilization. In order to minimize decontamination activities the following standard operating procedures have been established which are meant to minimize contact with wastes:

- Work habits that minimize contact with wastes are stressed.
- Disposable equipment, where appropriate, will be used.

12.0 ADDITIONAL SAFE WORK PRACTICES

Workers will be expected to adhere to the established safety practices for their respective specialties. The need to exercise caution in the performance of specific work tasks is made more acute due to weather conditions, restricted mobility and reduced peripheral vision caused by the protective gear itself, the need to maintain the integrity of the protective gear, and the increased difficulty in communicating caused by respirators (if required). Work at the site will be conducted according to established protocol and guidelines for the safety and health of personnel involved. The following are among the most important of these principles:

- If unsafe conditions are observed, stop work.
- In any unknown situation, always assume the worst conditions and plan responses accordingly.
- Employ the buddy system. Establish and maintain communication.
- Minimize contact with contaminated materials. Plan work areas, decontamination areas and procedures to accomplish this. Do not place equipment on the ground. Do not sit on contaminated materials.
- Smoking, eating, or drinking within a contaminated area and before decontamination will not be allowed.
- Avoid heat/cold and other work stresses related to wearing the protective gear. Work breaks should be planned to prevent stress-related accidents or fatigue.
- Maintain air monitoring systems. Be especially aware of combustible gas levels and adequate oxygen levels in your work area.
- Conflicting situations which may arise concerning safety requirements and working conditions must be immediately addressed and resolved rapidly by the site CHSMs to relieve any motivations or pressures to circumvent established safety policy.
- Unauthorized breaches of specified safety protocol will not be allowed. Personnel unwilling or unable to comply with the established procedures will be replaced. Any changes in established procedure should be documented on the form provided. The change should have a very specific and valid basis and must be approved by the PM.
- Be observant of not only one's own immediate surroundings but also that of others. Everyone will be working under constraints to awareness, and it is a team effort to notice and warn of impending dangerous situations. Extra precautions are necessary when working near heavy equipment while using personal protective gear. Vision, hearing, and communication are restricted by the protective gear.

- Level C respiratory protection is not anticipated for this project. However, if the need arises to wear Level C respiratory protection, personnel in Level C protection will be required to remove facial hair (except moustaches) to allow a proper fit of the face piece.
- Rigorous contingency planning and dissemination of plans to personnel minimize the impact of rapidly changing safety requirements in response to changing site conditions.
- Withdrawal from a hazardous situation to reassess procedures is the preferred course of action.

13.0 DISPOSAL PROCEDURES

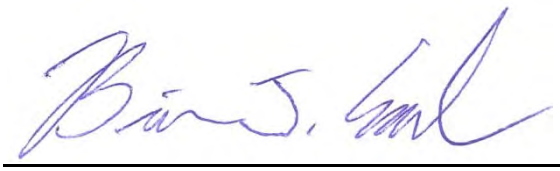
Discarded materials, waste materials, or other objects shall be handled in such a way as to preclude the potential for spreading contamination, creating a sanitary hazard, or causing litter to be left on site. Potentially contaminated materials (e.g., clothing, gloves, etc.) will be bagged or drummed as necessary with other contaminated materials, and segregated for disposal. If used, drums will be closed and bolted before leaving the site. Contaminated waste materials shall be disposed of as required by the provisions included in state and federal regulatory requirements. Non-contaminated materials shall be collected and bagged for appropriate disposal as normal waste.

14.0 APPROVALS

By their signature the undersigned certify that this HASP is approved:

4/1/2019

Greg Oslosky / ASTI Project Manager — Date



4/1/2019

Brian Earl / ASTI CHSM — Date

15.0 PROJECT TEAM REVIEW

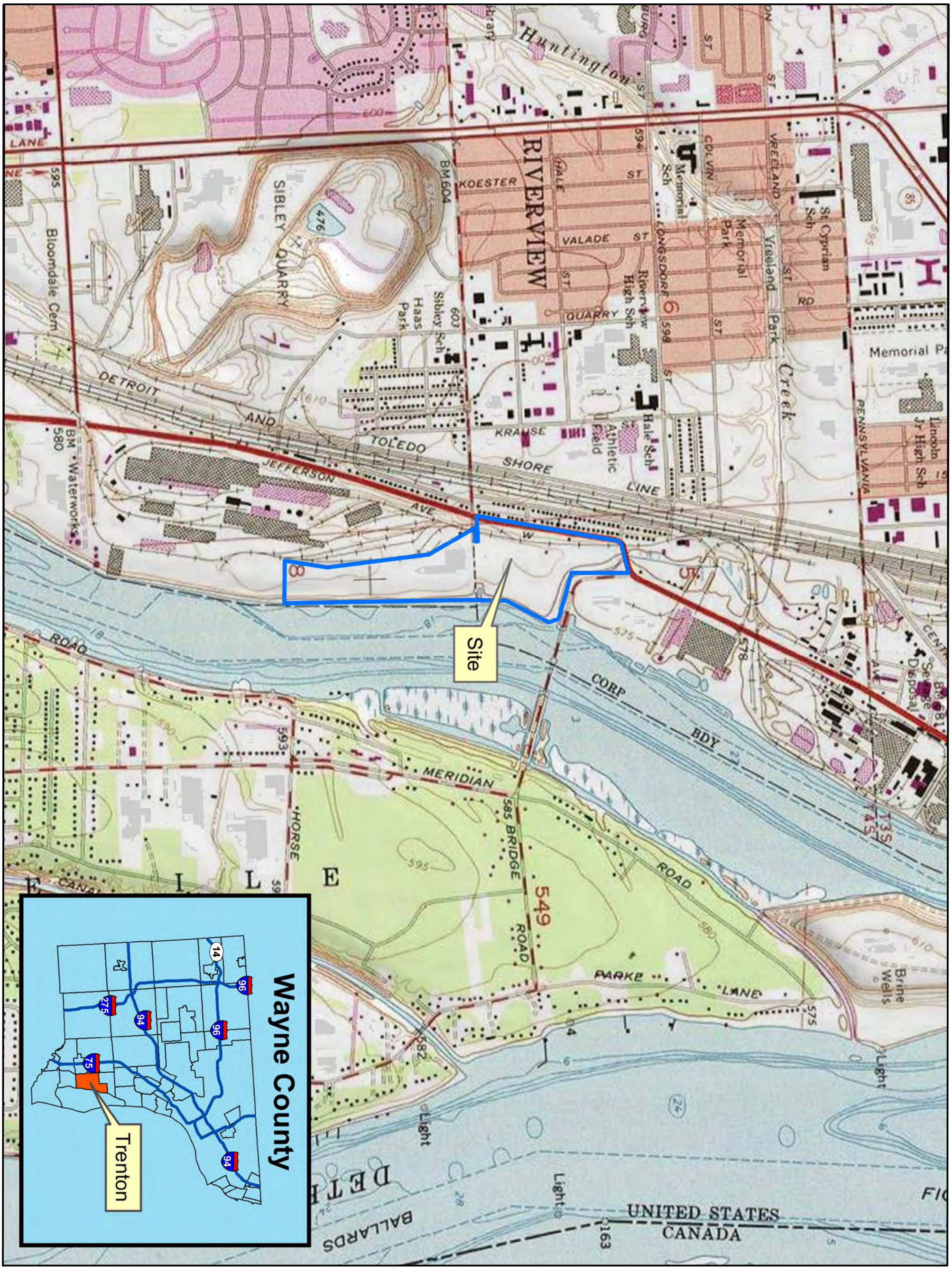
Each project team member shall sign this section after site-specific training is completed and before being permitted to work on site.

I have read and understand this Site-Specific Health and Safety Plan. I will comply with the provisions contained therein.

Site/Project: McLouth Steel Property – RTRR Property, Riverview, Michigan

Name Printed	Signature	Date

FIGURES



RTRR Property

18251 West Jefferson, Trenton & Riverview, MI

Environmental

Created for: Riverview-Trenton Railroad Company

Figure 1 - Site Location Map

ASTI Project 10860 JRN, March 12, 2019

RTRR Property

18251 West Jefferson, Trenton & Riverview, MI

ASTI Environmental

Created for: Riverview-Trenton Railroad Company

ASTI Project 10860 JRN, March 12, 2019

Figure 2 - Property Map

Take W Jefferson Ave to Fort St in Trenton

4 min (2.0 mi)

1. Head south on W Jefferson Ave toward High St

1.4 mi

2. Turn right onto King Rd

0.7 mi

Follow Fort St

5 min (3.4 mi)

3. Turn right onto Fort St

0.1 mi

4. Sharp left to stay on Fort St

0.3 mi

5. Continue straight to stay on Fort St

0.5 mi

6. Continue straight to stay on Fort St

0.5 mi

7. Continue straight to stay on Fort St

0.6 mi

8. Continue straight to stay on Fort St

Pass by Citizens Bank (on the right in 0.5 mi)

0.6 mi

9. Continue straight to stay on Fort St

0.7 mi

10. Continue straight to stay on Fort St

0.1 mi

Drive to your destination

49 s (466 ft)

11. Turn right

207 ft

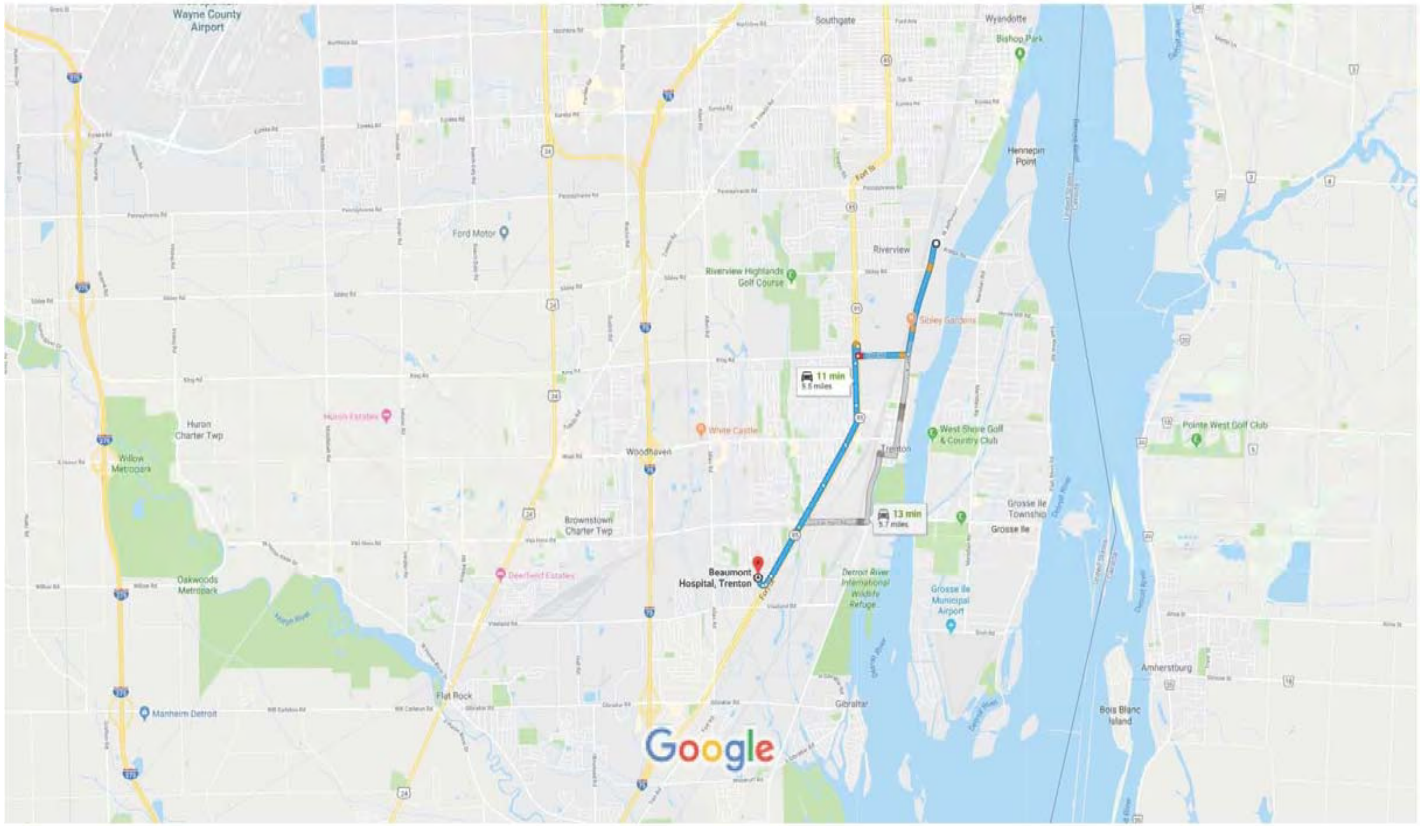
12. Turn right

Destination will be on the right

259 ft

Beaumont Hospital, Trenton

5450 Fort St, Trenton, MI 48183



N
W E
S

RTRR HASP

ASTI ENVIRONMENTAL

Created for: Riverview-Trenton Railroad Company
Created by: BJE, March 29, 2019

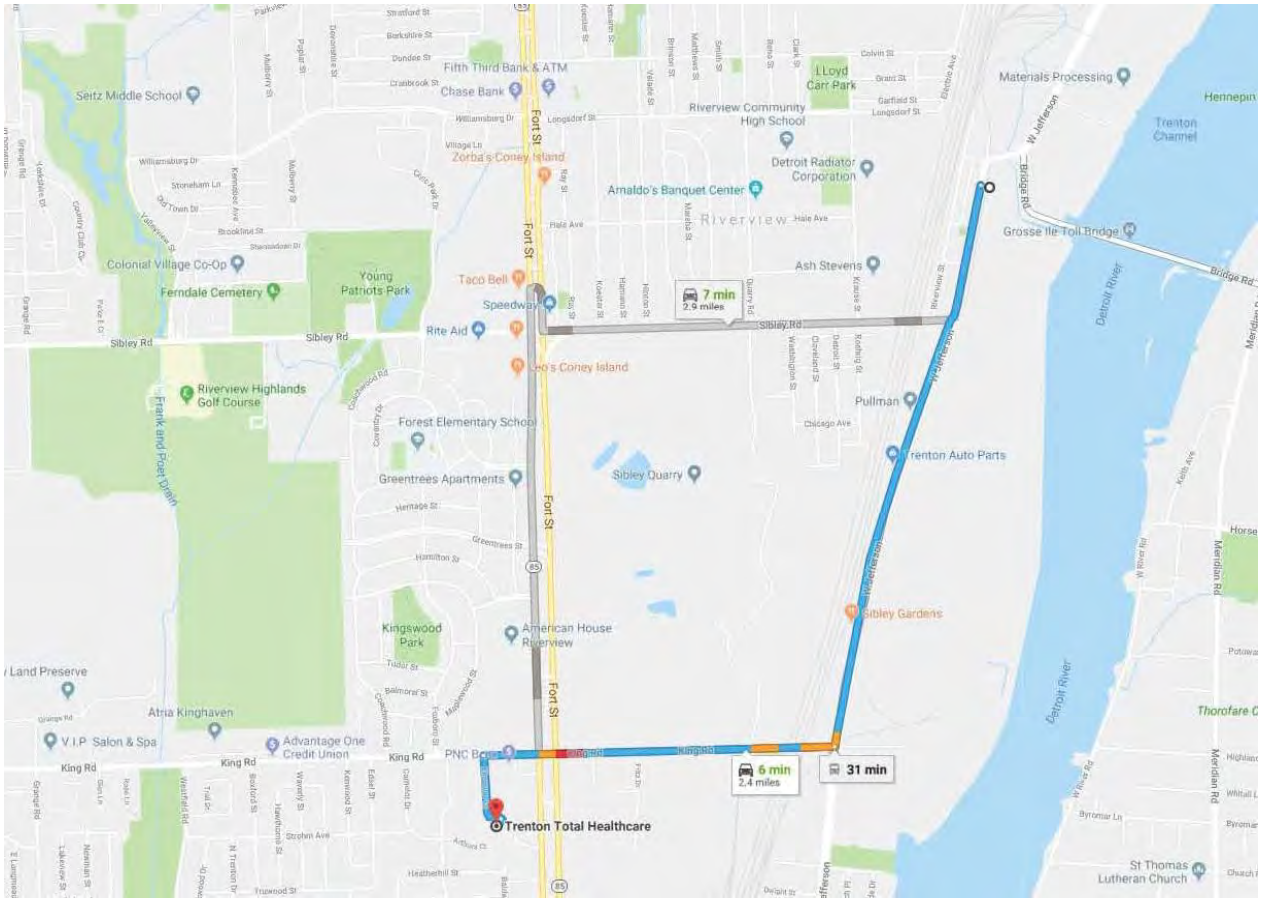
Figure 3: Route to Hospital

Photo provided by Google

1. Head south on W Jefferson Ave toward High St — 1.4 mi
2. Turn right onto King Rd — 0.8 mi
3. Turn left onto Kingsway Ct — 0.2 mi
4. Turn right — 108 ft

Trenton Total Healthcare

1675 Kingsway Ct, Trenton, MI 48183



ASTI ENVIRONMENTAL

Created for: Riverview-Trenton Railroad Company
Created by: BJE, March 29, 2019

Figure 4: Route to Urgent Care

Photo provided by Google

TABLES

Table 1 Former McLouth Steel Facility
List of Potential Chemicals RTRR Property

The following chemicals may be encountered while working on the RTRR Property:

Ammonia	Free Cyanide	Arsenic
Barium	Cadmium	Chromium
Cobalt	Copper	Ammonia
Lead	Manganese	Mercury
Nickel	Selenium	Silver
Xylenes	Vanadium	Zinc
1,2,4-trimethylbenzene	1,3,5-trimethylbenzene	2,4-Dimethylphenol
2-Methylphenol	3-Methylphenol	4-Methylphenol
Benzene	Benzo(a)anthracene	Benzo(a)pyrene
Benzo(b)fluoranthene	Carbazole	Dibenzofuran
Ethylbenzene	Fluoranthene	Fluorene
Methylphenol	Naphthalene	N-nitroso-di-n-propylamine
PCBs	Perchloroehtylene	Phenanthrene
Phenol	Vinyl Chloride	

Emergency Contact List

Emergency Contacts	Phone Number
Police/Fire Emergency	911
Beaumont Hospital	734-655-4800
MDEQ – Rich Conforti, MDEQ - Site Coordinator If unavailable, contact the Jacob Runge	(734) 740-9019 (517) 284-6580
Project Manager – Greg Oslosky	(616) 485-5743
MSC Land Company, LLC	(614) 774-9487 or (586) 405-1884
National Response Center (NRC)	(800) 424-8802
MI Pollution Emergency Alerting System	(800) 320-0519
DEQ Chemical Emergency	(800) 292-4706
Poison Control Center	(800) 222-1222

APPENDICES

Appendix A

WCC/ Permit #: Project Site: Date:	**Daily Tailgate Meeting & Job Clearance Form**	

Job Location:		Date:	
Site Supervisor:		Project Manager:	

List activities to be performed today:	
Permitted Activities (specific permit to be competed):	☐ Not Applicable ☐ Confined Space Entry ☐ Excavation/Trenching ☐ Hot Work ☐ Hoisting/Rigging (any lifting with equipment, excluding drill rigs) ☐ Natural Gas System Maintenance

Muster Point:		Spill Kit Location:	
First Aid Kit Location:		Fire Extinguisher Location:	
Emergency cut-off switches:		Designated cell phone use area(s):	

Has the Site Manager/Owner been notified of our activities and/or participated in a pre-work site walk?	☐ Yes ☐ No ☐ N/A
Is a fuel delivery scheduled for today?	☐ Yes ☐ No ☐ N/A
Have all personnel reviewed and understand the site specific HASP?	☐ Yes ☐ No*
Does each activity have a Job Safety Analysis (JSA)?	☐ Yes ☐ No*
Does each subcontractor have JSAs for their activities?	☐ Yes ☐ No* ☐ N/A
Have JSAs been reviewed by all affected personnel on-site?	☐ Yes ☐ No*
Has a site walk been performed to identify additional hazards?	☐ Yes ☐ No*
Have any newly identified hazards been documented on the JSA?	☐ Yes ☐ No* ☐ N/A
Have all members of the work team confirmed understanding of the work, hazards, and controls/ mitigation?	☐ Yes ☐ No*
Has each person on the work team discussed all hazards and mitigation measures associated with any task which will require their feet to leave the ground?	☐ Yes ☐ No* ☐ N/A
Have work areas been properly cordoned-off to protect workers, site staff, and the public?	☐ Yes ☐ No* ☐ N/A
Have equipment checks been completed, documented, and reviewed?	☐ Yes ☐ No* ☐ N/A
Have there been any equipment modifications made by subcontractor(s)? Is yes, discuss modifications.	☐ Yes ☐ No ☐ N/A
Do all members of the work team have API Safety Keys?	☐ Yes ☐ No* ☐ N/A
Do all members of the work team have a Shell "Life Saving Rules" Training card?	☐ Yes ☐ No*
Do all site workers understand injury/ intervention reporting requirements including immediately notifying the Site Supervisor of any injury near miss, unsafe condition or hazard observation?	☐ Yes ☐ No*
If permits are required, have they been reviewed and permit conditions understood by the Team?	☐ Yes ☐ No* ☐ N/A
If drilling, did driller physically point out all pinch points to entire team?	☐ Yes ☐ No* ☐ N/A
If drilling, has the driller & crew agreed the audible and visible signals for "all clear" prior to engaging controls?	☐ Yes ☐ No* ☐ N/A

** If No, then work cannot be performed until corrective action is completed and documented.*

Title of JSAs reviewed today:		Title of Subcontractor's JSAs reviewed today:	

All personnel are wearing (regardless of activity):	☐ Hard Hat ☐ Safety Glasses ☐ Safety Vest ☐ Steel-Toed Boots ☐ Gloves (appropriate for task) ☐ Long-Sleeved Shirt ☐ Snake Bite Prevention Chaps *See JSA for additional task specific PPE requirements.

Other Safety and Task-Specific Items Discussed Today:	**Stop Work Authority & Obligation**
	* All employees will stop the job any time anyone is concerned or uncertain about safety. * All employees will stop the job if anyone identifies a hazard or additional mitigation not recorded on the JSA. * All employees will be alerted to any changes in personnel or conditions at the worksite. * All employees will stop the job and reassess a task, hazards, and mitigations, and then amend the JSA as needed.

WCC/ Permit #: Project Site: Date:	**Daily Tailgate Meeting & Job Clearance Form**	

SITE WORKERS (including Contractors and Subcontractors): By signing here, you are stating the following:

* You have been involved in reviewing the JSAs and understand the hazards and control measures associated with each task you are about to perform.
* You understand the permit to work requirements applicable to the work you are about to perform (if it includes permitted activities).
* You understand the Life Saving Rules and are aware that tasks or work that is not risk-assessed shall not be performed.
* You are aware of your authority and obligation to 'Stop Work'.

I arrived and departed fit for duty:

* You are physically and mentally fit for duty,
* You are not under the influence of any type of medication, drugs, or alcohol that could affect your ability to work safely.
* You are aware of your responsibility to immediately report any illness, injury (regardless of where or when it occurred), or fatigue issue you may have to the Site Supervisor.
* You will sign-out uninjured unless you have otherwise informed the Site Supervisor.

Print Name & Company	Signature	Initials & Sign In Time	Initials & Sign Out Time
		In & Fit	Out & Fit
		In & Fit	Out & Fit
		In & Fit	Out & Fit
		In & Fit	Out & Fit
		In & Fit	Out & Fit
		In & Fit	Out & Fit
		In & Fit	Out & Fit
		In & Fit	Out & Fit
		In & Fit	Out & Fit
		In & Fit	Out & Fit
		In & Fit	Out & Fit
		In & Fit	Out & Fit
		In & Fit	Out & Fit
		In & Fit	Out & Fit
		In & Fit	Out & Fit
		In & Fit	Out & Fit

(Attach additional Site Worker sign-in/out sheets if needed)

SITE VISITORS (attach additional Site Visitor sign-in/out sheets if needed)

Print Name	Company Name	Arrival Time	Departure Time	Signature

SITE REPRESENTATIVE Sign In/Out (operating sites only, and signature must be requested. If the operator refuses to sign, note this on the Form)

Sign In: *I have discussed this Job Clearance Form with the contractor*		**Sign Out:** *I have discussed this Job Clearance Form with the contractor*	
Site Representative Name	**Site Representative Signature**	**Site Representative Name**	**Site Representative Signature**

WCC/ Permit #: Project Site: Date:	**Daily Tailgate Meeting & Job Clearance Form**	

TWILIGHT TOOL BOX TALK (Complete the following once field activities for the day have been concluded): ***All BBOs shall also be logged on the BBO tracking form and HSE field tracking matrix***		
Were there any Incidents, Near Misses, Potential Incidents, or Positive Interventions today? (*These should also be recorded on the task-specific JSA)*	☐ Yes ☐ No	If yes, provide details:
Were there any 'Stop Work' interventions? (*These should also be recorded on the task-specific JSA)*	☐ Yes ☐ No	If yes, provide details:
Were there any areas for improvement noted? (*These should also be recorded on the task-specific JSA)*	☐ Yes ☐ No	If yes, provide details:
Is the Site Manager/Owner happy with the way you left the site (including the location of waste drums and/or equipment)?	☐ Yes ☐ No	If no, provide details:

Project Performance and Milestone Tracking- Daily Accomplishment:	On-Site Equipment Requiring Daily Inspection/ SN/ Responsible Party
	1)
	2)
	3)
	4)
	5)
	6)
	7)
	8)
	9)
	10)
	11)
	12)
	13)
	14)
	15)

I certify that the above information is true and the job site is being left in a safe condition	☐ **Yes** ☐ **No**	**Site Supervisor Signature:**

Appendix B

Jobsite Safety Inspection Checklist

Contractor: _____ **Inspected By:** _____

Location: _____ **Date:** _____

Checklist Item

A → Adequate
X → Inadequate (List Reasons)
NA → Not Applicable

A	X	NA			
☐	☐	☐	**A1**	**Safety Program**	
☐	☐	☐		Health & Safety Plan (HASP) developed and available for review.	
☐	☐	☐		2. Safety "Kick off" meeting conducted with site safety management, and subcontractors.	
☐	☐	☐		3. Contractor "Safety Commitment" letter signed..	
☐	☐	☐		4. Contractor "Personnel Personal Safety Commitment" letter signed.	
☐	☐	☐		5. Alcohol and controlled substance program in place. Affidavits up to date.	
☐	☐	☐		6. Site-specific emergency plan established..	
☐	☐	☐		7. HASP Compliance Agreement signed by contractors and subcontractors.	
☐	☐	☐		8 Evacuation alarms and routes established. i	
A	X	NA	**A2**	**Recording and Reporting of Injuries**	
☐	☐	☐		1. Accident and near miss reporting procedures known.	
☐	☐	☐		2. Incident report forms in HASP.	
A	X	NA	**A3**	**First Aid and Medical Attention**	
☐	☐	☐		1. Emergency telephone numbers (police, fire, doctor, ambulance, hospital), in HASP	
☐	☐	☐		2. First aid kits available.	
☐	☐	☐		3. Adequate number of people on project are CPR qualified and identified.	
☐	☐	☐		4. Route to nearest hospital posted.	
A	X	NA	**A4**	**Personal Attire and Protective Equipment**	
☐	☐	☐		1. Hard hats properly worn by employees.	
—	—			2. Safety glasses with solid mounted side shields.	
—	—			3. Long shirt sleeves where required.	
—	—			4. Hearing protection available, areas defined, and being worn.	
☐	☐	☐		5. Respirators and dust masks available where areas are defined.	
☐	☐	☐		6. Safety-toed leather safety shoes/boots.	
—	—			7. Appropriate gloves being worn as required.	
—	—			8. High visibility apparel being worn.	
A	X	NA	**A5**	**Safe Behaviors**	
				1 Personnel observed using safe work behaviors.	

A	X	NA			
☐	☐	☐	**A6**	**Housekeeping and Hygiene**	
				1. Work area free of debris.	
				2. Daily pickup and storage of tools.	
☐	☐	☐		3. Work areas and walkways free and clear of debris.	
				4. Adequate lighting.	
				5. Portable water available.	
A	X	NA	**A7**	**Safety Training and Education**	
	☐	☐		1. HASP reviewed and signed by employees/subcontractors.	
☐				2. MSDS maintained in HASP.	
				3. Required training documented in HASP.	
				4. Employees and subcontractors have appropriate training.	
☐	☐	☐		5. Controlled-substance testing documents up-to-date.	
☐	☐	☐		6. Tailgate safety meetings documented.	
				7. Job Safety Analysis (JSA) in HASP.	
				8. Current first aid and CPR trained personnel on-site. Documentation available.	
A	X	NA	**A8**	**Motor Vehicles and Equipment**	
☐	☐	☐		1. Proper speed limit obeyed.	
				2. Seat belts being used.	
				3. Company name displayed.	
				4. Fire extinguisher available.	
A	X	NA	**A9**	**Hand & Power Tools**	
☐	☐	☐		1. Tools in good condition.	
				2. Tools inspected prior to use.	
				3. Tools stored safety when not in use.	
				4. Employees familiar with using tools.	
				5. Additional PPE needed / available.	
				6. Defective tools & equipment removed from site.	
A	X	NA	**A10**	**Underground Utilities**	
	☐	☐		1. One call completed by responsible party.	
				2. Drawings reviewed for utility locations.	
				3. Client approved areas of intrusive work.	
				4. Underground utility markings visually observed.	
				5. Subsurface work at least 3 feet from marked utilities.	
				6. Soft digging / Hand probing for underground utilities required.	
				7. Overhead utilities observed.	
				8. Underground Utility Checklist completed	
A	X	NA	**A11**	**Borings, Wells & Other Intrusive Earth Work**	
☐	☐	☐		1. Appropriate permit obtained and available.	
				2. Locations approved by client.	
☐	☐	☐		3. Locations at least 3 feet from underground utilities.	
				4. Hand probing for underground utilities.	
☐	☐	☐		5. Employee 10 feet from equipment preforming work.	
☐	☐	☐		6. Equipment at least 10 feet from overhead power lines.	
☐	☐	☐		7. Safety cones/barricades used to identify open areas.	
				8. Overhead utilities observed.	

A12 Test Pits & Soil Excavation

A	X	NA		
☐	☐	☐	1. Appropriate permit obtained and available.	
☐	☐	☐	2. Excavations sloped or benched as required.	
☐	☐	☐	3. Safety cones/barricades used to identify open areas.	
☐	☐	☐	4. Hand probing for underground utilities.	
☐	☐	☐	5. Soil placed back 4 ft. from edge of excavation/test pit.	
☐	☐	☐	6. Employee 10 feet from equipment preforming work.	
☐	☐	☐	7. Equipment at least 10 feet from overhead power lines.	
☐	☐	☐	8. Safety cones/barricades used to identify open areas.	
☐	☐	☐	9. Overhead utilities observed.	
☐	☐	☐	10. Test pit filled in after work completed.	

A13 Material Handling, Storage, Use, and Disposal

A	X	NA		
☐	☐	☐	1. Proper lifting techniques being used.	
☐	☐	☐	2. Waste containers identified properly.	
☐	☐	☐	3. Materials properly anchored or secured.	

A14 Electrical Work Procedures

A	X	NA		
☐	☐	☐	1. Electrical equipment grounded including portable hand tools and extension cords.	
☐	☐	☐	2. Ground fault circuit interrupters provided for electrical wiring, cords, and equipment.	
☐	☐	☐	3. Cords protected from damage	
☐	☐	☐	4. Equipment at least 10 feet from power lines.	
☐	☐	☐	5. Electrical dangers at site noted.	

A15 Work Permits

A	X	NA		
☐	☐	☐	1. Work Permits issuance procedure set up and understood..	
☐	☐	☐	2. Work Permits available.	
☐	☐	☐	3. Work to be covered under Work Permit procedure defined.	
☐	☐	☐	4. Permits issued for pressurized/energized systems.	
☐	☐	☐	5. Excavation permit required/obtained.	
☐	☐	☐	6. Work permit reviewed and initialed by Air Products' Representative.	
☐	☐	☐	7. Work permits reviewed by contractor/subcontractor.	

A16 Air Monitoring

A	X	NA		
☐	☐	☐	1. Air monitoring instrument required / used – (note type).	
☐	☐	☐	2. Air monitoring instruments calibrated.	
☐	☐	☐	3. Air monitoring readings recorded.	
☐	☐	☐	4. Action levels provided /understood.	

A17 Additional Comments

Unsafe Acts:

Notes:

Appendix C

Near Miss Report
Health and Safety

A Near-Miss is an incident which did not result in property damage or employee injury, but potentially could have under different circumstances. Near-Miss Reporting is the process of identifying and preventing an unsafe act or condition before it causes property damage or employee injury. All near misses must be reported to the Health and Safety Department using this form.

Near Miss Information

Check all that apply:

Unsafe Condition

Unsafe Act/ Behavior

Unsafe Equipment

Unsafe Use of Equipment

Location/
Project #:

Date/Time: _____

Description of Near Miss (Who, What, Where, When & How):

Causes (Why it happened):

Corrective Action (How can this be prevented in the future?):

Submitted By: _____

Date:

Reviewed by (Health and Safety Department Use Only)

Name: _____

Date:

NMR #:

Incident / Injury Report
Health & Safety

(Complete and return to Health & Safety Department)

Affected Employee Name: _____ Date: _____

Incident type: ☐ Injury ☐ Report Only/No Injury
☐ Near Miss ☐ Other: _____

EMPLOYEE INFORMATION (Person completing Form)

Employee Name: _____ Employee No: _____

Title: _____ Office Location: _____

Length of time employed or date of hire: _____

Mailing address: _____

_____

Sex: M ☐ F ☐ Birth date: _____

Business phone & extension: _____ Residence/cell phone: _____

INCIDENT INFORMATION

Project: _____ Project #: _____

Date/time of incident: _____ Time work started & ended: _____

Site location: _____

Incident Type: Possible Exposure ☐ Exposure ☐ Physical Injury ☐

Names of person(s) who witnessed the incident: _____

Exact location incident occurred: _____

Describe work being done: _____

Describe in detail how the incident occurred: _____

Nature of the incident (List the parts of the body affected): _____

Person(s) to whom incident was reported (Time and Date): _____

Incident / Injury Report
Health & Safety

Nature of the incident (List the parts of the body affected): _____

Person(s) to whom incident was reported (Time and Date): _____

List the names of other persons affected during this incident: _____

Possible causes of the incident (equipment, unsafe work practices, lack of PPE, etc): _____

Weather conditions during incident: _____

MEDICAL CARE INFORMATION

Did affected employee receive medical care? Yes ☐ No ☐

If Yes,Provide name & address of facility (hospital, clinic, etc): _____

_____

Length of stay at the facility? _____

Did the employee miss any work time? Yes ☐ No ☐ Undetermined ☐

Date employee last worked: _____ Date employee returned to work: _____

Has the employee returned to work? Yes ☐ No ☐

Does the employee have any work limitations or restrictions from the injury? : Yes ☐ No ☐

If Yes, please describe: _____

HEALTH & SAFETY INFORMATION

Was the operation being conducted under an established site specific Health and Safety Plan?
Yes ☐ No ☐ Not Applicable: ☐

Describe protective equipment and clothing used by the employee:

_____

Did any limitations in safety equipment or protective clothing contribute to or affect exposure / injury? If so, explain:

_____

_____ _____
Employee Signature Date

_____ _____
Representative Date

Appendix D

PERSONNEL DECONTAMINATION

LEVEL C DECONTAMINATION

Station 1:	Equipment Drop	1. Deposit equipment used on-site (tools, sampling devices and containers, monitoring instruments, radios, clipboards, etc.) on plastic drop cloths. Segregation at the drop reduces the probability of cross contamination. During hot weather operations, cool down stations may be set up within this area.
Station 2:	Outer Garment, Boots, and Gloves Wash and Rinse	2. Scrub outer boots, outer gloves and chemical-resistant splash suit with decon solution or detergent and water. Rinse off using copious amounts of water.
Station 3:	Outer Boot and Glove Removal	3. Remove outer boots and gloves. Deposit in container with plastic liner.
Station 4:	Canister or Mask Change	4. If worker leaves Exclusion Zone to change canister (or mask), this is the last step in the decontamination procedure. Worker's canister is exchanged, new outer gloves and boot covers donned, joints taped, and worker returns to duty.
Station 5:	Boot, Gloves and Outer Garment Removal	5. Boots, chemical-resistant splash suit, inner gloves removed and deposited in separate containers lined with plastic.
Station 6:	Facepiece Removal	6. Facepiece is removed (avoid touching face with fingers). Facepiece deposited on plastic sheets.
Station 7:	Field Wash	7. Hands and face are thoroughly washed. Shower as soon as possible.

LEVEL D DECONTAMINATION

Station 1:	Equipment Drop	1. Deposit equipment used on-site (tools, sampling devices and containers, monitoring instruments, radios, clipboards, etc.) on plastic drop cloths. Segregation at the drop reduces the probability of cross contamination. During hot weather operations, cool down stations may be set up within this area.
Station 2:	Outer Garment,	2. Scrub outer boots, outer gloves and chemical-resistant

	Boots, and Gloves Wash and Rinse	splash suit with decon solution or detergent and water. Rinse off using copious amounts of water.
Station 3:	Outer Boot and Glove Removal	3. Remove outer boots and gloves. Deposit in container with plastic liner.
Station 4:	Boot, Gloves and Outer Garment Removal	4. Boots, chemical-resistant splash suit, inner gloves removed and deposited in separate containers lined with plastic.
Station 5:	Field Wash	5. Hands and face are thoroughly washed. Shower as soon as possible.

EQUIPMENT DECONTAMINATION

GENERAL:

Equipment to be decontaminated during the project may include tools, monitoring equipment, respirators, sampling containers, laboratory equipment and drilling equipment.

All decontamination will be done by personnel in protective gear, appropriate for the level of decontamination, as determined by the site HSO. The decontamination work tasks will be split or rotated among support and work crews.

Within the “hot-spot” excavations, equipment bucket and treads (any parts that may have contacted the soil) will be dry scrubbed to remove any caked or course material, prior to leaving the immediate excavation area, to limit the potential for cross contamination between excavations. It is intended that machinery performing work in the “hot-spot” excavations/ exclusion zone will remain within that designated area. If equipment is to leave the “hot” area, it will be decontaminated first by dry scrub decon, followed by decontamination over a portable decontamination pad to contain wash water; or, wash water may be allowed to run off into a storm sewer system. Equipment needed may include a steam generator with high-pressure water, empty drums, screens, screen support structures, and shovels. Drums will be used to hold contaminated wash water pumped from the lined pit. These drums will be labeled as such. Decontamination pads, drums, or any other “wet” decon operations must be contained and remain no less than 100 feet from any potential receptors, as identified by the HSO/ Site Supervisor.

Miscellaneous tools and equipment will be dropped into a plastic pail, tub, or other container. They will be brushed off and rinsed with a detergent solution, and finally rinsed with clean water.

All equipment and dump trucks leaving the Site will proceed through the tire wash station located onsite. Water from the tire wash station will be collected via sump and disposed of per the HSO/ Site Supervisor. The tire wash station will not be located within 100 feet of any potential receptors.

Refer to the attached map (B-1) for locations, definitions, and placement of the exclusion zone, contaminant reduction zone, and clean zone.

MONITORING EQUIPMENT:

Monitoring equipment will be protected as much as possible from contamination by draping, masking, or otherwise covering as much of the instruments as possible with plastic without hindering the operation of the unit. The PID or OVA meter, for example, can be placed in a clear plastic bag, which allows reading of the scale and operation of knobs. The probes can be partially wrapped keeping the sensor tip and discharge port clear. The RAM Dust meters will be wiped down daily at a minimum, or as needed.

The contaminated equipment will be taken from the drop area and the protective coverings removed and disposed in the appropriate containers. Any dirt or obvious contamination will be brushed or wiped with a disposable paper wipe.

RESPIRATORS:

Respirators will be cleaned and disinfected after every use. Taken from the drop area, the masks (with the cartridges removed and disposed of with other used disposable gear) will be immersed in a cleaning solution and scrubbed gently with a soft brush, f ollowed by a rinse in plain warm water, and then allowed to air dry. In the morning, new cartridges will be installed. Personnel will inspect their own masks for serviceability prior to donning them. And, once the mask is on, the wearer will check the respirator for leakage using the negative and positive pressure fit check techniques.

Appendix E

Safety Data Sheets (SDS)

All contractors who will be bringing any chemical for use on site are required to provide a method statement of intent of use for each chemical and review the Safety Data Sheet(SDS) with the Site Safety Manager and Project Manager(PM) prior to use.

SDSs will be kept on file with each contractor's site specific HASP. A copy of the SDS will be provide to the Site Safety Manager/PM and will be on file in the Office Trailer.

MSDS Number: **H3880**

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

HYDROCHLORIC ACID, 33 - 40%

1. Product Identification

Synonyms: Muriatic acid; hydrogen chloride, aqueous
CAS No.: 7647-01-0
Molecular Weight: 36.46
Chemical Formula: HCl
Product Codes:
J.T. Baker: 5367, 5537, 5575, 5800, 5814, 5821, 5839, 5861, 5862, 5894, 5962, 5963, 5972, 5994, 6900, 7831, 9529, 9530, 9534, 9535, 9536, 9538, 9539, 9540, 9544, 9548
Mallinckrodt: 2062, 2515, 2612, 2624, 2626, 3861, 5583, 5587, H611, H613, H987, H992, H999, V078, V628

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Hydrogen Chloride	7647-01-0	33 - 40%	Yes
Water	7732-18-5	60 - 67%	No

3. Hazards Identification

Emergency Overview

POISON! DANGER! CORROSIVE. LIQUID AND MIST CAUSE SEVERE BURNS TO ALL BODY TISSUE. MAY BE FATAL IF SWALLOWED OR INHALED. INHALATION MAY CAUSE LUNG DAMAGE.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 3 - Severe (Poison)
Flammability Rating: 0 - None
Reactivity Rating: 2 - Moderate
Contact Rating: 4 - Extreme (Corrosive)
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES
Storage Color Code: White (Corrosive)

Potential Health Effects

Inhalation:
Corrosive! Inhalation of vapors can cause coughing, choking, inflammation of the nose, throat, and upper respiratory tract, and in severe cases, pulmonary edema, circulatory failure, and death.
Ingestion:
Corrosive! Swallowing hydrochloric acid can cause immediate pain and burns of the mouth, throat, esophagus and gastrointestinal tract. May cause nausea, vomiting, and diarrhea. Swallowing may be fatal.
Skin Contact:
Corrosive! Can cause redness, pain, and severe skin burns. Concentrated solutions cause deep ulcers and discolor skin.
Eye Contact:
Corrosive! Vapors are irritating and may cause damage to the eyes. Contact may cause severe burns and permanent eye damage.
Chronic Exposure:
Long-term exposure to concentrated vapors may cause erosion of teeth. Long term exposures seldom occur due to the corrosive properties of the acid.
Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders or eye disease may be more susceptible to the effects of this substance.

---

4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.
Ingestion:
DO NOT INDUCE VOMITING! Give large quantities of water or milk if available. Never

give anything by mouth to an unconscious person. Get medical attention immediately.
Skin Contact:
In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

---

5. Fire Fighting Measures

Fire:
Extreme heat or contact with metals can release flammable hydrogen gas.
Explosion:
Not considered to be an explosion hazard.
Fire Extinguishing Media:
If involved in a fire, use water spray. Neutralize with soda ash or slaked lime.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Structural firefighter's protective clothing is ineffective for fires involving hydrochloric acid. Stay away from ends of tanks. Cool tanks with water spray until well after fire is out.

---

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Neutralize with alkaline material (soda ash, lime), then absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

J. T. Baker NEUTRASORB® acid neutralizers are recommended for spills of this product.

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7. Handling and Storage

Store in a cool, dry, ventilated storage area with acid resistant floors and good drainage. Protect from physical damage. Keep out of direct sunlight and away from heat, water, and incompatible materials. Do not wash out container and use it for other purposes. When

diluting, the acid should always be added slowly to water and in small amounts. Never use hot water and never add water to the acid. Water added to acid can cause uncontrolled boiling and splashing. When opening metal containers, use non-sparking tools because of the possibility of hydrogen gas being present. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

---

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
For Hydrochloric acid:
- OSHA Permissible Exposure Limit (PEL):
5 ppm (Ceiling)
- ACGIH Threshold Limit Value (TLV):
2 ppm (Ceiling), A4 Not classifiable as a human carcinogen
Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.
Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded, a full facepiece respirator with an acid gas cartridge may be worn up to 50 times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air purifying respirators do not protect workers in oxygen-deficient atmospheres.
Skin Protection:
Rubber or neoprene gloves and additional protection including impervious boots, apron, or coveralls, as needed in areas of unusual exposure to prevent skin contact.
Eye Protection:
Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

---

9. Physical and Chemical Properties

Appearance:
Colorless, fuming liquid.
Odor:
Pungent odor of hydrogen chloride.
Solubility:
Infinite in water with slight evolution of heat.
Density:
1.18
pH:

For HCL solutions: 0.1 (1.0 N), 1.1 (0.1 N), 2.02 (0.01 N)
% Volatiles by volume @ 21C (70F):
100
Boiling Point:
53C (127F) Azeotrope (20.2%) boils at 109C (228F)
Melting Point:
-74C (-101F)
Vapor Density (Air=1):
No information found.
Vapor Pressure (mm Hg):
190 @ 25C (77F)
Evaporation Rate (BuAc=1):
No information found.

---

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage. Containers may burst when heated.
Hazardous Decomposition Products:
When heated to decomposition, emits toxic hydrogen chloride fumes and will react with water or steam to produce heat and toxic and corrosive fumes. Thermal oxidative decomposition produces toxic chlorine fumes and explosive hydrogen gas.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
A strong mineral acid, concentrated hydrochloric acid is incompatible with many substances and highly reactive with strong bases, metals, metal oxides, hydroxides, amines, carbonates and other alkaline materials. Incompatible with materials such as cyanides, sulfides, sulfites, and formaldehyde.
Conditions to Avoid:
Heat, direct sunlight.

---

11. Toxicological Information

Inhalation rat LC50: 3124 ppm/1H; oral rabbit LD50: 900 mg/kg (Hydrochloric acid concentrated); investigated as a tumorigen, mutagen, reproductive effector.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Hydrogen Chloride (7647-01-0)	No	No	3
Water (7732-18-5)	No	No	None

---

12. Ecological Information

Environmental Fate:
When released into the soil, this material is not expected to biodegrade. When released into the soil, this material may leach into groundwater.
Environmental Toxicity:
This material is expected to be toxic to aquatic life.

---

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

---

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: HYDROCHLORIC ACID
Hazard Class: 8
UN/NA: UN1789
Packing Group: II
Information reported for product/size: 475LB

International (Water, I.M.O.)

Proper Shipping Name: HYDROCHLORIC ACID
Hazard Class: 8
UN/NA: UN1789
Packing Group: II
Information reported for product/size: 475LB

---

15. Regulatory Information

Risk and Safety Phrases:
Symbol: C
Risk: 34-37
Safety: (1/2-)26-45

```
--------\Chemical Inventory Status - Part 1\---------------------------------
Ingredient                                        TSCA  EC   Japan  Australia
```

Hydrogen Chloride (7647-01-0)	Yes	Yes	Yes	Yes
Water (7732-18-5)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\----------

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.
Hydrogen Chloride (7647-01-0)	Yes	Yes	No	Yes
Water (7732-18-5)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\----------

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.
Hydrogen Chloride (7647-01-0)	5000	500*	Yes	No
Water (7732-18-5)	No	No	No	No

--------\Federal, State & International Regulations - Part 2\----------

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Hydrogen Chloride (7647-01-0)	5000	No	No
Water (7732-18-5)	No	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: Yes
SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No
Reactivity: No (Mixture / Liquid)

Australian Hazchem Code: 2R
Poison Schedule: None allocated.
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

---

16. Other Information

NFPA Ratings: Health: **3** Flammability: **0** Reactivity: **1**
Label Hazard Warning:
POISON! DANGER! CORROSIVE. LIQUID AND MIST CAUSE SEVERE BURNS TO ALL BODY TISSUE. MAY BE FATAL IF SWALLOWED OR INHALED. INHALATION MAY CAUSE LUNG DAMAGE.
Label Precautions:
Do not get in eyes, on skin, or on clothing.
Do not breathe vapor or mist.
Use only with adequate ventilation.
Wash thoroughly after handling.
Store in a tightly closed container.
Remove and wash contaminated clothing promptly.
Label First Aid:

In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In all cases get medical attention immediately.

Product Use:
Laboratory Reagent.

Revision Information:
MSDS Section(s) changed since last revision of document include: 16.

Disclaimer:
****

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****

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

Material Safety Data Sheet

Isobutylene

Section 1. Chemical product and company identification

Product Name : Isobutylene

Supplier : AIRGAS INC., on behalf of its subsidiaries
259 North Radnor-Chester Road
Suite 100
Radnor, PA 19087-5283
1-610-687-5253

Product use : Synthetic/Analytical chemistry.

MSDS# : 001031

Date of Preparation/Revision : **4/3/2007.**

In case of emergency : 1-866-734-3438

Section 2. Hazards identification

Physical state : Gas. (COLORLESS LIQUEFIED COMPRESSED GAS WITH A SWEET GASOLINE-LIKE ODOR)

Emergency overview : Warning!

FLAMMABLE GAS.
CONTENTS UNDER PRESSURE.
VAPOR MAY CAUSE FLASH FIRE.

Keep away from heat, sparks and flame. Do not puncture or incinerate container. Keep container closed. Use only with adequate ventilation.

Contact with rapidly expanding gases can cause frostbite.

Routes of entry : Inhalation

Potential acute health effects

Eyes : No known significant effects or critical hazards.

Skin : No known significant effects or critical hazards.

Inhalation : Acts as a simple asphyxiant.

Ingestion : Ingestion is not a normal route of exposure for gases

Potential chronic health effects : **CARCINOGENIC EFFECTS** Not available.
MUTAGENIC EFFECTS Not available.
TERATOGENIC EFFECTS Not available.

Medical conditions aggravated by overexposure : Acute or chronic respiratory conditions may be aggravated by overexposure to this gas.

See toxicological Information (section 11)

Section 3. Composition, Information on Ingredients

Name	CAS number	% Volume	Exposure limits
Isobutylene	115-11-7	100	**Del Lietuvos Higienos Normos (Lithuania, 12/2001).** TWA: 100 mg/m ^{3} 8 hour(s). Form: All forms

Section 4. First aid measures

No action shall be taken involving any personal risk or without suitable training.If fumes are still suspected to be present, the rescuer should wear an appropriate mask or a self-contained breathing apparatus.It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

Eye contact : In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin contact : In case of contact, immediately flush skin with plenty of water. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Frostbite : Try to warm up the frozen tissues and seek medical attention.

Inhalation : If inhaled, remove to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Get medical attention.

Ingestion : Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention if symptoms appear.

Section 5. Fire fighting measures

Flammability of the product : Flammable.

Auto-ignition temperature : 465°C (869°F)

Flammable limits : Lower: 1.8% Upper: 9.6%

Products of combustion : These products are carbon oxides (CO, CO_2).

Fire hazards in presence of various substances : Extremely flammable in presence of open flames, sparks and static discharge, of oxidizing materials.

Fire fighting media and instructions : In case of fire, use water spray (fog), foam, dry chemicals, or CO_2.

If involved in fire, shut off flow immediately if it can be done without risk. Apply water from a safe distance to cool container and protect surrounding area.

Extremely flammable. Gas may accumulate in confined areas, travel considerable distance to source of ignition and flash back causing fire or explosion.

Special protective equipment for fire-fighters : Fire fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full facepiece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions : Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment (Section 8). Shut off gas supply if this can be done safely. Isolate area until gas has dispersed.

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 7. Handling and storage

Handling : Keep container closed. Use only with adequate ventilation. Keep away from heat, sparks and flame. To avoid fire, minimize ignition sources. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Do not puncture or incinerate container. High pressure gas. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.

Storage : Keep container tightly closed. Keep container in a cool, well-ventilated area. Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F).

Section 8. Exposure Controls, Personal Protection

Engineering controls : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. The engineering controls also need to keep gas, vapor or dust concentrations below any explosive limits. Use explosion-proof ventilation equipment.

Personal protection

Eyes : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.

Skin : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary.Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

The applicable standards are (US) 29 CFR 1910.134 and (Canada) Z94.4-93

Hands : Chemical-resistant, impervious gloves or gauntlets complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Personal protection in case of a large spill : A self-contained breathing apparatus should be used to avoid inhalation of the product.

Consult local authorities for acceptable exposure limits.

Section 9. Physical and chemical properties

Molecular weight Molecular formula : 56.12 g/mole C4-H8

Boiling/condensation point : -6.89°C (19.6°F)

Melting/freezing point : -139.99°C (-220°F)

Critical temperature : 144.8°C (292.6°F)

Vapor pressure : 24.3 psig

Vapor density : 1.9 (Air = 1)

Specific Volume (ft^3/lb) : 6.68449

Gas Density (lb/ft^3) : 0.1496

Section 10. Stability and reactivity

Stability and reactivity : The product is stable.

Incompatibility with various substances : Extremely reactive or incompatible with oxidizing agents.

Section 11. Toxicological information

Other toxic effects on humans : No specific information is available in our database regarding the other toxic effects of this material for humans.

Specific effects

Carcinogenic effects : No known significant effects or critical hazards.

Mutagenic effects : No known significant effects or critical hazards.

Reproduction toxicity : No known significant effects or critical hazards.

Section 12. Ecological information

Products of degradation : These products are carbon oxides (CO, CO_2) and water.

Toxicity of the products of biodegradation : The product itself and its products of degradation are not toxic.

Environmental fate : Not available.

Environmental hazards : No known significant effects or critical hazards.

Toxicity to the environment : Not available.

Section 13. Disposal considerations

Product removed from the cylinder must be disposed of in accordance with appropriate Federal, State, local regulation.Return cylinders with residual product to Airgas, Inc.Do not dispose of locally.

Section 14. Transport information

Regulatory information	UN number	Proper shipping name	Class	Packing group	Label	Additional information
DOT Classification	UN1055	ISOBUTYLENE SEE ALSO PETROLEUM GASES, LIQUEFIED	2.1	Not applicable (gas).		**Limited quantity** Yes. **Packaging instruction** **Passenger Aircraft** Quantity limitation: Forbidden. **Cargo Aircraft** Quantity limitation: 150 kg **Special provisions** 19, T50
TDG Classification	UN1055	ISOBUTYLENE	2.1	Not applicable (gas).		**Explosive Limit and Limited Quantity Index** 0.125 **ERAP Index** 3000 **Passenger Carrying Ship Index** Forbidden **Passenger Carrying Road or Rail Index** Forbidden **Special provisions** 29
Mexico Classification	UN1055	ISOBUTYLENE SEE ALSO PETROLEUM GASES, LIQUEFIED	2.1	Not applicable (gas).		-

Section 15. Regulatory information

United States

U.S. Federal regulations : TSCA 8(b) inventory: 2-Methylpropene(Isobutylene)

SARA 302/304/311/312 extremely hazardous substances: No products were found.
SARA 302/304 emergency planning and notification: No products were found.
SARA 302/304/311/312 hazardous chemicals: 2-Methylpropene(Isobutylene)
SARA 311/312 MSDS distribution - chemical inventory - hazard identification: 2-Methylpropene(Isobutylene): Fire hazard, Sudden Release of Pressure

Clean Water Act (CWA) 307: No products were found.

Clean Water Act (CWA) 311: No products were found.

Clean air act (CAA) 112 accidental release prevention: 2-Methylpropene(Isobutylene)

Clean air act (CAA) 112 regulated flammable substances: 2-Methylpropene(Isobutylene)

Clean air act (CAA) 112 regulated toxic substances: No products were found.

State regulations : Pennsylvania RTK: 2-Methylpropene(Isobutylene): (generic environmental hazard)
Massachusetts RTK: 2-Methylpropene(Isobutylene)
New Jersey: 2-Methylpropene(Isobutylene)

Canada

WHMIS (Canada) : Class A: Compressed gas.
Class B-1: Flammable gas.

CEPA DSL: 2-Methylpropene(Isobutylene)

Section 16. Other information

United States

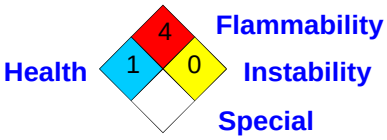
Label Requirements : FLAMMABLE GAS.
CONTENTS UNDER PRESSURE.
VAPOR MAY CAUSE FLASH FIRE.

Canada

Label Requirements : Class A: Compressed gas.
Class B-1: Flammable gas.

Hazardous Material Information System (U.S.A.) :

National Fire Protection Association (U.S.A.) :



Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

LIQUINOX MSDS

Section 1 : MANUFACTURER INFORMATION

Supplier: Same as manufacturer.

Manufacturer: Alconox, Inc.
30 Glenn St.
Suite 309
White Plains, NY 10603.

Manufacturer emergency phone number: 800-255-3924.
813-248-0585 (outside of the United States).

Manufacturer: Alconox, Inc.
30 Glenn St.
Suite 309
White Plains, NY 10603.

Supplier MSDS date: 2005/02/24

D.O.T. Classification: Not regulated.

Section 2 : HAZARDOUS INGREDIENTS

C.A.S.	CONCENTRATION %	Ingredient Name	T.L.V.	LD/50	LC/50
25155-30-0	10-30	SODIUM DODECYLBENZENESULFONATE	NOT AVAILABLE	438 MG/KG RAT ORAL 1330 MG/KG MOUSE ORAL	NOT AVAILABLE

Section 3 : PHYSICAL / CHEMICAL CHARACTERISTICS

Physical state: Liquid.

Appearance & odor: Odourless.
Pale yellow.

Odor threshold (ppm): Not available.

Vapour pressure (mmHg): @ 20°C (68°F).
17

Vapour density (air=1): >1

Volatiles (%)

By volume: Not available.

Evaporation rate (butyl acetate = 1): < 1.

Boiling point (°C):	100 (212F)
Freezing point (°C):	Not available.
pH:	8.5
Specific gravity @ 20 °C:	(water = 1). 1.083
Solubility in water (%):	Complete.
Coefficient of water\oil dist.:	Not available.
VOC:	None

Section 4 : FIRE AND EXPLOSION HAZARD DATA

Flammability:	Not flammable.
Conditions of flammability:	Surrounding fire.
Extinguishing media:	Carbon dioxide, dry chemical, foam. Water Water fog.
Special procedures:	Self-contained breathing apparatus required. Firefighters should wear the usual protective gear. Use water spray to cool fire exposed containers.
Auto-ignition temperature:	Not available.
Flash point (°C), method:	None
Lower flammability limit (% vol):	Not applicable.
Upper flammability limit (% vol):	Not applicable.

Not available.

Sensitivity to mechanical impact:	Not available.
Hazardous combustion products:	Oxides of carbon (COx). Hydrocarbons.
Rate of burning:	Not available.
Explosive power:	Containers may rupture if exposed to heat or fire.

Section 5 : REACTIVITY DATA

Chemical stability:	Product is stable under normal handling and storage conditions.
Conditions of instability:	Extreme temperatures.
Hazardous polymerization:	Will not occur.
Incompatible substances:	Strong acids. Strong oxidizing agents.
Hazardous decomposition products:	See hazardous combustion products.

Section 6 : HEALTH HAZARD DATA

Route of entry:	Skin contact, eye contact, inhalation and ingestion.
Effects of Acute Exposure	
Eye contact:	May cause irritation.
Skin contact:	Prolonged and repeated contact may cause irritation.
Inhalation:	May cause headache and nausea.
Ingestion:	May cause vomiting and diarrhea. May cause gastric distress.
Effects of chronic exposure:	See effects of acute exposure.
LD50 of product, species & route:	> 5000 mg/kg rat oral.
LC50 of product, species & route:	Not available.
Exposure limit of material:	Not available.
Sensitization to product:	Not available.
Carcinogenic effects:	Not listed as a carcinogen.
Reproductive effects:	Not available.
Teratogenicity:	Not available.
Mutagenicity:	Not available.
Synergistic materials:	Not available.
Medical conditions aggravated by exposure:	Not available.
First Aid	
Skin contact:	Remove contaminated clothing. Wash thoroughly with soap and water. Seek medical attention if irritation persists.
Eye contact:	Check for and remove contact lenses. Flush eyes with clear, running water for 15 minutes while holding eyelids open: if irritation persists, consult a physician.
Inhalation:	Remove victim to fresh air. If irritation persists, seek medical attention.
Ingestion:	Do not induce vomiting, seek medical attention. Dilute with two glasses of water. Never give anything by mouth to an unconscious person.

Section 7 : PRECAUTIONS FOR SAFE HANDLING AND USE

Leak/Spill:	Contain the spill. Prevent entry into drains, sewers, and other waterways. Wear appropriate protective equipment. Small amounts may be flushed to sewer with water. Soak up with an absorbent material. Place in appropriate container for disposal. Notify the appropriate authorities as required.
Waste disposal:	In accordance with local and federal regulations.
Handling procedures and equipment:	Protect against physical damage. Avoid breathing vapors/mists. Wear personal protective equipment appropriate to task.

Wash thoroughly after handling.
Keep out of reach of children.
Avoid contact with skin, eyes and clothing.
Avoid extreme temperatures.
Launder contaminated clothing prior to reuse.

Storage requirements: Store away from incompatible materials.
Keep containers closed when not in use.

Section 8 : CONTROL MEASURES

Precautionary Measures

Gloves / Type:

Wear appropriate gloves.

Respiratory / Type: None required under normal use.

Eye / Type:

Safety glasses recommended.

Footwear / Type: Safety shoes per local regulations.

Clothing / Type: As required to prevent skin contact.

Other / Type: Eye wash facility should be in close proximity.
Emergency shower should be in close proximity.

Ventilation requirements: Local exhaust at points of emission.

Appendix F

	Job Safety Analysis (JSA) Health and Safety
JSA Title: **Building Construction Oversight**	
A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions.	

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☒ Face Shield	☒ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☐ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☒ Traffic Cones/Signs	☐ Life Vest/Jacket	
☐ Other:				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
1. Transport equipment to work area	1. Back Strain 2. Slips/ Trips/ Falls 3. Traffic 4. Cuts/abrasions from equipment 5. Contusions from dropped equipment	1. Use proper lifting techniuqes / Use wheeled transport 2. Minimize distance to work area / Have unobstructed path to work area / Follow good housekeeping procedures 3. Wear proper PPE (high visibility vest or clothing) 4. Wear proper PPE (leather gloves, long sleeves) 5. Wear proper PPE (safety shoes)
2. Drilling/anchor boilt installation	1. Hazards associated with drilling, flying objects, heavy equipment, ground level hazards and dust 2. Slips/ Trips/ Falls 3. Hazards associatedwith concrete work	1. Maintain a safe distance from drilling operation / Wear proper PPE (hard hat, safety glasses, safety shoes, safety vest) 2. Be aware of potential trip hazards / Follow good housekeeping procedures / Mark significant below-grade hazards (i.e. holes, trenches)

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
		with safety cones or spray paint / Wear the proper PPE (safety shoes) 3. Maintain a safe distance from pouring operation
3. Steel building erection	1. Overhead hazards, falling objects 2. Pinching/crushing hazards	1. Wear proper PPE (hard had, safety glasses, safety vest) / Be aware of overhead hazards and maintain a safe distance of at least 10 ft. 2. All personnel should make others aware of moving objects or their inten to move objects / Avoid areas where pinching and crushing hazards are possible
4. All activities 4. All activities (cont'd)	1. Slips/ Trips/ Falls 2. Hand injuries, cuts or lacerations during manual handling of materials 3. Foot injuries 4. Back injuries 5. Traffic 6. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.) 7. High Noise levels 8. Overhead hazards 9. Heat Stress/ Cold Stress 10. Eye Injuries	1. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 2. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves 3. Wear Langan approved safety shoes 4. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 5. Wear high visibility clothing & vest / Use cones or signs to designate work area 6. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 7. Wear hearing protection 8. Wear hard hat / Avoid areas were overhead hazards exist. 9. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 10. Wear safety glasses
Additional items.		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

	Job Safety Analysis (JSA) Health and Safety
JSA Title: **Electrical Connection Oversight**	
A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions.	

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☒ Face Shield	☒ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☐ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☐ Traffic Cones/Signs	☐ Life Vest/Jacket	
☐ Other:				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
5. Transport equipment to work area	6. Back Strain 7. Slips/ Trips/ Falls 8. Traffic 9. Cuts/abrasions from equipment 10. Contusions from dropped equipment	6. Use proper lifting techniuqes / Use wheeled transport 7. Minimize distance to work area / Have unobstructed path to work area / Follow good housekeeping procedures 8. Wear proper PPE (high visibility vest or clothing) 9. Wear proper PPE (leather gloves, long sleeves) 10. Wear proper PPE (safety shoes)
6. Overall Hazards	4. Shock or electrocution 5. Sparks/Fire	4. De-activate the energy so the machine/equipment is isolated from the power souce / Ensure completed lockout tagout isolation before

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
	6. Slips/ Trips/ Falls	beginning the job / Test electrical components using an approved, working electrical meter to ensure and prove the machine/equipment's electrical circuits are isolated from the power source 5. Ensure complete lockout tagout isolation before beginning the job 6. Be aware of potential trip hazards / Follow good housekeeping procedures / Mark significant below-grade hazards (i.e. holes, trenches) with safety cones or spray paint / Wear proper PPE (safet y shoes)
7. Pipe/Wire cutting	3. Power Tools 4. Sparks/Fire	3. Compentent person must inspect power tools daily / Only authorized personnel should operate power tools / Wear proper PPE when using power tools (safety shoes, safety glasses, hearing protection, leather gloves) 4. Ensure work area is free of flammable substances/objects / Keep flammables in proper containers / Keep an appropriate, properly inspected fire extinguisher onsite at all times
8. Wiring connections	1. Pinch Hazard 2. Cuts/abrasions to knuckles/hands 3. Back Strain	1. Wear proper PPE (leather gloves) 2. Wear proper PPE (leather gloves) 3. Use proper lifting techniques / Use wheeled transport
9. All activities 5. All activities (cont'd)	11. Slips/ Trips/ Falls 12. Hand injuries, cuts or lacerations during manual handling of materials 13. Foot injuries 14. Back injuries 15. Traffic 16. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.) 17. High Noise levels 18. Overhead hazards 19. Heat Stress/ Cold Stress 20. Eye Injuries	11. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 12. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves 13. Wear Langan approved safety shoes 14. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 15. Wear high visibility clothing & vest / Use cones or signs to designate work area 16. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 17. Wear hearing protection 18. Wear hard hat / Avoid areas were overhead hazards exist. 19. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 20. Wear safety glasses
Additional items.		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

	Job Safety Analysis (JSA) Health and Safety
JSA Title: **Equipment Transportation and Set-Up**	
A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions.	

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☐ Face Shield	☐ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☐ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☐ Traffic Cones/Signs	☐ Life Vest/Jacket	
☐ Other:				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
10. Transport equipment to work area	11. Back Strain 12. Slips/ Trips/ Falls 13. Traffic 14. Cuts/abrasions from equipment 15. Contusions from dropped equipment	11. Use proper lifting techniuqes / Use wheeled transport 12. Minimize distance to work area / Have unobstructed path to work area / Follow good housekeeping procedures 13. Wear proper PPE (high visibility vest or clothing) 14. Wear proper PPE (leather gloves, long sleeves) 15. Wear proper PPE (safety shoes)
11. Moving equipment to its planned location	7. Pinch Hazard 8. Slips/ Trips/ Falls	7. Wear proper PPE (leather gloves) 8. Be aware of potential trip hazards / Practice good housekeeping procedures / Mark significant below-grade hazards (i.e. holes, trenches) with safety cones or spray paint

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
12. Equipment Set-up	5. Pinch Hazard 6. Cuts/abrasions to knuckles/hands 7. Back Strain	5. Wear proper PPE (leather gloves) 6. Wear proper PPE (leather gloves) 7. Use proper lifting techniques / Use wheeled transport
13. All activities 8. All activities (cont'd)	21. Slips/ Trips/ Falls 22. Hand injuries, cuts or lacerations during manual handling of materials 23. Foot injuries 24. Back injuries 25. Traffic 26. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.) 27. High Noise levels 28. Overhead hazards 29. Heat Stress/ Cold Stress 30. Eye Injuries	21. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 22. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves 23. Wear Langan approved safety shoes 24. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 25. Wear high visibility clothing & vest / Use cones or signs to designate work area 26. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 27. Wear hearing protection 28. Wear hard hat / Avoid areas were overhead hazards exist. 29. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 30. Wear safety glasses

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

	Job Safety Analysis (JSA) Health and Safety
JSA Title:	**General Construction Activities**
A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions.	

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☒ Face Shield	☒ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☐ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☒ Traffic Cones/Signs	☐ Life Vest/Jacket	
☐ Other:				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
14. Transport equipment to work area	16. Back Strain 17. Slips/ Trips/ Falls 18. Traffic 19. Cuts/abrasions from equipment 20. Contusions from dropped equipment	16. Use proper lifting techniuqes / Use wheeled transport 17. Minimize distance to work area / Have unobstructed path to work area / Follow good housekeeping procedures 18. Wear proper PPE (high visibility vest or clothing) 19. Wear proper PPE (leather gloves, long sleeves) 20. Wear proper PPE (safety shoes)
15. Installation of piping from vapor wells to skid connections and fro mdischarge pipping to effluent stack	9. Pinch fingers when connecting pipes 10. Slips/ Trips/ Falls 11. Machinery Hazards	9. Wear proper PPE (leather gloves) 10. Be aware of potential trip hazards / Practice good housekeeping procedures / Mark significant below-grade hazards (i.e. holes, trenches) with safety cones or spray paint 11. Wear proper PPE (safety vest) / Maintain safe distance from operating machinery
16. Remediation equipment	8. Back strain when lifting heavy equipmet	9. Use proper lifting techniques / Use wheeled transport / Minimize distance

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
installation	9. Slips/ Trips/ Falls 10. Traffic	to vehicle 10. Be aware of potential trip hazards / Practice good housekeeping procedures / Mark significant below-grade hazards (i.e. holes, trenches) with safety cones or spray pain 11. Wear proper PPE (safety vest)
17. All activities 4. All activities (cont'd)	31. Slips/ Trips/ Falls 32. Hand injuries, cuts or lacerations during manual handling of materials 33. Foot injuries 34. Back injuries 35. Traffic 36. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.) 37. High Noise levels 38. Overhead hazards 39. Heat Stress/ Cold Stress 40. Eye Injuries	31. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 32. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves 33. Wear Langan approved safety shoes 34. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 35. Wear high visibility clothing & vest / Use cones or signs to designate work area 36. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 37. Wear hearing protection 38. Wear hard hat / Avoid areas were overhead hazards exist. 39. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 40. Wear safety glasses
Additional items.		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

Blank Template Identify the job task/activity being analyzed	Job Safety Analysis (JSA) Health and Safety
JSA Title:	
A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions.	

Employees should modify the template JSA's as to reflect site specific conditions.

Utilize the following chart to identify to employees the personal protective equipment (PPE) that is required/worn as needed while completing this identified task. The PPE indicated below should correlate with the PPE identified under "Preventive / Corrective Actions". Equipment that is not listed below must be added to the chart.

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☐ Safety Shoes	☐ Long Sleeves	☐ Safety Vest (Class 2)	☐ Hard Hat	☐ Hearing Protection
☐ Safety Glasses	☐ Safety Goggles	☐ Face Shield	☐ Nitrile Gloves	☐ PVC Gloves
☐ Leather Gloves	☐ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☐ Traffic Cones/Signs	☐ Life Vest/Jacket	
☐ Other:				

The following Job Steps, Potential Hazards and Preventative/Corrective Actions must be completed or edited by the employee developing the JSA. To effectively complete the following steps the following should be considered: the purpose of the job, the activities it involves, and the hazards it presents.

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
18. Describe the job, step by step, from beginning to end. Before examining each job step for potential hazards, define the job as a series of steps.	1. List the potential hazards associated with each job step. Examine each step carefully to find and identify hazards- the actions, conditions and possibilities that could lead to an accident.	1. List the actions to prevent or correct the potential hazards identified. Prevention and corrective action can include: engineering controls, providing safe guards, PPE, training, good housekeeping and proper ergonomics. Note: It is important to recognize the potential for creating additional hazards when modifying the initial process.
<u>For Example:</u> 19. Transport equipment to work site	<u>Related Potential Hazards:</u> 1. Back Strain 2. Slips/ Trips/ Falls 3. Traffic (if applicable)	<u>Preventative/ Corrective Actions to the identified potential hazards.</u> 1. Use proper lifting techniques / Use wheeled transport 2. Minimize distance to work area/ Have unobstructed path to work area 3. Wear high visibility vest
20. All activities	41. Slips/ Trips/ Falls 42. Hand injuries, cuts or lacerations during manual handling of materials 43. Foot injuries 44. Back injuries 45. Traffic 46. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.) 47. High Noise levels 48. Overhead hazards 49. Heat Stress/ Cold Stress 50. Eye Injuries	41. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 42. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves 43. Wear Langan approved safety shoes 44. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 45. Wear high visibility clothing & vest / Use cones or signs to designate work area 46. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 47. Wear hearing protection 48. Wear hard hat / Avoid areas were overhead hazards exist. 49. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 50. Wear safety glasses

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
Additional items.		

Employees that prepare and/or review the JSA must sign and date below, indicating they have read and understand the information provided.

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

Contractor:	Date:	JSA No:
Site Supervisor:	Permit to Work Required:	Permit No:
Location of Work Site:	Description of Work: **Excavation Oversight**	

	How / Where / When Could a hazard be present? What am I about to do? What could go wrong?	**Emergency Management Plan** Eliminate → Control → Protect **Risk Control Measures** List the control measures required to eliminate, control, or protect against the identified hazard.	**Who is responsible?**	**Stop Trigger** Discuss what needs to happen (or not happen) to stop the job during this task.
Motion	Heavy equipment operation	Maintain communication with operator. Stay within operator's line of sight. Communicate with operator prior to approaching equipment or excavation, establish equipment disabling protocol and commands; verbal or hand signal. Do not walk behind heavy machinery.		Lack of communication
	Vibration	Ensure all moveable objects are secure and unable to be moved via vibration.		Any improper movement
	Placement and movement of heavy equipment	Plan exclusion zone to be adequate to work within. Field technician should have a clear view of excavator, heavy equipment, and area being excavated. Dewatering equipment should be situated out of the primary working area. Equipment is properly staged at or around excavation/trenched area at conclusion of day's activities.		Visual confirmation, improper or unsafe barricading/setup of work area
	Equipment orientation	Stay clear of equipment, couplings, rotating devices; clean equipment only when it has stopped rotating and is in neutral, no loose clothing.		Any unsafe act
	Movement of equipment while excavating	Set leveling jack, chock wheels, set all brakes, gear box in neutral, levers/controls in proper position, test kill switches.		Any improper movement, failure to use stabilizers

	Flying and falling debris	Plan exclusion zone, effective communication, proper support of structures during demolition/excavation, protect property from undesired damage.		Compromised structural integrity
	Walking Surfaces	Remove trip hazards from work area, use caution when walking on pea gravel/loose gravel surface. Cordon off trenching and/or excavation areas.		Unsafe conditions
	Working at heights	Personnel should avoid walking on edges of excavation. Excavated materials and equipment must be effectively stored and retained at least 2 feet (0.6 meter) or more from the edge of a properly sloped/shored excavation  Protect yourself against a fall when working at height		Any unsafe act
	Overhead hazard	Scan directly overhead and overhead adjacent to excavation area for any potential overhead hazards that maybe caused by being directly or indirectly disturbed by heavy equipment.		Visual recognition of potential hazard
	Frayed cables or wire rope	Wire rope shall be removed from use when any of the following conditions exist: in hoisting ropes, six randomly distributed broken wires in one rope lay or three broken wires in one strand in one rope lay. Abrasion, scrubbing, flattening, or peening causing loss of >1/3 of the original diameter of the outside wires. Wear leather gloves if handling cables.		Frayed/fraying/damaged cable or wire rope
Chemical	Underground piping runs	Obtain as-builts and historic maps. Utilize utility locating services. Watch for backfill material. Air knife prior to ground disturbance to avoid unmarked underground utilities. Observe and trace surface patching. Utilize Utility Clearance Checklist		Any potential underground line

	Hazardous/flammable chemicals/vapors in exclusion zone	Verify no hazardous/flammable chemicals in exclusion zone, use air monitoring devices, fire watch in place.		Any air monitor reading over action level in HASP
	Chemicals, fluids leaking from tanks, lines, pumps	Locate shut offs prior to start work, know facility alarm system and procedure, Vehicle Inspection Checklist		Visual confirmation
	Dewatering (Contaminated Groundwater)	Spill control measures should be in place for all dewatering operations, water will be disposed of by proper handler.		Any unsafe/undesired condition
	Vapor release from disturbed soil	Use air monitoring equipment during all intrusive work.		Any air monitor reading over action level in HASP
	Excavation equipment fuel, hydraulic fluid and oil leaks	Check for leaks prior to day's activities, heavy equipment inspection form, and during excavation activities. Have absorbent pads and spill kit on site.		Visual confirmation
Environment	Weather			Thunder, lightning, any unsafe weather conditions
	Insects + hazardous wildlife	Insect repellant, check for ticks; scan area for bees and wasps, identify animal evidence (nests, feces) - call PM if nests could create hazardous condition in work area. Avoid overgrown areas.		Visible confirmation, insect bites
	Site workers, pedestrians, vagrants	Mark out exclusion zone, follow sign-in procedure. Scan area frequently for pedestrians.  No smoking onsite. Designate a smoking area offsite.  No alcohol or drugs while working or driving.  Verify isolation before work begins.		Any unsafe condition

	Am I fit for duty?			Not Fit
	Noise	Hearing protection is required in any location where powered or motorized equipment or any other noise source could reasonably be expected to exceed 85 dBA. At least two types of hearing protectors will be available, per SMS 026.		Lack of, failure to utilize proper hearing protection
	Slippery or unstable ground conditions	Verify excavator is situated in a stable area, remove pea gravel/loose stone from excavation, do not attempt to dig if ground conditions are not suitable for equipment stability.		Any unsafe condition
	Hazardous plants	Scan area for poison ivy/oak vines and mark/communicate areas to be avoided.		Hazardous plants identified in work area
Energized Systems	Vehicle	Driver must turn off engine before exiting vehicle.  Driver and passengers must wear seatbelt at ALL TIMES no matter what the speed or distance.  No cell phone use while driving.		Unoccupied vehicle running. Driving without a seatbelt.
	Site systems	Review location of site systems, tanks, lines etc. in area at tailgate meeting, scan area for unsafe conditions		Leaks, drips, spills, sprays, noise, odor
	Motors, hydraulic pistons, rotary drive, electronic controls	Heavy Equipment Safety Inspection Checklist (SMS 19-1) Verify kill switches.		Any unsafe condition
	Equipment fueled systems	Have fire watch in place.		Leak, drip, spill, odor, smoke

Contractor:	Date:	JSA No:
Site Supervisor:	Permit to Work Required:	Permit No:
Location of Work Site:	Description of Work: **Site visit**	

	How / Where / When Could a hazard be present? What am I about to do? What could go wrong?	**Emergency Management Plan** Eliminate → Control → Protect **Risk Control Measures** List the control measures required to eliminate, control, or protect against the identified hazard.	**Who is responsible?**	**Stop Trigger** Discuss what needs to happen (or not happen) to stop the job during this task.
Motion	Vehicles entering/exiting site	Use traffic control, don PPE before leaving vehicle, avoid high traffic areas at peak times, if possible. Sign in/out with designated on-site manager		Unauthorized vehicles
	Slip, trip, and fall hazards – hoses, concrete/asphalt cracks, parking stops, ice, mud	Scan work area for hazards – remove or mark out trip hazards for visibility, apply sand/salt to ice		New hazard, unmarked hazard
	Wind – dust, debris	Wet down area if necessary, wear dust mask, safety glasses		Airborne dust
	Lifting	Take 5 prior to lifting at the end of day. Stretch tired muscles, use two people to carry loads > 50 lbs.		Any injury precursor
Chemical	Chemicals stored in vehicles – decon, sampling supplies, fire extinguishers	Make sure chemicals stores in vehicle or tool box are protected from extreme temps, set up fire extinguisher at firewatch – make sure it is secure		Spills, leaks, drips
	Hazardous/flammable chemicals/vapors in exclusion zone	Verify no hazardous/flammable chemicals in exclusion zone, use air monitoring devices, verify action levels in HASP.  Conduct gas tests where required and/or desired.		Visual confirmation, unsafe air monitor reading

	Chemicals, fluids leaking from tanks, lines, pumps, or vehicles	Locate shut-offs prior to start work, know facility alarm system and procedure, and pre-travel vehicle inspections		Visual confirmation
	Coolers leaking ice, liquids	Inspect coolers prior to use, close lids properly and make sure they seal, don't store beverages in sample coolers.		Visual confirmation
	Vehicles leaking fluid	Check vehicles regularly, have absorbent pads on site		Visual confirmation
Environment	Weather			Thunder, lightning, any unsafe weather condition
	Sun, heat	Wear sunscreen, stay hydrated, watch for signs of heat stress		Visual confirmation
	Insects	Insect repellant, check for ticks; scan area for bees and wasps- call PM if nests could create hazardous condition in work area. Avoid overgrown areas.		Visual confirmation/ insect bites
	Site employees, visitors, pedestrians	Mark out exclusion zone. Follow sign in procedure. Scan area frequently for pedestrians.  Verify isolation before work begins.  No smoking onsite. Designate a smoking area offsite.  No alcohol or drugs while working or driving.		Visual confirmation
	Thunder, lightning, hazardous weather conditions	Discuss inclement weather plan during tailgate meeting and determine rally point, review after 30 min stop period		Thunder, lightning, air horn, unsafe condition
	Cold stress	Know the signs of cold stress, take frequent breaks, stay hydrated		
	Confined work space	 Don't enter confined spaces without a permit!		No permit, and/or no vapor monitoring equipment

	Site worker's condition	Verify health conditions, allergies + medical history during tailgate meeting. Current meds – safe to operate machinery? Anyone intoxicated/hungover?		Any unsafe condition
Energized Systems	Vehicle	Driver must turn off engine before exiting vehicle.  Driver must wear seatbelt at ALL TIMES no matter what the speed or distance.  No cell phone use while driving.  Follow prescribed Journey Mgmt. Plan		Unoccupied vehicle running. Driving without a seatbelt. Violation of life-saving rule.
	Site systems	Review location of site systems, tanks, lines etc in area at tailgate meeting. Scan area for unsafe conditions		Leaks, drips, spills, sprays, noise, odor.
	Batteries in interface probe, PID, any necessary equipment	Battery check prior to work, discard PROPERLY any corroded batteries.		Corrosion or failed battery test.
	Pressure in drums	High vapor count in soil cuttings – vent drums if leaving onsite		PID readings of concern

Contractor:	Date:	JSA No:
Site Supervisor:	Permit to Work Required:	Permit No:
Location of Work Site:	Description of Work: **Remote Area Site Walk (site walk, H&S paperwork, DTM, breakdown)**	

	How / Where / When Could a hazard be present? What am I about to do? What could go wrong?	**Emergency Management Plan** Eliminate → Control → Protect **Risk Control Measures** List the control measures required to eliminate, control, or protect against the identified hazard.	**Who is responsible?**	**Stop Trigger** Discuss what needs to happen (or not happen) to stop the job during this task.
Motion	Vehicles entering/exiting site, black ice in parking lot	Use Level 3 traffic control, don PPE before leaving vehicle, determine & avoid high traffic areas at peak times, if possible, be aware of vehicle sliding/drifting		Unauthorized vehicles in work zone
	Slip, trip, and fall hazards – hoses, concrete/asphalt cracks, parking stops, ice, mud	Scan work area for hazards – remove or mark out trip hazards for visibility, apply sand/salt to ice		New hazard, unmarked hazard
	Wind – dust, debris, falling trees, branches, slope and/or canopy debris	Wet down area if necessary, wear dust mask, safety glasses, scan work area for hazards, determine safe travel routes		Airborne dust, hanging forest canopy debris and/or standing dead trees
	Bending, lifting, muscle strain + cramping, hiking long distance/steep slopes	Take 5 prior to lifting at the end of day. Stretch tired muscles, use two people to carry loads > 50 lbs. Avoid static posture and change body position frequently. Monitor surroundings and determine safe travel routes.		Any injury precursor
Chemical	Vehicles leaking fluid	Check vehicles regularly, have absorbent pads on site		Visual confirmation

Environment	Weather, Snow, Rain			Thunder, lightning, snow, rain, high winds, any unsafe weather condition
	Sun, cold	Wear sunscreen, stay hydrated, watch for signs of cold stress		Visual confirmation
	Insects, Ticks, Spiders	Insect repellant, check for ticks; scan area for bees and wasps- call PM if nests could create hazardous condition in work area. Avoid overgrown areas.		Visual confirmation/ insect bites
	Wildlife – deer and bears	Discuss potential wildlife encounters during tailgate meeting, determine rally point, do not approach or provoke any wildlife		Visual confirmation of potentially dangerous wildlife
	Site employees, visitors, pedestrians, hunters	Mark out exclusion zone. Follow sign in procedure. Scan area frequently for pedestrians.  Verify isolation before work begins.  No smoking onsite. Designate a smoking area offsite.  No alcohol or drugs while working or driving. If approached – politely talk to pedestrians and/or hunters and explain the situation		Visual confirmation
	Thunder, lightning, hazardous weather conditions, ice/snow storm	Discuss inclement weather plan during tailgate meeting and determine rally point, review after 30 min stop period		Thunder, lightning, air horn, unsafe condition
	Black ice on paved surfaces, frost on vehicle windshields and/or windows	Discuss inclement weather plan during tailgate meeting, possible sliding/drifting of vehicles, low visibility conditions. Allow sufficient time for windshield and windows to defrost prior to driving.		Ice too widespread for safe travel

	Mountain road stream flooding – perennial and ephemeral – during rainstorms	Discuss weather conditions during tailgate meeting , drive/walk slowly, watch surface conditions ahead, stay on flat areas with solid ground		Water flowing over roads/walkways, blocked roadways, unsafe driving conditions
	Site worker's condition	Verify health conditions, allergies + medical history during tailgate meeting. Current meds – safe to operate machinery? Anyone intoxicated/hungover? Anyone exhausted from hiking?		Unfit for work
	Cold stress	Know the signs of cold stress, take frequent breaks, stay hydrated		First sign of cold stress/hypothermia
Energized Systems	Vehicle	Driver must turn off engine before exiting vehicle.  Driver and ALL passengers must wear seatbelt at ALL TIMES no matter what the speed or distance.  No cell phone use while driving.		Unoccupied vehicle running. Driving or riding without a seatbelt.
	Site systems	Review location of site systems, tanks, lines, etc. in area at tailgate meeting. Scan area for unsafe conditions		Leaks, drips, spills, sprays, noise, odor.
	Batteries in interface probe, PID, any necessary equipment	Battery check prior to work, discard PROPERLY any corroded batteries.		Corrosion or failed battery test.
	Pressure in drums	High vapor count in soil cuttings – vent drums if leaving onsite		PID readings of concern

Contractor:	Date:	JSA No:
Site Supervisor:	Permit to Work Required:	Permit No:
Location of Work Site:	Description of Work: **Surface Water Sampling**	

	How / Where / When Could a hazard be present? What am I about to do? What could go wrong?	**Emergency Management Plan** Eliminate → Control → Protect **Risk Control Measures** List the control measures required to eliminate, control, or protect against the identified hazard.	**Who is responsible?**	**Stop Trigger** Discuss what needs to happen (or not happen) to stop the job during this task.
Motion	Bending, lifting, writing, muscle strain, and cramping	Avoid static posture and change body position frequently.		Potential for ache or cramp- before it starts!
	Slips, trips, falls on uneven surfaces	Inspect work area for safe footing prior to starting work. Take precaution when carrying loads across uneven ground; use two people to carry loads > 50 lbs.		Failure to check surroundings and/or communicate hazards
	Wind-blown dust/debris	Wear safety glasses and wet down area if necessary.		Unmanageable dust and debris.
	Moving water	Avoid static posture- change body position frequently, ensure footing is secure, appropriate stance, wear gloves, wear all appropriate PPE, including hip waders, safety harness and personal flotation device.  Permitting may be required to work near/over water!		Precursor to injury, any unsafe condition. Ex) Air + Water temp = less than 100 degrees, full body, thermal PFD required!
	Transfer sample to laboratory bottles	Wear appropriate PPE (gloves for material handling and safety glasses for splashes). Use proper lifting technique and don't twist when lifting. Avoid spray from wind.		Increased wind and any unsafe act or condition.
	Lifting and carrying sample coolers	Use proper lifting technique and don't twist when lifting. Seek help if lifting > 50 lbs. Plan the carrying route and mark out any potential trip hazards.		Any unsafe condition, injury precursor

Chemical	LPH, crude oil, or other chemicals in surface water	Hip waders, nitrile gloves, air monitoring, safety glasses, verify action levels in HASP		Visual confirmation, odor, air monitor reading
	Hazardous/flammable chemicals/vapors	Verify no hazardous/flammable by use air monitoring devices.		Visual confirmation, unsafe air monitor reading
	Chemicals, fluids leaking from tanks, lines, pumps	Locate shut offs prior to start work. Know facility alarm system and procedure. Pre-travel vehicle inspections and complete SMS 19-1.		Visual confirmation
	Preservatives in Glassware	Verify MSDS for all preservatives and take precautionary measures. Use caution when opening/closing bottleware and wear both nitrile and Kevlar gloves. Inspect bottleware prior to use and handling.		Cracked or broken bottleware
	Equipment fuel and oil leaks	Check for leaks regularly. Have absorbent pads in field vehicle/onsite.		Visual confirmation
Environment	Weather			Thunder, lightning, any unsafe weather condition
	Insects	Use insect repellant. Check for ticks. Avoid areas with active bee or wasp nests and verify bee sting allergies.		Visible confirmation, insect bites
	Site employees, visitors, pedestrians	Mark out exclusion zone. Follow sign in procedure. Scan area frequently for pedestrians.  No smoking onsite. Designate a smoking area offsite.  No alcohol or drugs while working or driving.  Verify isolation before work begins.		Visual confirmation

	Am I fit for duty?			Not fit – any unsafe conditon
	Slippery or unstable ground conditions	Remove trip hazards from work area, use caution when walking on pea gravel/loose gravel surface.		Any unsafe condition
Energized Systems	Vehicle	Driver must turn off engine before exiting vehicle.  Driver must wear seatbelt at ALL TIMES no matter what the speed or distance.  No cell phone use while driving.		Unoccupied vehicle running. Driving without a seatbelt.
	Site systems	Review location of site systems, tanks, lines etc in area at tailgate meeting. Scan area for unsafe conditions		Leaks, drips, spills, sprays, noise, odor.
	Batteries in interface probe, PID	Battery check prior to work, discard PROPERLY any corroded batteries.		Corrosion or failed battery test.
	Tire pressure/ inflation method	Verify inflation method, make sure noted on SMS 19-1 or other inspection form,		Loose connection and/or air leak.

Appendix G

HEAT STRESS

Due to the increase in ambient air temperatures and the effects of protective outer wear deceasing body ventilation, there exists an increase in the potential for injury, specifically, heat casualties. Site personnel will be instructed in the identification of a heat stress victim, the First Aid treatment procedures for the victim and the prevention of heat stress casualties.

IDENTIFICATION AND TREATMENT

1. Heat Exhaustion

    a. Symptoms: Usually begins with muscular weakness, dizziness, nausea, and a staggering gait. Vomiting may be frequent. The bowels may move involuntarily. The victim is pale, his skin is clammy, and he may perspire profusely. The pulse is weak and fast, breathing is shallow. The victim may faint unless the victim lies down. This may pass, but sometimes it remains and death could occur.

    b. First Aid: Immediately remove the victim to the Personnel Decontamination Reduction Zone in a shady or cool area with good air circulations. Remove all protective outer wear. Call the local hospital for physician. Treat the victim for shock (Make victim lie down, raise feet 6-to 12-inches and keep warm but loosen all clothing.) If the victim is conscious, it may be helpful to sip an electrolytic solution. Transport victim to a medical facility as soon as possible.

2. Heat Stroke

    a. Symptoms: This is the most serious of heat casualties due to the fact that the body excessively overheats. Body temperatures often are between 107° to 110°F. First there is often pain in the bead, dizziness, nausea, oppression, and the skin is dry, red and hot. Unconsciousness follows quickly and death is imminent if exposure continues. The attack will usually occur suddenly.

    b. First Aid: Immediately evacuate the victim to a cool and shady area in the Contamination Reduction Zone. Remove all protective outer wear and all personal clothing and decontaminate the victim. Lay victim on their back on a clean sheet or blanket with the head and shoulders slightly elevated. It is imperative that the body temperature be lowered immediately. This can be accomplished by applying cold wet towels, ice bags, etc. to the head and body. Sponge off the bare skin with cool water or rubbing alcohol, if available, or even place victim in a tub of cool water. The main objective is to cool the victim without chilling him. Give no stimulants. Transport the victim by ambulance to a medical facility as soon as possible.

PREVENTION OF HEAT STRESS

1. One of the major causes of heat casualties is the depletion of body fluids. On the site there will be plenty of fluids available. Personnel should replace water and salts loss from sweating. Salts can be replaced by drinking a commercial mix of electrolytes and nutrients such as Gatorade. If drinking Gatorade for extended periods of time, the Gatorade should be mixed at 50 percent of normal strength.

2. A work schedule should be established so that the majority of the work day will be during the morning hours of the day before ambient air temperature levels reach their highs.

3. A work/rest guideline will be implemented for personnel required to wear Level B or Level C protection. These guidelines are as follows:

Ambient Temperatures	Maximum Wearing Time
Above 90°F	1 hour
80° to 90°F	1-1/2 hours
70°to 80°F	2hours
60° to 70°F	3 hours
less than 60°F	4 hours

A sufficient period will be allowed for personnel to "cool down." This may require shifts of workers during operations.

HEAT STRESS MONITORING

For monitoring the body's recuperative ability to excess heat, one or more of the following techniques should be used as a screening mechanism. Monitoring of personnel wearing protective clothing should commence when the ambient temperature is 70°F or above. Frequency of monitoring should increase as the ambient temperature increases or if slow recovery rates are indicated. When temperatures exceed 80°F workers should be monitored for heat stress after every work period.

- Heart Rate (HR): should be measured by the radial pulse for 30 seconds. The HR, 5 minutes after the beginning of the rest period, should not exceed 120 percent of the normal "at rest" HR. If the HR is higher, the next work period should be shortened by 10 minutes (or 33 percent), while the length of the rest period stays the same. This process should be repeated until an acceptable HR is achieved.

- Body Temperature: should be measured orally with a clinical thermometer as early as possible in the resting period. Oral temperature (OT), taken 5 minutes after beginning of the rest period, should not exceed 1/2 degree above normal "at rest" OT. If it does, the next work period should be shortened by 10 minutes (or 33 percent),

while the length of the rest period stays the same. If the OT taken 5 minutes after the beginning of the next resting period exceeds 1/2 degree above normal “at rest’ OT, the following work cycle should be further shortened by 33 percent.

- Body Water Loss (BWL): due to sweating, body water loss should be measured by weighing the worker in the morning and in the evening. The clothing worn should be similar at both weighings; preferably the worker should be nude. The scale should be accurate to plus or minus 1/4 pound. BWL should not exceed 15 percent of the total body weight. If it does, workers should be instructed to increase their daily intake of fluids by the weight lost.

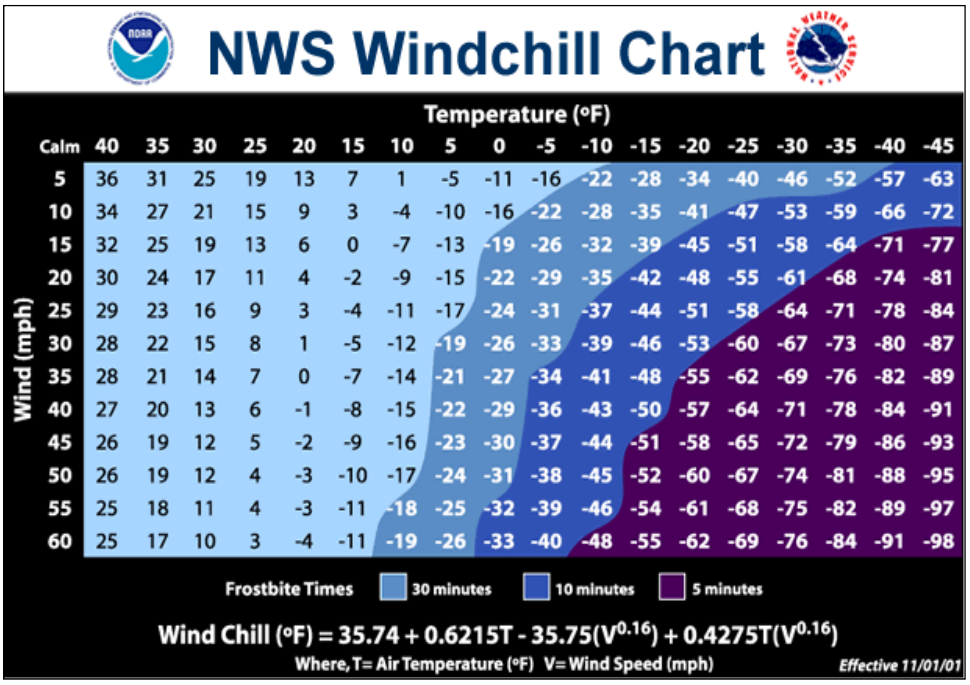
Ideally, body fluids should be maintained at a constant level during the work day.

Good hygienic standards must be maintained by frequent change of clothing and daily showering. Clothing should be permitted to dry during rest periods. Persons who notice skin problems should immediately consult medical personnel.

COLD INJURY/STRESS

Cold injury (frostbite, hypothermia) and impaired ability to work are dangers at low temperatures and when the wind-chill factor is low. Areas of the body which have a high surface-area-to-volume ratio are the most susceptible to frostbite. Cold puts extra strain on the heart. Avoid exertion, any person with high blood pressure or heart disease needs to be extra careful not to over exert themselves. Never eat a large meal before working outdoors in the winter, this will limit the bodies ability to produce heat.

Two factors influence the development of a cold injury: ambient temperature and wind speed. The Project Manager and HSC will monitor conditions and provide insulating garments and a warm shelter as necessary. Work stoppages due to cold weather will be at the discretion of the HSC.



COLD INJURY MONITORING

Persons working on-site should watch for warning signs of cold injury (i.e., the stages of frostbite), including numbing of the extremities, a sudden whitening of the skin, or gradual stiffening of the outer layers of the skin. Affected persons will be moved to the site office for gradual warming of the exposed extremity with warm fluids, placing affected area next to warm skin, or sterile cloth materials. Do not apply direct heat to the area like heating vents or pads, this can lead to burns. Never rub or massage an area that has frostbite. If blisters form do not pop them. If there is a chance of refreezing do not heat the area. If at all possible, do not walk on frostbitten feet. The injured area will be kept elevated and covered with sterile, dry material after warming. If the person is showing signs of hypothermia, heat the center of the body first (head, chest, neck, and groin). Individuals will be transported to the emergency medical clinic or hospital, as appropriate.

The warning signs of hypothermia include shivering, listlessness or sleepiness, slow pulse, glassy stare and freezing of the extremities. Any of these conditions require immediate attention, and the HSC must be notified if they occur. Affected individuals will be moved to an appropriate location (e.g., the site office), where they will be wrapped in blankets and given warm fluids until the condition improves. Individuals will be transported to the emergency medical clinic or hospital, as appropriate.

PREVENTION OF COLD INJURY

The following table details work procedures for work activities under low temperature conditions in the work area. Work stoppages due to low temperature or wind chill will be at the discretion of the HSC.

Temperature	Work	Rest	Additional Actions
20 to 10 F	2 hrs	5 min	Review cold stress in a safety meeting.
10 to 0 F	2 hrs	15 min.	Rest area must be out of the wind. Monitor for cold stress.
0 to -10F	90 min	15 min	Rest area should be heated and must be out of the wind.
-10 to -20 F	30 min	15 min	Non-emergency work should be rescheduled if possible. Rest area must be heated and out of the wind.
<-20 F	15 min	15 min	All non-emergency work MUST be rescheduled.

Appendix H

Photo From:
http://commons.wikimedia.org/wiki/File:PoisonOak_wb_ biggerLeaves.jpg

Poison Oak *(Toxicodendron diversilobum)*

Family: Anacardiaceae

Description: Contains poisonous oil called urushiol. The oil is found on the surface of leaves and stems. Dermal contact with this oil causes an allergic reaction. The extent/degree of the allergic reaction is person dependent. Appearance and growth habit vary.

Growth: Leaves can be 1-4 inches long and have scalloped, toothed or lobed edges. From February to March leaves are developing and are bronze in color. In the spring leaves are bright green with blooming white flowers.

Injury Prevention: Pants, long-sleeves and durable footwear are effective in protecting the skin from contact with Poison Oak. In case of skin contact, immediately wash affected areas with soap and cold water before urushiol oil bonds with skin. Urushiol oil on clothing is transferable. Being as such, remove contaminated clothing with care and wash with cold water and detergent. Visit a physician if a rash develops.

Water Hemlock *(cicuta maculata)*

Family: Apiaceae

Description: Considered the most poisonous plant in temperate North America. Poison is concentrated in the roots, although all parts of the plant are poisonous. The active toxin, cicutoxin, acts directly on the central nervous system and is a violent convulsant. If ingested, the symptoms appear promptly and include abdominal pain, violent convulsions, fever, paralysis, respiratory failure and in some cases death as soon as 15 minutes after consumption. Touching the plant may result in serious skin irritation. The extent/ degree of irritation is personal dependent.

Growth: Water Hemlock grows in wet marshy areas along rivers and ponds. Maximum height of growth is between 3 and 5 feet. The long leaves are made up of several lance-shaped, pointed and serrated leaflets. Each leaflet is 1 to 4 inches long and the entire leaf may be up to 16 inches long. Small umbrella-like clusters of white flowers and dry tan fruit a few millimeters long blossom from this plant.

Injury Prevention: Never ingest. To avoid skin contact, wear long sleeves, pants, and durable footwear. If skin contact, immediately wash affected areas with cold water and soap. If skin irritation occurs, visit a physician. If ingestion occurs, immediately call 911.

Poison Ivy ***(Toxicodendron radicans)***

Family: Anacardiaceae

Description: This is the most common source of allergic disease in the United States. Contact with the plant can cause urushiol-induced contact dermatitis, an itchy, irritating and sometimes painful rash. The rash is caused by a clear sap called urushiol.

Growth: Grows in forests, thickets and open lands in both wet and dry conditions. Vigorous vine climbing by areal roots and sprawling shrubs on the ground. May grow horizontal branches 3 to 6 feet long that spread from tree trunks. It can be identified by its thornless vine and three almond-shaped shiny leaflets that grow to 1-5 inches long.

Injury Prevention: If contact occurs, immediately wash with soap and cold water or rubbing alcohol. Calamine lotion may help mitigate symptoms if they occur. Wear long sleaves, pants and durable footwear to avoid contact.

Giant Hogweed *(Heracleum mantegazzianum)*

Family: Apiaceae

Description: With contact the stiff, postulate-based stem bristles can irritate the skin. Even more dangerous is the sap, which can cause serious blisters, burning and permanent scarring and brown staining of the skin. The toxic sap is contained in every part of the plant. The sap is phototoxic which prevents contacted skin from protecting itself from sunlight and leads to serious skin inflammation. Reaction can begin as soon as 15 minutes after contact.

Growth: Giant Hogweed can grow up to 12 to 15 feet tall with umbrella-shaped clusters of white flowers. The large leaves are incised, deeply lobed and can grow up to 4 feet wide. The stem is bright green with extensive dark reddish-purple splotches.

Injury Prevention: Avoid giant hogweed if encountered. Protective clothing such as long sleeves, pants and durable footwear can prevent contact. If handling the plant is necessary, wear gloves and eye protection. If contact with the skin occurs, immediately was the affected area with soap and cold water and avoid exposure to sunlight for a minimum of 48 hours after contact occurs.

Photo From:
https://www.fws.gov/midwest/endangered/reptiles/eama/eama-fct-sht.html

Eastern Massasauga Rattlesnake
(Sistrurus Crotalus)

Family: Viperidae

Description: The eastern massasauga rattlesnake has been listed as a threatened species under the Endangered Species Act. These are small snakes with thick bodies and heart-shaped heads. They typically grow up to two feet long. The are grey or light brown with large brown blotches on their back and smaller blotches on the sides. They live in wet areas along rivers and lakes. They have a cytotoxic venom that destroys tissue, disrupts blood flow and prevents blood clotting.

Hazard Prevention: This snake avoids humans when it can. Most bites have occurred after people deliberately handled or accidentally stepped on one. If seen, avoid the snake and stay aware of surroundings. Avoid hiking through areas of low visibility. Wear shoes and long pants.
If Bitten:

1. Remain calm and retreat from the snake at least 15 feet. Arrange to have the victim transported to a medical facility as soon as possible.
2. Remove restrictive clothing items (rings, bracelets, watches, buttoned shirts, etc.) from the victim.
3. Splint or otherwise immobilize any bitten limbs and keep them below heart level.
4. Keep victims calm; put them at rest; keep them warm and give them comfort and reassurance (which will lower their heart rate, slowing the spread of the venom). Keeping a victim's heart rate down, however, should never interfere with getting him or her to a medical facility.
5. If the snake is still present or nearby, try to get an accurate description by using a camera or remembering certain physical traits such as color, pattern, or length. This can help ensure the proper antivenin is administered. However, one should never put oneself at risk of being bitten to obtain this description.


Photo From: https://en.wikipedia.org/wiki/Latrodectus

Black Widow *(Latrodectus)*

Family: Theridiidae

Description: These are small spiders most easily recognized by their dark coloring and reddish hourglass-shaped markings on their abdomen. Their venom is unusually potent and contains a neurotoxin called latrotoxin. This toxin can cause pain, muscle rigidity, vomiting, sweating and very rarely can be fatal. Only the bites of the females are dangerous to humans. Their bodies range from 0.1 to 0.4 inches in size, and some females can reach up to 0.5 inches in length.

Hazard Prevention: Black widow spiders prefer to nest near the ground in dark undisturbed areas such as holes created by other animals or wood piles so take caution when working around these conditions. They have poor eyesight and depend on vibrations reaching them through their webs, so be aware of surroundings during demolition or other disruptive construction processes.

If Bitten:

1. Remain calm. Very often the black widow will not inject any venom into the bite and serious symptoms will not develop.
2. Wash the wound well with soap and water to help prevent infection.
3. If muscle cramps develop, take the victim to the nearest hospital to receive black widow antivenin.

Photo From: https://en.wikipedia.org/wiki/Brown_recluse_spider

Brown Recluse *(Loxosceles Reclusa)*

Family: Sicariidae

Description: Brown recluse spiders typically range between 0.25 and 0.8 inches, but can grow larger. They are most commonly found having a light to medium brown color, but can be whitish to dark brown/blackish gray. They usually have black line markings on the back side of their head. For definitive identification, examine the eyes. Unlike other spiders, brown recluse only have six eyes that are arranged in pairs. They have potentially deadly hemotoxic venom that can cause necrosis. The bites do not always hurt right away and tend to only be discovered by the appearance of other symptoms including reddened skin, blistering, pain, itching, open sores, fever and chills, neausea, vomiting and a rash all over the body with many tiny, flat purple and red splotches.

Hazard Prevention: They frequently build their webs in woodpiles, sheds, garages, cellars and any other dry undisturbed locations so take caution when working in these areas. Avoid undisturbed cardboard as they tend to favor this for habitat. Human-recluse contact most often occurs when these isolated spaces are disturbed and the spider feels threatened so remain aware of surroundings. Bites are most common when the spider has become tangled in clothing, towels or inside work gloves.

If Bitten:

1. Remain calm. Too much movement will increase the flow of venom into the blood.
2. Apple a cool, wet cloth to the bite or cover the bite with a cloth and apply an ice bag.
3. Do not apply a tourniquet.
4. Try to positively identify the spider.
5. Immediately call for medical care if severe symptoms or an open sore/necrosis occurs.

Photo From: https://en.wikipedia.org/wiki/Ixodes_scapularis

Deer Tick *(Ixodes scapularis)*

Family: Ixodida

Description: The deer tick, or black-legged tick, is found in the northern Midwestern United States and southeastern Canada. These ticks can carry many human and animal diseases, including Lyme disease and babesiosis. They are very small; the adult tick is approximately the size of a sesame seed. It is a parasite commonly found on white-tailed deer. An unfed tick is naturally black in color, but after it has consumed blood its abdomen will be a light grayish-blue color. Once latched on to a host, deer ticks will drink its blood for four to five days. Ticks are very hard and can survive severe weather conditions. Deer ticks live in shady, moist areas at ground level and will cling to tall grasses and shrubs. They also live at the edges of wooded areas and around stone walls.

Hazard Prevention: Wear long sleeves, pants and closed-toed shoes with no holes. Tall socks with pant legs tucked help to prevent ticks from crawling up the pant leg. Tucking long sleeves into work gloves can also help ticks from coming into contact with skin. Thoroughly check yourself and your clothing after every work day, with special attention paid to your feet, ankles and legs, to ensure you have not been bitten. If a tick is found on the skins surface immediately follow the steps below to avoid having the tick burrow further into the skin.

If Bitten:

1. Remove the tick promptly and carefully. Use fine-tipped tweezers to grasp the tick as close to the skins surface as possible.
2. Pull upward with steady, even pressure. Do not twist or jerk the tick; this can cause the mouth-parts to break off and remain in the skin.
3. After the tick is removed, thoroughly clean the bite area and you hands with rubbing alcohol or soapy water.
4. Dispose of the tick by putting it in alcohol, placing it in a sealed bag, wrapping it tightly in tape or flushing it down the toilet. Never crush a tick with your fingers.
5. If a rash or fever develops within a few weeks of the tick bite, immediately see a doctor.

Sources:

https://michiganflora.net/home.aspx
https://en.wikipedia.org/
https://www.fws.gov/midwest/endangered/reptiles/eama/eama-fct-sht.html
https://www.desertusa.com/insects/black-widow-spider-bite.html
https://www.mercy.net/newsroom/2018-07-11/a-brown-recluse-spider-bit-me---now-what-/

Appendix I

Safe Work System

EXCAVATION / TRENCHING PERMIT

Permit # _____

OSHA 1926.650(b) Scope and application. This subpart applies to all open excavations made in the earth's surface. Excavations are defined to include trenches. "Excavation" means any man-made cut, cavity, trench, or depression in an earth surface, formed by earth removal.

D Site Address _____ Cost Center _____ D

Contractor Company _____ Work Order/PO # _____ D

Name of the authorized Permit Holder _____ Phone _____

D Name of Permit Issuer _____ Phone _____

D The soils have been identified and a suitable excavation plan was designed by a competent person and communicated YES ____ NO ____

D The stability of adjoining structures that may potentially be endangered by excavation have been evaluated by a competent person and the plan communicated YES ____ NO ____

D Is the operator and equipment certified for the work to be performed YES ____ NO ____

D The on site means to contact emergency services are operable YES ____ NO ____

D The location of utilities (such as sewer, telephone, natural gas, fuel, electric, water) or any other underground installations have been determined prior to opening the excavation YES ____ NO ____

D The primary means of access/egress are located per OSHA standards YES ____ NO ____

D List the means to be used as a warning system for mobile equipment operating near the edge of excavations (Such as barricades, hand or mechanical signals, or stop logs) _____

D List the other hazards of the Excavation Work being performed _____

_____

(Such as falling loads/tools/equipment, electrical, exhaust, combustibles, contaminated soil, mechanical defects, design defects, nearby vent stacks, hydrocarbon liquid or vapor, fuel delivery, omission of protective features, extreme temperature, extreme noise, high pressures, structures, weather, other)

D List the measures used to eliminate, or control other hazards before work _____

_____

(Such as barricades, rigging performed by a competent person, stable surface, outriggers set as needed, lockout/tagout/verification of energy sources, correct extinguishers nearby, housekeeping, flag men, work stoppage during fuel delivery, other)

D Equipment/Materials are staged at least 2 feet from the edge of excavations YES ____ NO ____

D The excavation has been inspected daily, and as needed by a competent person for evidence of standing water, possible cave-ins, failure of protective systems, hazardous atmospheres, or other hazardous conditions YES ____ NO ____

D A hot work permit is required and issued (such as for use of equipment using combustible engines) YES ____ NO ____

D Guardrails are provided for walkways 6 feet or more above lower levels YES ____ NO ____

D Identify the system in place to protect employees from cave-ins for excavations greater than 5 feet or where the soil has potential for cave in _____

D List the safety equipment to be provided by contractor (such as extinguishers, PPE, protective equipment/clothing, face and eye protection, communications equipment, alarm systems, 0ther):

D All components of the excavation equipment and tools have been inspected and tested by a competent person and are adequate for use YES ____ NO ____

(Such as wire rope or straps, evidence of any heat or damage, guards cover moving parts and exhaust, air / hydraulic deterioration or leakage, other)

D Any other information necessary, in order to ensure employee safety

D Atmospheric conditions are safe for excavation: (if a well designed hazard assessment has been conducted to identify any underground piping or electrical, then a periodic gas check will be ok) YES ____ NO ____

Initial Readings:

Oxygen 19.5% - 23.5%	Combustible Gas <10% LEL	Toxic Gas - Type and Levels (CO-35PPM/H2S-10PPM/Other)

Authorized Tester Name _____ Date _____ Time _____

Contractor is solely responsible for the understanding, training and execution of OSHA regulations relative to this activity. Permit forms must be retained for a minimum of two years.

Gas Tester Make/Model:	Instrument Serial Number: Calibration Date:
PERMIT VALIDATION	
This Permit is valid from am/pm TO am/pm on / / . (Note: Permit must not exceed 1 day)	
I ensure this permit has been filled out completely and in accordance with all applicable OSHA requirements to provide a safe workplace. I will take action to control hazardous conditions associated with this work.	
Permit Acceptance (print name): Permit Holder Signature: Date: Time:	Permit Authorization (Print Name): Permit Issuer Signature: Date: Time:
PERMIT CLOSE OUT	
All work has been completed in accordance with this Permit and the site has been left in a safe and satisfactory condition.	
Permit Holder Signature: Date: Time:	Permit Issuer Signature: Date: Time:

Contractor is solely responsible for the understanding, training and execution of OSHA regulations relative to this activity. Permit forms must be retained for a minimum of two years.

WELDING, BURNING, AND CUTTING PERMIT

Date:_____ Shift:_____ Job #:_____ Permit #:_____

Contractor:_____ Foreman:_____

Type of Work:_____

Work Location:_____

PRE-WORK SAFETY CHECKLIST

1. Is a properly charged portable fire extinguisher, with a minimum rating of 2A:10B:C, available at the work location? _____Yes _____No Provide Rating:_____
2. Is the surrounding area clear of combustibles, is all directions, as noted below: All directions means above, below and behind adjacent walls. This includes pipe sleeves and openings into these adjacent areas:
   Within 35 feet of the work area? _____Yes _____No
   If no, combustibles must be covered with an approved fire-resistant material.
   State type of covering:_____
3. Is the work location a minimum of 50 feet from all fuel, gas cylinders, or explosives storage locations? _____Yes _____No. If no, storage locations and combustibles stored in these locations must be covered with an approved fire-resistant material.
   State type of covering:_____
4. Are oxygen and fuel gas cylinders used for the work properly stored in a cart or cylinder rack? _____Yes _____No
5. Are conveyor systems, or exhaust ventilation systems within 35 feet of the work location shut down or protected? _____Yes _____No
6. Is the work at an elevated location? _____Yes _____No
   If yes, the area below must be completely barricaded for 35 feet in all directions.
7. Fire watch must be present at all times during breaks or lunch. One individual shall take a lunch before or after the crew to ensure fire does not occur at these times.

Please return this permit to the 21st Century Salvage, Inc. foreman at the end of each shift. Foreman must return completed and signed permits to the safety director.

SUBCONTRACTOR FOREMAN SIGNATURE:

_____ DATE:_____

FOREMAN SIGNATURE:

_____ DATE:_____

Contractor is solely responsible for the understanding, training and execution of OSHA regulations relative to this activity. Permit forms must be retained for a minimum of two years.