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HEALTH AND SAFETY PLANS

SOURCE AREA REMOVAL AND TREATMENT

FPE Edgefield Site, Edgefield, South Carolina

April 2023

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ATTACHMENT I

CCI Primary construction Health and Safety Plan

April 2023

FPE Site Edgefield, SC

Prepared for De Maximis
By CCI Environmental Services

CCI

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Certification Page

_____ Date:

Spencer Epps

H&S Manager

CCI Environmental Services

_____ Date:

Keith Burch

Vice President, Remediation

CCI Environmental Services

The information in this Health and Safety Plan has been designed for the scope of work (April 2023) presently contemplated by CCI Environmental Services (CCI). Therefore, this document may not be appropriate if the work is not performed by or using the methods presently contemplated by CCI. In addition, as the work is performed, conditions different from those anticipated may be encountered and this document may have to be modified. Therefore, CCI only intends this plan to address currently anticipated activities and conditions and makes no representations or warranties as to the adequacy of the Health and Safety Plan for all conditions encountered.

Health and Safety Plan Acknowledgement Form

Project Number: 26886

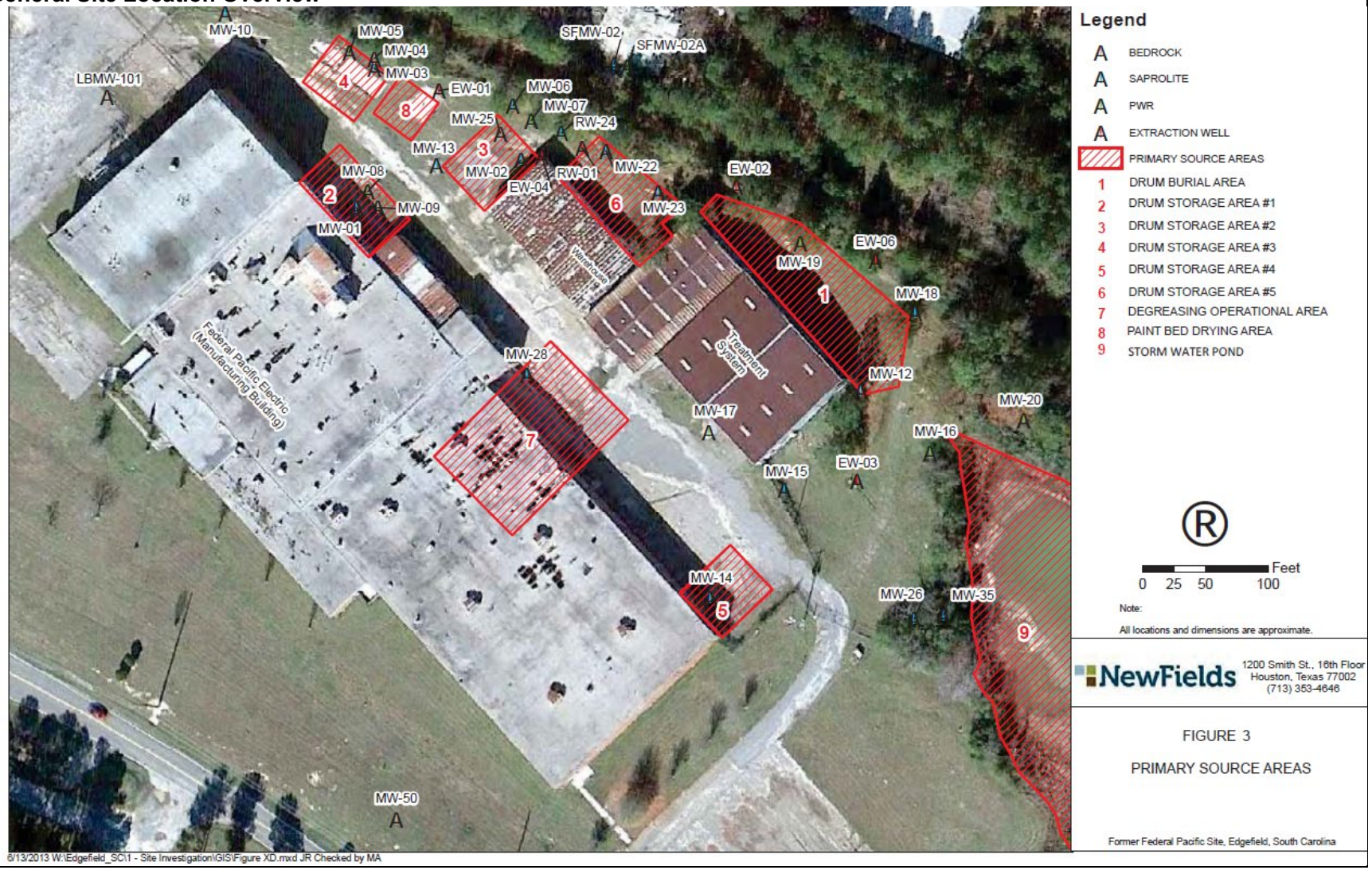
Project Name: FPE Site Edgefield, SC

My signature below certifies that I have read and understand the policies and procedures specified in this Health and Safety Plan (HASP). For CCI Environmental Services employees, this HASP may include company-specific appendices to this plan developed by entities other than CCI Environmental Services. My signature also indicates that I have been informed of the personnel to contact if I have any questions and know where to report any additional health and safety hazards. I agree to work within these health and safety plan guidelines and understand that failure to do so could result in removal from the site and/or termination.

Date	Name (print)	Signature	Company

Site Emergency Procedures

Figure A
General Site Location Overview



Emergency Contact Information

Table A
Site Emergency Contacts and Phone Numbers*

Category	Information	
Possible Chemicals of Concern	1,2-Dichloroethane; Tetrachloroethene; Trichloroethene; Vinyl Chloride	
Minimum Level of Protection	Level D	
Site(s) Location Address	FPE Site, Highway 25, Edgefield SC	
Emergency Phone Numbers		
Ambulance	911	
Fire	911	
Police	911	
Poison Control	(800) 222-1222	
MedCor	1-800-775-5866	
De Maximis Contact	Chris Shudick	Phone: 219-306-7366
O & M PM Contact	Christopher Fuerst	Phone: 865-816-0986
Arcadis EHS Contact		Phone:
CCI Project Manager	Keith Burch	Phone: 704-650-1298
CCI Project Superintendent	Sean Tucker	Phone: 336-456-0157
CCI H&S Manager	Spencer Epps	Phone: 704-576-8181

Notes:
* In the event of any emergency, contact the CCI Safety Manager and PM.

1. For local resources, please visit: http://www2.epa.gov/emergency-response/emergency-response-my-community. The National Response Center hotline is 1-800-424-8802.

Hospital Information, Route Map, and Driving Directions

Table B
Hospital Information

Category	Information
Hospital Name	Edgefield County Hospital
Address	300 Ridge Medical Plaza Rd
City, State	Edgefield, South Carolina
Phone	5803-637-3174
MedCor	1-800-775-5866
Emergency Phone	911

Figure B
Hospital Route Driving Directions

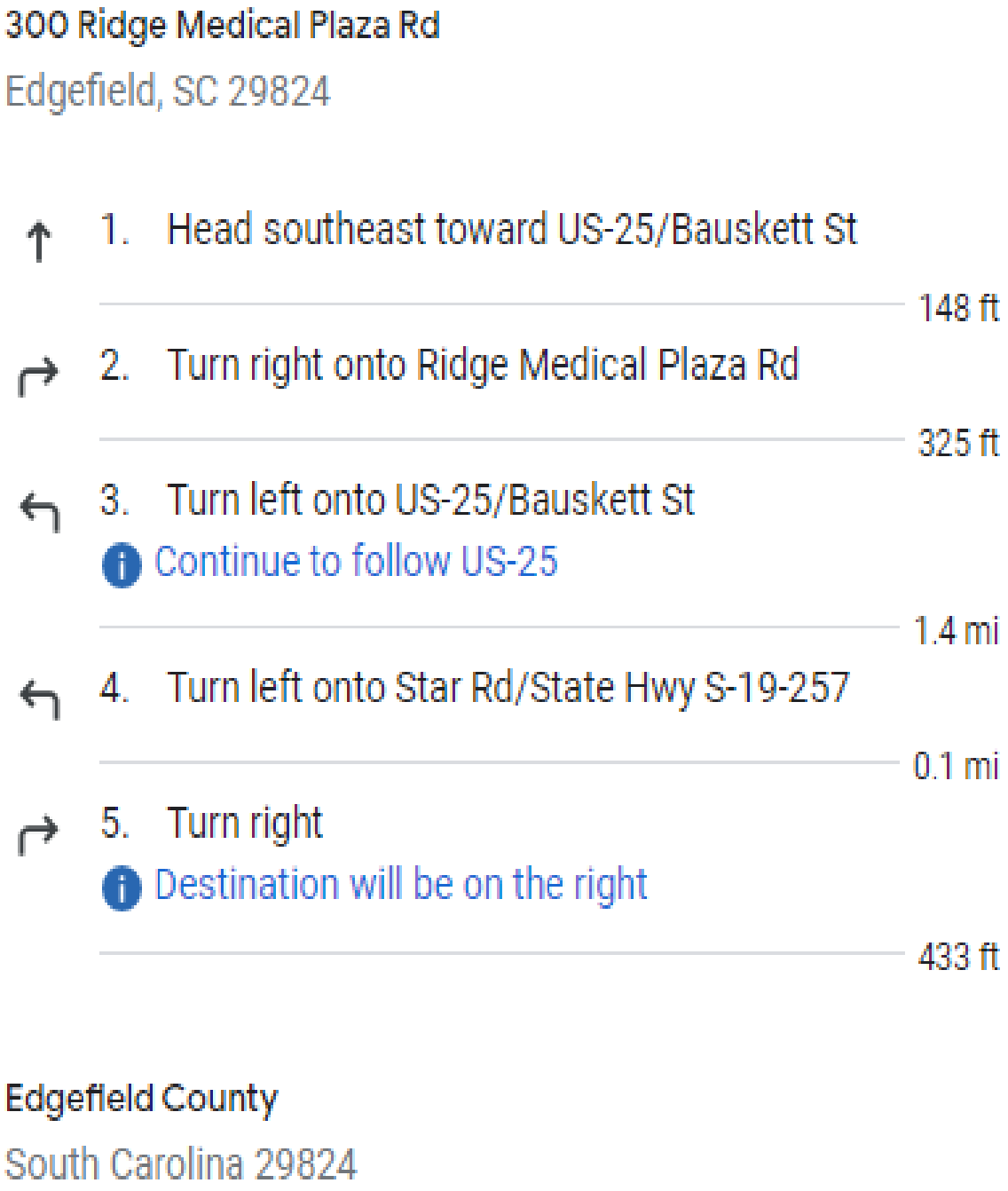
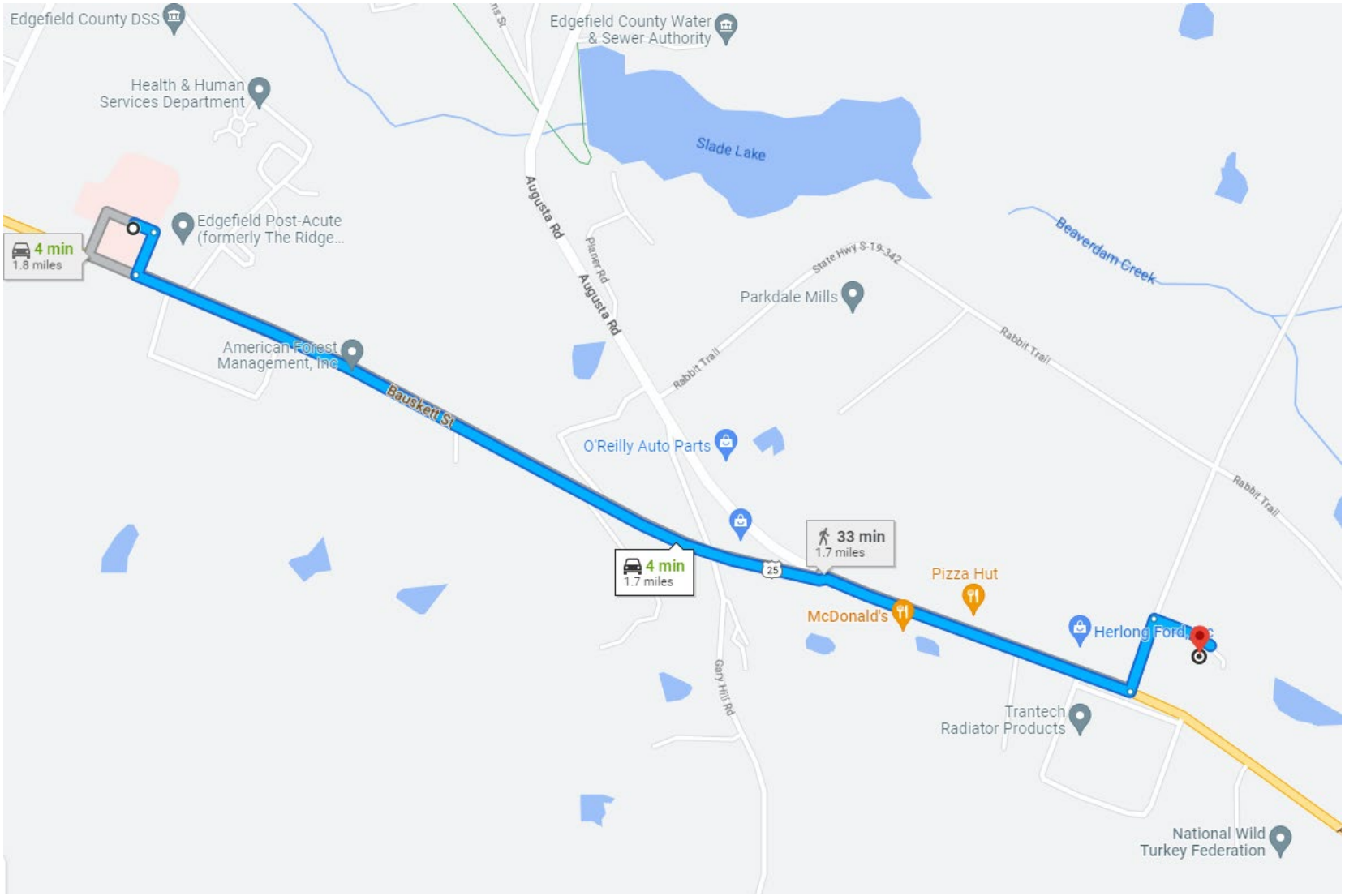


Figure C
Hospital Route Map



Urgent Care Information, Route Map, and Driving Directions

Table C
Urgent Care Information

Category	Information
Facility Name	Piedmont Prompt Care at Sweetwater
Address	107 Walnut Lane, Suite 102
City, State	North Augusta, South Carolina
Phone	803-202-7110
MedCor	1-800-775-5866
Emergency Phone	911

Figure D
Hospital Route Driving Directions

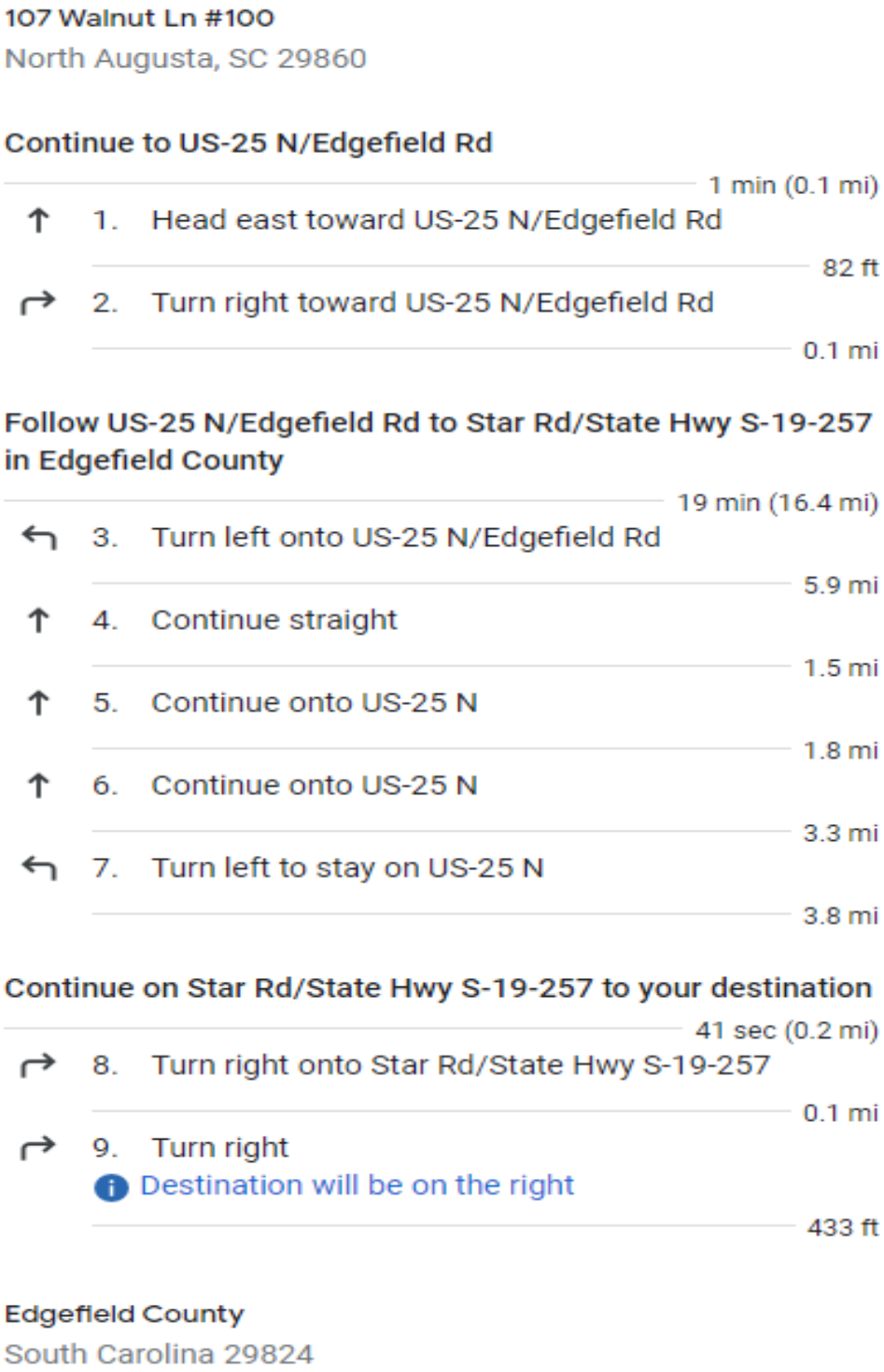
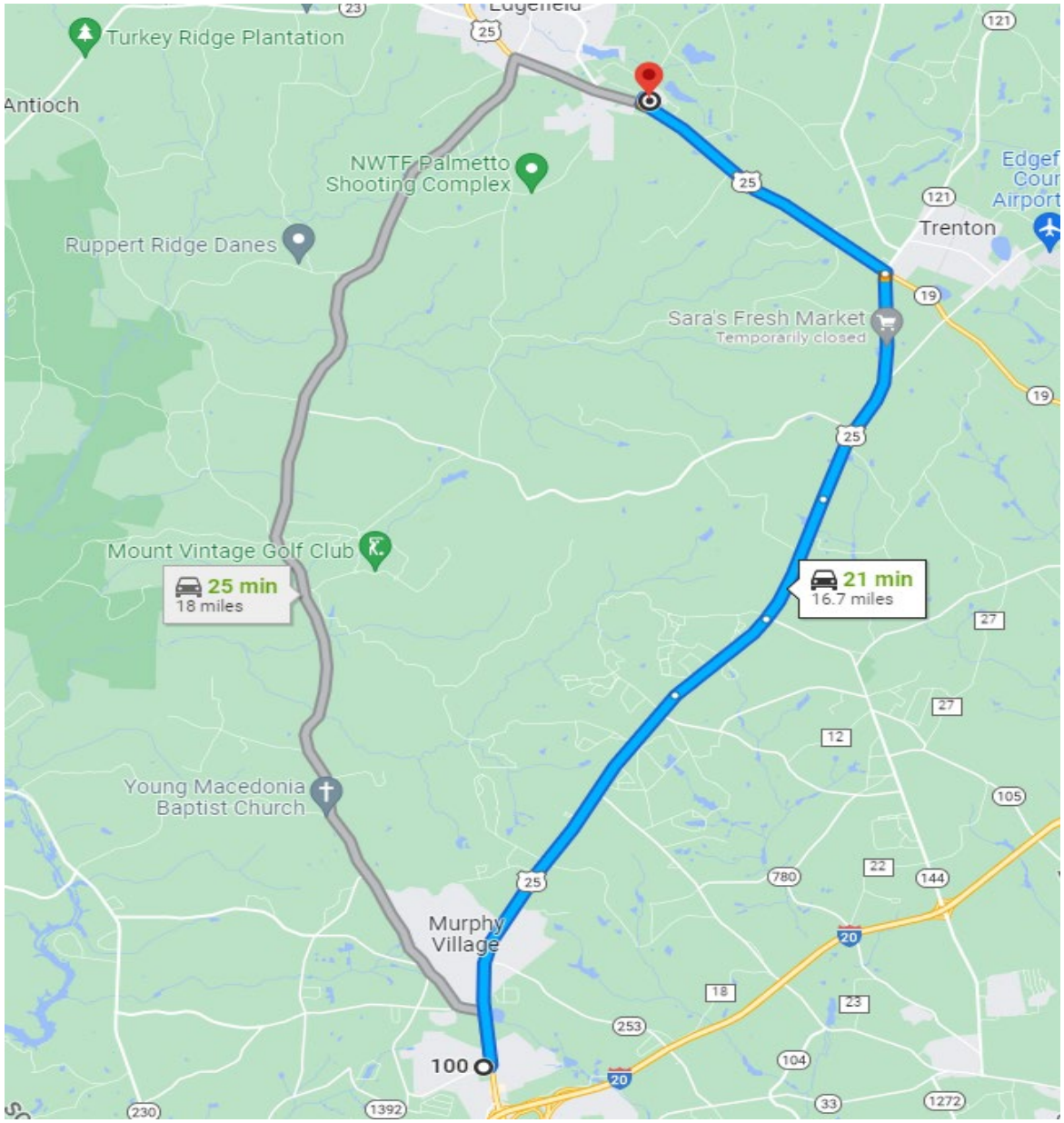


Figure E
Urgent Care Route Map



Care Management- MedCor Incident Intervention

CCI Environmental Services, in partnership with MedCor, Inc (an independent outside organization) has implemented a Telephonic Injury Triage Assessment Program. This program offers an immediate telephonic medical evaluation by a qualified licensed professional of an injured employee following a reported work-related incident as well as report generation. This program is designed to provide an immediate response to CCI valued employees who sustain a potential work-related injury as well as assist operations personnel by generating valuable reports about the injury at the conclusion of each call.

- Upon notification of a potential work-related injury, the supervisor/manager will initiate a call to MedCor on behalf of the injured employee.
- The injured employee will detail any medical symptoms or complaints which will be evaluated by a Registered Nurse (RN) specially trained to perform telephonic triage
- The RN will recommend first aid self-treatment or refer the injured employee for an off-site medical evaluation by a CCI panel provider
- The RN will fax after-care instruction sheets in English or Spanish to a designated location at the workplace for the injured employee at the conclusion of the call, which will summarize any recommended self-treatment protocol
- For all injuries that are called to the service, standardized reports will be generated at the conclusion of the call that capture the most important information relative to the potential work-related injury that was reported
- For off-site medical evaluation referrals, the RN can send paperwork to the provider if requested to do so at service startup.

Timely reporting is an essential practice for all potential work-related injuries to ensure the best possible outcomes.

All employees should utilize this service if a workplace injury or illness occurs on any De Maximis site.

For non-emergency events, notify De Maximis immediately, preferably before the injured person istransported offsite for treatment.

For emergencies, notify De Maximis as soon as possible, but do not allow the notification to delay medical care. See emergency response procedure below.

Key Safety Personnel

The following people share responsibility for health and safety at the site. See Section 3 of this Health and Safety Plan (HASP) for a description of the role and responsibility of each.

O & M Project Manager: Christopher Fuerst	Phone: 865-816-0986
CCI Project Manager: Keith Burch	Phone: 704-650-1298
CCI Project Supervisor: Sean Tucker	Phone: 336-456-0157
Health & Safety Manager: Spencer Epps	Phone: 704-576-8181

Emergency Response Procedures

In the event of an emergency, immediate action must be taken by the first person to recognize the event. Use the following steps as a guideline:

- Survey the situation to verify that it is safe for you and the victim. Do not endanger your own life. Do not enter an area to rescue someone who has been overcome unless properly equipped and trained. Verify that all protocols are followed. If applicable, review Safety Data Sheets (SDS) to evaluate response actions for chemical exposures.
- Call the appropriate emergency number (911, if available) or direct someone else to do this immediately (see Table A). Explain the physical injury, chemical exposure, fire, or release and location of the incident.
- Notify on-Site De Maximis personnel.
- Have someone retrieve the nearest first aid kit (containing appropriate items for the work scope) and Automated External Defibrillator (AED), if available. Note: Only use an AED if you have been properly trained and are currently certified to do so.
- Administer first aid and cardiopulmonary resuscitation (CPR), if properly trained, until emergency responders arrive.
- Notify the Project Manager (PM), Field Supervisor (FS), and owner.
- Notify De Maximis Project Manager or Alternative De Maximis Contact, if De Maximis Project Manager is not immediately available.
- Complete the appropriate incident investigation reports.
- If evacuation is required, the FS must perform a head count to verify that all CCI Environmental Services personnel have been accounted for.

First Aid and CPR Guidelines

Personnel qualified and current in basic first aid and/or CPR procedures may perform those procedures as necessary. Personnel qualified and current in basic first aid and/or CPR are protected under Good Samaritan policies if they only perform the basic tasks that they were taught. Do not perform first aid and/or CPR tasks if you have not been trained in first aid and/or CPR.

Injury Management/Incident Notification

Observe the following injury management/incident notification procedures and practices for emergency and non-emergency events. Please refer to Appendix A for the Health and Safety Incident Flowchart:

Injury Management

- Once a personal injury incident is discovered, the first action will be to ensure that the injured party receives appropriate medical attention and determine if the incident appears tobe an emergency or non-emergency incident.
- If it is safe to do so, the nearest workers will immediately assist a person who shows signs of medical distress or who is involved in an accident.

Non-Emergency Incident Procedure

- Notify CCI Environmental Services Field Supervisor.
- CCI Environmental Services Field Supervisor/Subcontractor will call the company-specific first-aid hotline (i.e., MedCor Hotline –1-800-775-5866).
- CCI Environmental Services Field Supervisor notifies CCI H&S Manager
- CCI H&S notifies CCI Project Manager.
- CCI Environmental Services Project Manager notifies De Maximis Project Manager.

Emergency Incident Procedure

- Call 911 or the appropriate emergency number and/or render first aid as soon as possible.
- Escort the injured person to the occupational clinic or hospital or arrange for an ambulance.
- Directly after caring for an injured person, the FS will be summoned. The FS will immediately contact the PM or other designated individual to alert them of themedical emergency. The FS will advise them of the following:
- Location of the victim at the work site
- Nature of the emergency
- Whether the victim is conscious
- Specific conditions contributing to the injury, if known
- Contact the PM (if not contacted previously) and owner immediately.
- Contact De Maximis Project Manager. If the De Maximis project manager is not available, do not only leave a voicemail; also call the alternative De Maximis contact specified in Table A or other De Maximis contact if alternate contact is not available.
- The PM will contact upper line management, including the CCI Health and Safety Manager.
- The H&S manager will facilitate the incident investigation.

All client requirements pertinent to personal injury incident reporting will also be adhered to.

Incident Other Than Personal Injury

All incidents including, but not limited to, fire, explosion, property damage, or environmental release will be responded to in accordance with the site-specific HASP. In general, this includes securing the site appropriate to the incident, turning control over to the emergency responders, or securing the site and summoning appropriate remedial personnel or equipment. CCI Environmental Services will immediately notify the client of any major incident, fire, equipment or property damage, or environmental incident with a preliminary report. A full report will be provided within 72 hours.

Near-Miss Reporting

All near-miss incidents (those that could have reasonably led to an injury, environmental release, or other incident) must also be reported to the FS and/or PM immediately so they can take action to verify that such conditions that led to the near-miss incident can be readily corrected to prevent future occurrences. Fill out the Near Miss report form and text a picture of it to CCI H&S Manager also notify the De Maximis PM of near-miss incidents.

Spills and Releases of Hazardous Materials

When required, notify the National Response Center and local state agencies. The following information should be provided to the National Response Center:

- Name and telephone number
- Name and address of facility
- Time and type of incident
- Name and quantity of materials involved, if known
- Extent of injuries
- Possible hazards to human health or the environment outside of the facility

The emergency telephone number for the National Response Center is 1-800-424-8802. If hazardous waste has been released or produced through control of the incident, verify that:

- Waste is collected and contained
- Containers of waste are removed or isolated from the immediate site of the emergency
- Treatment or storage of the recovered waste, contaminated soil or surface water, or any other material that results from the incident or its control is provided
- No waste that is incompatible with released material is treated or stored in the facility until cleanup procedures are completed

Verify that all emergency equipment used is decontaminated, recharged, and fit for its intended use before operations are resumed.

ABBREVIATIONS

AED	Automated External Defibrillator
ANSI	American National Standards Institute
APR	Air-Purifying Respirator
ASTM	ASTM International
CCI	Contaminant Control Inc.
CFR	Code of Federal Regulations
COC	chemical of concern
CPR	cardiopulmonary resuscitation
CRZ	Contamination Reduction Zone
dbA	A-weighted decibel
dB	decibel
DEQ	Department of Environmental Quality
EPA	U.S. Environmental Protection Agency
eV	electron volts
EZ	Exclusion Zone/Hot Zone
FID	flame ionization detector
FS	Field Supervisor
GFCI	ground-fault circuit interrupter
H:V	horizontal to vertical
H&S	Health & Safety
HASP	Health and Safety Plan
HAZMAT	Hazardous Materials
HAZWOPER	Hazardous Waste Operations and Emergency Response
HEPA	High Efficiency Particulate Air
JSA	Job Safety Analysis
kV	kilovolts
LEL	lower explosive limit
LO/TO	lockout/tagout

NIOSH	National Institute for Occupational Safety and Health
NPL	National Priority List
NRR	Noise Reduction Rating
OSHA	Occupational Safety and Health Act or Administration
OV	organic vapor
OVM	organic vapor monitor
PAH	polycyclic aromatic hydrocarbon
PE	Professional Engineer
PEL	Permissible Exposure Limit
PG	Professional Geologist
PFD	personal flotation device
PID	photoionization detector
PM	Project Manager
PPE	personal protective equipment
ppm	parts per million
RCRA	Resource Conservation and Recovery Act
SDS	Safety Data Sheets
SVOC	semi volatile organic compound
SZ	Support Zone/Clean Zone
TLV	Threshold Limit Value
TWA	time-weighted average
USCG	U.S. Coast Guard
UST	underground storage tank
UV	ultraviolet
VOC	volatile organic compound

1. Introduction

This Health and Safety Plan (HASP) has been prepared on behalf of De Maximis presents health and safety requirements and procedures that will be followed by CCI Environmental Services personnel and, at a minimum, by its subcontractors (if any) during work activities at the De Maximis Soil Remediation in Goldsboro, NC (the Site). This HASP has been developed in accordance with Title 29 of the Code of Federal Regulations (CFR), Part 1910.120 (b), and will be used in conjunction with CCI Environmental Services Corporate Health and Safety Program. See Section 1.1 for HASP modification procedures. This HASP also references and cites where appropriate, specific OSHA, US EPA, US DOT, MSHA, State or local regulations applicable to the work outline in this plan.

The provisions of this HASP are mandatory for all CCI personnel assigned to the project. A copy of this HASP must always be maintained on Site and available for employee review. CCI subcontractors are also expected to follow the provisions of this HASP unless they have their own HASP that covers their specific activities related to this project. Any subcontractor HASPs must include the requirements set forth in this HASP, at a minimum. All visitors to the work site must also abide by the requirements of this HASP and will attend a pre-work briefing where the contents of this HASP will be presented and discussed.

Personnel assigned to work at the project site will be required to read this plan and must sign the Health and Safety Plan Acknowledgement Form to confirm that they understand and agree to abide by the provisions of the HASP.

Subcontractors are ultimately responsible for the health and safety of their employees. Subcontractors may mandate health and safety protection measures for their employees beyond the minimum requirements specified in this HASP.

The objectives of this HASP are to identify potential physical, chemical, and biological hazards associated with field activities; establish safe working conditions and protective measures to control those hazards; define emergency procedures; and describe the responsibilities, training requirements, and medical monitoring requirements for site personnel.

This HASP prescribes the procedures that must be followed during specific site activities. Significant operational changes that could affect the health and safety of personnel, the community, or the environment will not be made without the prior approval of the Project Manager (PM) and the Health and Safety Manager.

Issuance of this approved plan documents that the workplace has been evaluated for hazards. A hazard assessment has been performed and the adequacy of the personal protective equipment (PPE) selected was evaluated as required by 29 CFR 1910.132(d) – Personal Protective Equipment, General Requirements (general industry); 1910.134 – Respiratory Protection; 1926.28 – Personal Protective Equipment (construction industry); and 1926.55 – Gases, vapors, fumes, dusts and mist, and is duly noted by the signature(s) and date appearing on the certification page of this document.

1.1. Health and Safety Plan Modifications

This HASP will be modified by amendment, if necessary, to address changing field conditions oradditional work tasks not already described in this document. Modifications will be proposed by the Field Supervisor (FS) and will be reviewed by the H&S Manager or authorized representative and approved by the PM.

1.2. Daily Site Safety Meetings

Daily “tailgate” meetings will be held at the start of each shift to ensure all personnel understandcurrent site conditions and operations to be conducted. These meetings will cover any operational issues or abnormalities in operation during the prior shift. Additionally, these daily site safety meetings will be used to ensure that personnel understand the specified use of personal protective equipment (PPE), air monitoring equipment, tools, chemicals, etc., for this project as well as to address general site health and safety concerns. Any amendments to the HASP will also be reviewed at these meetings.

1.3. Health and Safety Plan Acknowledgement

The Project Manager shall be responsible for informing all personnel at the site for whom CCI Environmental has engaged, of the contents of this plan and ensuring that each person workingfor CCI Environmental signs the Safety Plan Acknowledgement Form.

By signing the Health and Safety Plan Acknowledgement Form, these individuals are responsible for recognizing the hazards present on-site and understanding the means specified for the elimination or control of these hazards for the protection of human health andthe environment.

2. Site Description, Background, & Scope of Work

Background:

The area to be worked in is the former Federal Pacific Electric (FPE) Company manufacturing site located in Edgefield, South Carolina. Based on the historic soil data collected and reported for the FPE Edgefield Site (Site), including the *Phase II Source Area Investigation Report,* Arcadis, 15DEC2014, and *Phase III Source Area Investigation Report*, Arcadis, 27JAN2016, three primary source areas have been identified: Area 1—Drum Burial Area; Area 7—Degreasing Operational Area; and Area 8—Former Paint Bed Drying Area. A summary of work performed within each primary source areas is provided below:

Area 1—Drum Burial Area (DBA)
Drum excavation activities completed in 1999 are summarized in ATC's Report of Drum Removal Activities. The report explains the breakdown of the DBA into 11 excavation areas ranging in depths from 3 to 11 feet. The three largest areas (Area D, H, and J identified in the ATC report) covered most of the area and were excavated to depths ranging from 6 to 11 ft. Clean backfill was reported to be used in the excavated areas. Backfill was completed with the stockpiled soils from the area that was not stained or highly impacted.

Area 7—Degreasing Operational Area (DOA)
The former manufacturing building was demolished in 2015, leaving only the building slab in place. The DOA characterization included samples from under the slab and no work altering the soil was reported to be completed in that area.

Area 8—Paint Bed Drying Area (PBDA)
When excavating in 1997, ATC and their subcontractor excavated to approximately 12-14 feet. Excavation was stopped to prevent the excavation of groundwater. According to the 1997 "Former Paint Sludge Drying Bed Closure Report," the soil became increasingly moist, indicative of groundwater saturation. The report also specifies clean backfill was brought in to fill the excavated areas back to previous grade. With operation of the onsite pumping since 2009, the depth to water has increased 10-15 feet.

Scope of Work:

The project involves soil excavation from three areas of the Site, soil treatment via aeration/agitation open excavation oxidizer treatment (by others), placement of treated soils back into excavation, and restorations. Provisions are to be made for off-site disposal of any soil not meeting treatment standards, including any off-site borrow for backfilling.

Mobilization

CCI proposes mobilization of the following resources to this project:

Labor	Equipment	Materials
(1) Supervisor	(3) Service Trucks	Tools & Expendables
(2) Operators	(2) 200 Excavator w/thumb	PPE & Poly
(2) Technicians	(1) Track Skid steer	Fuel
(2) Truck Drivers	(1) Tow Behind Storage Trailer	Orange Fencing
	(1) Long Reach Excavator	Backfill (if needed)
	(1) Dozer	E&SC Materials
	(1) Wheel Loader	Geotextile Fabric
	(1) Trash Pump & Hose	Stone
	(1) Frac Tank (if needed)	
	Shoring Systems	
	Crane for Installation	
	Vibratory Hammer (shoring)	
	Hydraulic Breaker—Concrete	
	(2) CCI Dump Trucks	
	Two Way Radios	
	LEL/O2 Monitor	
	CO Monitor	
	Water Truck or Buffalo	
	Bag Filter Pod (if needed)	

All CCI personnel assigned to this project will be 40 Hour OSHA HAZWOPER trained with current refresher training and medical monitoring documentation.

Following the work, the equipment will be decontaminated and demobilized. A final report will be submitted to include all manifests, weight tickets and fill tickets.

3. Authority and Responsibility of Key Personnel

This section describes the authority and responsibilities of key CCI project personnel. The names and contact information for the following key safety personnel are listed in the Site Emergency Procedures section at the beginning of this HASP. Should key site personnel change during the project, a new list will be established and posted immediately at the Site.

3.1. Project Manager

The PM provides overall direction for the project. The PM is responsible for ensuring that the project meets the client's objectives in a safe and timely manner. The PM is responsible for providing qualified staff for the project and adequate resources and budget for the health and safety staff to carry out their responsibilities during the field work. The PM will be in regular contact with the Field Supervisor (FS) and H&S Manager to verify that appropriate health and safety procedures are implemented into each project task.

The PM has authority to direct response operations; the PM assumes total control over project activities but may assign responsibility for aspects of the project to others. In addition, the PM performs the following tasks:

- Oversees the preparation and organization of background review of the project, the workplan, and the field team
- Verifies that the team obtains permission for site access and coordinates activities withappropriate officials
- Briefs the FS and field personnel on specific assignments
- Together with the FS, sees that health and safety requirements are met
- Consults with the H&S Manager regarding unsafe conditions, incidents, or changes in siteconditions or the scope of work.

3.2. Field Supervisor

The FS reports to the PM, has authority to direct response operations, and assumes control over on-site activities. The FS will direct field activities, will coordinate the technical and health and safety components of the field program, and is responsible in general for enforcing this site-specific HASP and Corporate Health and Safety Program requirements.

- The FS will be the primary point of contact for all field personnel and visitors and has direct responsibility for implementation and administration of this HASP. The FS and any other member of the field crew have **STOP WORK AUTHORITY**—the authority to stop orsuspend work in the event of an emergency, if conditions arise that pose an unacceptable health and safety risk to the field crew or environment, or if conditions arisethat warrant revision or amendment of this HASP. It is critical that both the FS and PM communicate regularly to proactively identify and address any safety-related concerns that may arise. The following include, but are not necessarily limited to, the functions of the FS related to this HASP:
- Conduct and document daily safety meetings, or designate an alternate FS in his or herabsence

- Execute the work plan and schedule
- Conduct periodic field health and safety inspections to verify compliance with this HASP
- Oversee implementation of safety procedures
- Implement site personnel protection levels
- Enforce site control measures to help verify that only authorized personnel are allowedon site
- Notify, when necessary, local public emergency officials (all personnel on site mayconduct this task as needed)
- Follow-up on incident reports to the PM
- Periodically inspect protective clothing and equipment for adequacy and safetycompliance
- Verify that protective clothing and equipment are properly stored and maintained
- Perform or oversee air monitoring (if required) in accordance with this HASP
- Maintain and oversee operation of monitoring equipment and interpretation of data fromthe monitoring equipment
- Monitor site personnel for signs of stress, including heat stress, overexertion, coldexposure, and fatigue
- Require participants to use the “buddy” system in performing tasks
- Provide (via implementation of this HASP) emergency procedures, evacuation routes, and telephone numbers for the local hospital, poison control center, fire department, andpolice department
- Communicate incidents promptly to the PM
- Maintain communication with the H&S Manager on site activities
- If applicable, verify that decontamination and disposal procedures are followed
- Maintain the availability of required safety equipment
- Advise appropriate health services and medical personnel of potential exposures
- Notify emergency response personnel in the event of an emergency and coordinateemergency medical care
- Is responsible for implementing injury and illness management plan and notifications.

The FS will record health-and-safety-related details of the project in the field logbook. At a minimum, each day’s entries must include the following information:

- Project name or location
- Names of all on-site personnel and visitors and De Maximis personnel that visit the Site.
- Level of PPE worn and any other specifics regarding PPE
- Weather conditions
- Type of field work being performed

The FS will have completed the required Occupational Safety and Health Administration (OSHA) 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training and annual updates, the 8-hour Supervisor training, medical monitoring clearance,

and current first aid and cardiopulmonary resuscitation (CPR) training. Other certifications or training may be stipulated based on client or site requirements.

3.3. Site Safety Officer (SSO)

The SSO reports all site-specific safety issues and concerns to the Project Manager and Safety Manager. He is responsible for daily implementation of the HASP, including such issues as PPE,training, policy enforcement, health monitoring, and report preparation, among others. He is also responsible for decontamination procedures, equipment, and supplies.

- Ensure protective clothing used is consistent with the requirements of the HASP.
- Periodically inspects protective clothing and equipment.
- Ensures that PPE is properly stored and maintained.
- Controls entry and exit at the Access Control Points.
- Coordinates safety and health program activities with on-site essential personnel.
- Confirms each crewmember’s suitability for work based on a physician’srecommendations.
- Operates and maintains monitoring equipment as appropriate, including the placementand management of up to three DustTrak Particulate Monitors.
- Monitors the “work parties" for signs of stress, such as cold exposure, heat stress, andfatigue.
- Monitors on-site hazards and conditions.
- Recommends work stoppage as deemed necessary to protect human health and theenvironment.
- Participates in the preparation of and the implementation of the HASP.
- Conducts periodic inspections to determine if the HASP is being followed.
- Enforces the “buddy” system.
- Set up decontamination lines and decontamination solutions appropriate for the type of chemical contamination on site.
- Controls the decontamination of all equipment, personnel, and samples from thecontaminated areas.
- Assists in the disposal of contaminated clothing and materials.
- Ensures that all the required equipment is available.
- Advise medical personnel of potential exposures and consequences.
- Is aware of site emergency procedures, evacuation routes, and the telephone numbers ofthe ambulance service, local hospital, poison control center, fire department, and police department.
- Notifies, when necessary, local emergency officials.
- Coordinates emergency medical care.
- Completes and submits Daily Reports.

3.4. H&S Manager

The H&S Manager (or designee) is responsible for managing on-site health and safety activities andwill provide support to the PM and FS on health and safety issues. The following are specificduties of the H&S Manager:

- Provide technical input into the design and implementation of this HASP
- Advise on the potential for occupational exposure to project hazards, along withappropriate methods and/or controls to eliminate site hazards
- Verify that a hazard assessment has been performed and that the adequacy of the PPEselected was evaluated as required by 29 CFR 1910.132(d), 1910.134, 1926.25, and 1926.55, and is noted by the signatures and date appearing on the Certification Page of this document
- Consult with the FS on matters relating to suspending site activities in the event of anemergency
- Verify that all on-site CCI Environmental Services personnel and subcontractors haveread and signed the HASP Acknowledgement Form
- Verify that corrective actions resulting from deficiencies identified by audit andobservations are implemented and effective
- Assist with management of all injuries and illnesses.

The H&S Manager or his/her designee will have completed the required OSHA 40-hour HAZWOPER training and annual updates, as well as the 8-hour Supervisor training, and will have medical monitoring clearance. In addition, the H&S Manager or his/her designee will have current training in first aid and CPR.

3.5. Project Field Team

All project field team members will attend a project-specific meeting conducted by the FS concerning safety issues and project work task review before beginning work on site. All field crew, including subcontractors, must be familiar with and comply with this HASP. The field crew has the responsibility to immediately report any potentially unsafe or hazardous conditions to the FS, and all members of the field crew have **STOP WORK AUTHORITY**—the authority to stop or suspend work if conditions arise that pose an unacceptable health and safety risk to the field crew or environment, or if conditions arise that warrant revision or amendment of this HASP. It is critical that all field team members proactively communicate with the FS to identify potential unsafe conditions. The field team reports to the FS for on-site activities and is responsible for the following:

- Reviewing and maintaining a working knowledge of this HASP
- Safe completion of on-site tasks required to fulfill the work plan
- Compliance with the HASP
- Attendance and participation in daily safety meetings
- Notification to the FS of existing or potential safety conditions at the site
- Reporting all incidents and injuries to the FS
- Demonstrating safety and health-conscious conduct

Per OSHA 1910.120(e)(3)(i)[1], newly assigned HAZWOPER 40-hour trained field team members must have at least 3 days of field work supervised by an experienced FS (preferably an individual with HAZWOPER Supervisor training). It is the responsibility of the PM to identify such “short service” personnel and verify that their supervised field experience occurs (or has occurred) and is documented in the project field notes and on the Daily Safety Briefing form (Appendix A).

[1] “General site workers (such as equipment operators, general laborers and supervisory personnel) engaged in hazardous substance removal or other activities which expose or potentially expose workers to hazardous substances and health hazards shall receive a minimum of 40 hours of instruction off the site, and a minimum of three days actual field experience under the direct supervision of a trained experienced supervisor.”

4. Project Specific Requirements

This section provides activity-specific levels of protection and air monitoring requirements to be used on this site based on the scope of work and the COCs.

4.1. Activity-Specific Level of Protection Requirements

Refer to Section 8 of this plan for general requirements for PPE. Level D is the minimum acceptable level for this site and most sites. An upgrade to Modified Level D occurs when thereis a possibility that contaminated media can come in contact with the skin or work uniform. An upgrade to Level C occurs when there is a potential for exposure to airborne COCs (i.e., if the results of air monitoring reveal that action levels have been exceeded). Hearing protection earmuffs must be worn when there are high noise levels. Site personnel must maintain proficiency in the use and care of PPE that is to be worn.

5. Risk Analysis and Control

The following sections discuss the potential health and safety hazards associated with the field tasks described in the scope of work. Controls of these hazards are addressed through mechanical and physical control measures, use of PPE, monitoring, training, decontamination, emergency response, and safety procedures.

Significant changes in the scope of work covered by this HASP must be communicated to the PM, H&S Manager, and De Maximis PM, and an amendment to this HASP must be created as needed. Any task conducted beyond those identified in the scope of work and this HASP must be evaluated using the Job Safety Analysis (JSA) process prior to conducting the work.

5.1. Job Safety Analysis

CCI Environmental Services work tasks have been evaluated for their hazards, and JSA documents have been developed that detail the chemical, physical, and biological hazardsassociated with these tasks, along with the control measures (e.g., engineering controls, administrative controls, and/or PPE) that will be used to conduct them in a safe manner.

The PM, HSO, and FS are responsible for identifying work tasks and project site conditions thatare beyond the previously developed JSA documents and for communicating such information to the H&S Manager. The H&S Manager will provide support, as needed, to the PM and/or the FS, who will have primary responsibility to develop project specific JSAs.

The contents of the JSA documents shall be communicated to project personnel during the siteorientation meeting and during daily safety meetings when conducting work where the specific JSAs are applicable.

JSA documents applicable to this project are in Appendix B of this HASP

5.2. Augmented Job Safety Analysis Process

If significant work tasks are identified during the project that were not previously addressed in the JSA documentation supplied in Appendix B of this HASP, then a task specific JSA document must be developed at the project site prior to conducting the work. The PM and/or FS shall develop this document(s) with input from the H&S Manager, as needed, and this HASP will be amended to include the document. Project personnel shall be trained in the contents of the developed task specific JSA prior to itsimplementation. The De Maximis PM should review the out-of-scope/new JSA before use. A copy of the task specific JSA form used in this process is supplied in Appendix B of this HASP.

5.3. Chemicals of Concern Profile

Specific compounds and pertinent information on each are contained in the *Chemicals of Concern Quick Reference* table below. Table 5-1 provides a summary profile for the COCs forthis project. As available, this profile is based on recent site history and site characterization information. For more detailed and specific information, always refer to the Safety Data Sheet(SDS) or equivalent information for the chemical (see Appendix C). Inhalation, ingestion, absorption, and injection exposure routes will be controlled through proper use of PPE. Assessment of the potential for contact with contaminants will be used to guide selection of appropriate PPE. The primary source of direct contact with site chemicals expected is from airborne dusts and vapors.

5.3.1 Exposure Routes

Possible routes of exposure to the chemicals potentially encountered on this project include inhalation, and ingestion of dust. Exposure will be minimized by using safe work practices andby wearing the appropriate PPE. A further discussion of PPE requirements is presented in Section 8.

5.3.2 Inhalation

Inhalation of particulates or dust during field activities is possible. Whenever possible, workactivities will be oriented so that personnel are upwind of the sampling location.

5.3.3 Ingestion

Direct ingestion of contaminants can occur by inhaling airborne dust or by swallowing contaminants trapped in the upper respiratory tract. Indirect ingestion can occur by introducing the contaminants into the mouth by way of food, tobacco, fingers, or other carriers. Although ingestion of contaminants can occur, proper hygiene, decontamination, and contamination reduction procedures should reduce the probability of this route of exposure. No eating, drinking, or other activities that involve hand to mouth contact shall occur in the exclusion zone. All personnel must thoroughly wash their face, hands, and neck prior to hand to mouth activities.

5.3.4 Fomite Transfer

Contamination can be easily spread outside of the exclusion zone to vehicles, residences, andmore on shoes, clothing, skin, etc. As such, thorough and effective decontamination shall be employed to ensure contaminants are not mechanically transmitted outside of the exclusion zone.

Table 5-1: Chemicals of Concern Profile

ETHYLENE DICHLORIDE (1,2-DICHLOROETHANE)†

Chemical Identification			
CAS #	107-06-2		
Formula	$C_2H_4Cl_2$		
Synonyms	1,2-dichloroethane; ethylene chloride; glycol dichloride		
Physical Properties			
Physical description	Colorless liquid with a pleasant, chloroform-like odor.		
Boiling point	182°F	**Molecular weight**	98.96
Freezing point/melting point	-32°F	**Vapor pressure**	64 mmHg
Flash point	56°F	**Vapor density**	3.4
Specific gravity	1.24	**Ionization potential**	11.05 eV
Lower explosive limit (LEL)	6.2%	**Upper explosive limit (UEL)**	16%
NFPA health rating	2	**NFPA fire rating**	3
NFPA reactivity rating	0	**NFPA special instruction**	
Vapor hazard ratio (VHR)			
Historical exceedance percentage			

Chemical Identification			
Target organs			
Monitoring Methods Used by OSHA			
Analyte code (IMIS no.)	0874		
Sampling group			
Sampler/Sampling media	CSC tube (100/50 mg) [SKC 226-01]		
Sampling time*	50 min		
Sampling volume (TWA)*	10 L		
Sampling flow rate (TWA)*	0.2 L/min		
Sampling volume (STEL/Peak/C)*			
Sampling flow rate (STEL/Peak/C)*			
Analytical method instruments	GC-ECD		
Method reference	OSHA 3 (fully validated)		

Monitoring Methods Used by OSHA				
Notes				
Special requirements				

· All sampling instructions above are recommended guidelines for OSHA Compliance Safety and Health Officers (CSHOs), please see the corresponding OSHA method reference for complete details.

Wipe Method	
Sampler/Sampling media	

Bulk Method

On-Site Screening Techniques					
Device	Detector tube	Detector tube			
Model/Type	Gastec 135L	Matheson-Kitagawa 8014-235S			
Sampling information (see manufacturer instructions)	0.5-2 strokes; 16-1040 ppm range; uncertainty 16% for 100-300 ppm, 8% for 300-1040 ppm	1 stroke; approx 5-160 ppm range			

Exposure Limits

On-Site Screening Techniques							
OSHA PEL 8-hour TWA (ST) STEL (C) Ceiling Peak		**NIOSH REL** Up to 10-hour TWA (ST) STEL (C) Ceiling		**ACGIH TLV©** 8-hour TWA (ST) STEL (C) Ceiling		**CAL/OSHA PEL** 8-hour TWA (ST) STEL (C) Ceiling Peak	
PEL-TWA	50 ppm (200 mg/m³)	**REL-TWA**	1 ppm (4 mg/m³)	**TLV-TWA**	10 ppm [1977]	**PEL-TWA**	1 ppm (4 mg/m³)
PEL-STEL		**REL-STEL**	2 ppm (8 mg/m³)	**TLV-STEL**		**PEL-STEL**	2 ppm (8 mg/m³)
PEL-C	100 ppm [5 min any 3 hrs]; 200 ppm (Peak)	**REL-C**		**TLV-C**		**PEL-C**	200 ppm
Skin notation	N	**Skin notation**	N	**Skin notation**	N	**Skin notation**	N
Notes: See 29 CFR 1910.1000 Table Z-2. OSHA Construction and Maritime Industry PEL is 50 ppm (200 mg/m³) as an 8 HR TWA only. See 29 CFR 1926.55 Table 1 and 29 CFR 1915.1000 Table Z-Shipyards.		**Notes:** CARCINOGEN (Ca): REDUCE EXPOSURE TO LOWEST FEASIBLE CONCENTRATION. See Appendix A and Appendix C, Supplementary Exposure Limits (Chloroethanes)..		**Notes:**		**Notes:**	
Health factors: See NIH-NLM PubChem.		**IDLH**	50 ppm				

On-Site Screening Techniques

Carcinogenic classifications: IARC-2B, NIOSH-Ca, NTP-R, TLV-A4, EPA-B2	**Notes:** Ca		

AIHA emergency response planning guidelines - ERPG-1/ERPG-2/ERPG-3:
50 ppm/200 ppm/300 ppm

Additional Resources and Literature References

NOAA: CAMEO Chemicals - Ethylene dichloride

NIOSH: Pocket Guide to Chemical Hazards - Ethylene dichloride

Literature References

- ACGIH: *Documentation of the Threshold Limit Values (TLVs) and Biological Exposure Indices (BEIs)* - Ethylene dichloride. See annual publication for most recent information.
- EPA Air Toxics Website: Ethylene Dichloride (1,2-Dichloroethane). U.S. Environmental Protection Agency Technology Transfer Network
- Bowler, R.M., Gysens, S. and Hartney, C.: Neuropsychological effects of ethylene dichloride exposure. *Neurotoxicology* 24(4-5): 553-562, 2003.
- Guengerich, F.P., Kim, D.H. and Iwasaki, M.: Role of human cytochrome P-450 IIE1 in the oxidation of many low molecular weight cancer suspects. *Chem. Res. Toxicol.* 4(2): 168-179, 1991.
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PERCHLOROETHYLENE (TETRACHLOROETHYLENE)†

Chemical Identification			
CAS #	127-18-4		
Formula	C_2Cl_4		
Synonyms	tetrachloroethylene, carbon bichloride, 1,1,2,2-tetrachloroethylene, 1,1,2,2-tetrachloroethene		
Physical Properties			
Physical description	Colorless liquid with a mild, chloroform-like odor.		
Boiling point	250°F	**Molecular weight**	165.8
Freezing point/melting point	-2°F	**Vapor pressure**	14 mmHg
Flash point		**Vapor density**	5.83
Specific gravity	1.62	**Ionization potential**	9.32 eV
Lower explosive limit (LEL)		**Upper explosive limit (UEL)**	
NFPA health rating	2	**NFPA fire rating**	0
NFPA reactivity rating	0	**NFPA special instruction**	
Vapor hazard ratio (VHR)			
Historical exceedance percentage			
Target organs			

Monitoring Methods Used by OSHA			
Analyte code (IMIS no.)	2020	2020	
Sampling group	OVSG-1		
Sampler/Sampling media	CSC tube (100/50 mg) [SKC 226-01]	SKC 575-002 Passive Sampler [SKC 575-002]	
Sampling time*	240 min (≥1 min Peak; ≤5 min C)	<240 min TWA; >5min C, Peak	
Sampling volume (TWA)*	12 L		
Sampling flow rate (TWA)*	0.05 L/min		
Sampling volume (STEL/Peak/C)*	0.05 L (Peak); 0.25 L (C)		
Sampling flow rate (STEL/Peak/C)*	0.05 L/min		
Analytical method instruments	GC-FID	GC-FID	
Method reference	OSHA 5000 (fully validated)	OSHA 1001 (fully validated)	
Notes		To obtain sampling and analytical error similar to that available with active sampling, knowledge of the atmospheric pressure and temperature are required, and these should be obtained using NIST-traceable	

Monitoring Methods Used by OSHA				
		devices. If that is not possible, temperature is assumed to be 22.2 °C, and the atmospheric pressure is estimated based on the elevation of the sampling location. When estimates are used in place of traceable measurements the sampling and analytical error associated with passive sampling is substantially increased, and this makes it more difficult to demonstrate overexposures after considering the 95% lower confidence limit.		
Special requirements				

· All sampling instructions above are recommended guidelines for OSHA Compliance Safety and Health Officers (CSHOs), please see the corresponding OSHA method reference for complete details.

Wipe Method	
Sampler/Sampling media	

Bulk Method

On-Site Screening Techniques						
Device	Detector tubes	Detector tubes	Detector tubes	Detector tubes	Detector tubes	CMS Chip
Model/Type	Dräger - Perchloroethylene 0.1/a, 8101551; 2/a, 8101501; 10/b, CH30701	Gastec 133HA	Gastec 133L, 133LL	Gastec 133D	Matheson-Kitagawa 8014-135SA, 8014-243U, 8014-135SB, 8014-135SH	Perchloroethylene, 5-150 ppm range
Sampling information (see manufacturer instructions)	0.1/a: 3-9 strokes, 0.2-4 ppm range, uncertainty approx 33%. 2/a: 1-5 strokes, 2-300 ppm range, uncertainty approx 25%. 10/b: 3 strokes, 5-500 ppm range, uncertainty approx 25%	4 strokes, 0.05-50 ppm range, uncertainty 16% for 0.2-10 ppm, 8% for 10-50 ppm	0.5 - 2 strokes, 133L: 0.4-75 ppm range, uncertainty 16% for 2-5 ppm, 8% for 5-25 ppm. 133LL: 0.05-9 ppm range, uncertainty 16% for 0.2-1 ppm, 8% for 1-3 ppm	1-8 hours, 3-150 ppm range, uncertainty 25% for 25-50 ppm-h, 16% for 50-150 ppm-h	follow mfr instructions. 8014-135SA: approx 5-300 ppm range, 8014-243U: approx 5-160 ppm range, 8014-135SB: approx 1-10 ppm, 8014-135SH: 0.05-2% range	

Exposure Limits			
OSHA PEL 8-hour TWA (ST) STEL (C) Ceiling Peak	**NIOSH REL** Up to 10-hour TWA (ST) STEL (C) Ceiling	**ACGIH TLV©** 8-hour TWA (ST) STEL (C) Ceiling	**CAL/OSHA PEL** 8-hour TWA (ST) STEL (C) Ceiling Peak

On-Site Screening Techniques							
PEL-TWA	100 ppm	**REL-TWA**		**TLV-TWA**	25 ppm [1990]	**PEL-TWA**	25 ppm (170 mg/m³)
PEL-STEL		**REL-STEL**		**TLV-STEL**	100 ppm [1990]	**PEL-STEL**	100 ppm (685 mg/m³)
PEL-C	200 ppm; 300 ppm (Peak) [a single time up to 5 min for any 3 hrs]	**REL-C**		**TLV-C**		**PEL-C**	300 ppm
Skin notation	N	**Skin notation**	N	**Skin notation**	N	**Skin notation**	N
Notes: See 29 CFR 1910.1000 Table Z-2. The Construction and Maritime PEL is 100 ppm (670 mg/m³) as an 8 hr TWA. See 29 CFR 1926.55 Table 1 and 29 CFR 1915.1000 Table Z-Shipyards.		**Notes:** CARCINOGEN (Ca): REDUCE EXPOSURE TO LOWEST FEASIBLE CONCENTRATION (LOQ 0.4 ppm). See Appendix A		**Notes:** BEI®		**Notes:**	
Health factors: See NIH-NLM PubChem.		**IDLH**	150 ppm				

On-Site Screening Techniques

Carcinogenic classifications: IARC-2A, NIOSH-Ca, NTP-R, TLV-A3	**Notes:** Ca		

AIHA emergency response planning guidelines - ERPG-1/ERPG-2/ERPG-3: 100 ppm/200 ppm/1000 ppm

Additional Resources and Literature References

NOAA: CAMEO Chemicals - Perchloroethylene

NIOSH: Pocket Guide to Chemical Hazards - Tetrachloroethylene

Literature References

- EPA: Hazard Summary - Tetrachloroethylene
- ACGIH: *Documentation of the Threshold Limit Values (TLVs) and Biological Exposure Indices (BEIs)* - Tetrachloroethylene. See annual publication for most recent information.
- ANSI: USA Standard Acceptable Concentrations of Tetrachloroethylene. 1967.
- EPA IRIS Tetrachloroethylene, 2012
- IARC, Lancet Oncology, 13:1192-1193, 2011
- NIOSH: Criteria for a Recommended Standard - Occupational Exposure to Tetrachloroethylene. 1976.
- NIOSH: *Occupational Health Guideline for Tetrachloroethylene*. 1978.
- Gobba, F., Righi, E., Fantuzzi, G., Roccatto, L., Predieri, G., and Aggazzotti, G.: Perchloroethylene in alveolar air, blood, and urine as biologic indices of low-level exposure. *J. Occup. Environ. Med.* 45(11): 1152-1157, 2003.
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- Lash, L.H. and Parker, J.C.: Hepatic and renal toxicities associated with perchlorethylene. *Pharmacol. Rev.* 53(2): 177-208, 2001.
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- Ruder, A.M., Ward, E.M. and Brown, D.P.: Mortality in dry-cleaning workers: an update. *Am. J. Ind. Med.* 39(2): 121-132, 2001.

Last Updated Date : 06/06/2022

TRICHLOROETHYLENE†

Chemical Identification			
CAS #	79-01-6		
Formula	C_2HCl_3		
Synonyms	ethylene trichloride; TCE; trichloroethene; trilene		
Physical Properties			
Physical description	Colorless liquid (unless dyed blue) with a chloroform-like odor.		
Boiling point	189°F	**Molecular weight**	131.4
Freezing point/melting point	-99°F	**Vapor pressure**	58 mmHg
Flash point	>200°F	**Vapor density**	4.53
Specific gravity	1.46	**Ionization potential**	9.45 eV
Lower explosive limit (LEL)	8%	**Upper explosive limit (UEL)**	10.5%
NFPA health rating	2	**NFPA fire rating**	1
NFPA reactivity rating	0	**NFPA special instruction**	
Vapor hazard ratio (VHR)			
Historical exceedance percentage			
Target organs			

Monitoring Methods Used by OSHA			
Analyte code (IMIS no.)	2490	2490	
Sampling group	OVSG-1		
Sampler/Sampling media	CSC tube (100/50 mg) [SKC 226-01]	SKC 575-002 Passive Sampler [SKC 575-002]	
Sampling time*	240 min (1 min Peak; ≤5 min C)	<240 min TWA; >5min C, Peak	
Sampling volume (TWA)*	12 L		
Sampling flow rate (TWA)*	0.05 L/min		
Sampling volume (STEL/Peak/C)*	0.05 L (Peak); 0.25 L (C)		
Sampling flow rate (STEL/Peak/C)*	0.05 L/min		
Analytical method instruments	GC-FID	GC-FID	
Method reference	OSHA 5000 (fully validated)	OSHA 1001 (fully validated)	
Notes		To obtain sampling and analytical error similar to that available with active sampling, knowledge of the atmospheric pressure and temperature are required, and these should be obtained using NIST-traceable devices.	

Monitoring Methods Used by OSHA				
		If that is not possible, temperature is assumed to be 22.2 °C, and the atmospheric pressure is estimated based on the elevation of the sampling location. When estimates are used in place of traceable measurements the sampling and analytical error associated with passive sampling is substantially increased, and this makes it more difficult to demonstrate overexposures after considering the 95% lower confidence limit.		
Special requirements				

· All sampling instructions above are recommended guidelines for OSHA Compliance Safety and Health Officers (CSHOs), please see the corresponding OSHA method reference for complete details.

Wipe Method	
Sampler/Sampling media	

Bulk Method

On-Site Screening Techniques						
Device	CMS Chip					
Model/Type	Trichloroethylene, 5-100 ppm range					

On-Site Screening Techniques						
Sampling information (see manufacturer instructions)						

Exposure Limits							
OSHA PEL 8-hour TWA (ST) STEL (C) Ceiling Peak		**NIOSH REL** Up to 10-hour TWA (ST) STEL (C) Ceiling		**ACGIH TLV©** 8-hour TWA (ST) STEL (C) Ceiling		**CAL/OSHA PEL** 8-hour TWA (ST) STEL (C) Ceiling Peak	
PEL-TWA	100 ppm	**REL-TWA**		**TLV-TWA**	10 ppm [2006]	**PEL-TWA**	25 ppm (135 mg/m³)
PEL-STEL		**REL-STEL**		**TLV-STEL**	25 ppm [2006]	**PEL-STEL**	100 ppm (537 mg/m³)
PEL-C	200 ppm; 300 ppm (Peak), for a single time period up to 5 min in any 2 hours	**REL-C**		**TLV-C**		**PEL-C**	300 ppm
Skin notation	N	**Skin notation**	N	**Skin notation**	N	**Skin notation**	N
Notes: See 29 CFR 1910.1000 Table Z-2. OSHA Construction and Maritime Industry PEL is 100 ppm (535 mg/m³) as an 8 hr TWA. See 29 CFR 1926.55		**Notes:** CARCINOGEN (Ca): REDUCE EXPOSURE TO LOWEST FEASIBLE CONCENTRATION. See Appendix A, NIOSH		**Notes:** BEI®		**Notes:**	

On-Site Screening Techniques

Appendix A and 29 CFR 1915.1000 Table Z-Shipyards.	Potential Occupational Carcinogens and Appendix C, Supplementary Exposure Limits.			
Health factors: See NIH-NLM PubChem.	**IDLH**	1000 ppm		
Carcinogenic classifications: IARC-2A, NIOSH-Ca, TLV-A2, NTP-R	**Notes:** Ca			

AIHA emergency response planning guidelines - ERPG-1/ERPG-2/ERPG-3:
100 ppm/500 ppm/5000 ppm

Additional Resources and Literature References

NOAA: CAMEO Chemicals - Trichloroethylene

NIOSH: Pocket Guide to Chemical Hazards - Trichloroethylene

Literature References

- ACGIH: *Documentation of the Threshold Limit Values (TLVs) and Biological Exposure Indices (BEIs)* - Trichloroethylene. See annual publication for most recent information.
- EPA Air Toxics Website: Trichloroethylene. U.S. Environmental Protection Agency Technology Transfer Network.
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Additional Resources and Literature References

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- Lipscomb, J.C., Garrett, C.M. and Snawder, J.E.: Cytochrome P450-dependent metabolism of trichloroethylene: interindividual differences in humans. *Toxicol. Appl. Pharmacol.* 142(2): 311-318, 1997.
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VINYL CHLORIDE (CHLOROETHYLENE)†

Chemical Identification			
CAS #	75-01-4		
Formula	C_2H_3Cl		
Synonyms	chloroethene; chloroethylene; ethylene monochloride; monochloroethene; monochloroethylene; VC; vinyl chloride monomer (VCM)		
Physical Properties			
Physical description	Colorless gas or liquid (below 7°F) with a pleasant odor at high concentrations.		
Boiling point	7°F	**Molecular weight**	62.5
Freezing point/melting point	-256°F	**Vapor pressure**	3.3 atm
Flash point	-110°F	**Vapor density**	2.21
Specific gravity	0.969 at 8.6°F	**Ionization potential**	9.99 eV
Lower explosive limit (LEL)	3.6%	**Upper explosive limit (UEL)**	33%
NFPA health rating	2	**NFPA fire rating**	4
NFPA reactivity rating	2	**NFPA special instruction**	
Vapor hazard ratio (VHR)			
Historical exceedance percentage			
Target organs			

Monitoring Methods Used by OSHA			
Analyte code (IMIS no.)	2580		
Sampling group			
Sampler/Sampling media	ORBO™ 91 Carbosieve® S-III (130/65) [Supelco 20360]		
Sampling time*	60 min		
Sampling volume (TWA)*	3 L		
Sampling flow rate (TWA)*	0.05 L/min		
Sampling volume (STEL/Peak/C)*			
Sampling flow rate (STEL/Peak/C)*			
Analytical method instruments	GC-FID		
Method reference	OSHA 75 (fully validated)		
Notes	Submit as a separate sample. Refrigerate samples and analyze as soon as possible.		
Special requirements			

* All sampling instructions above are recommended guidelines for OSHA Compliance Safety and Health Officers (CSHOs), please see the corresponding OSHA method reference for complete details.

Wipe Method	
Sampler/Sampling media	

Bulk Method

On-Site Screening Techniques					
Device	Detector tube	Detector tube	CMS Chip	CMS Chip	
Model/Type	Gastec 131LA	Matheson-Kitagawa 8014-132SA	Vinyl chloride, 0.3-10 ppm range	Vinyl chloride, 10-250 ppm range	
Sampling information (see manufacturer instructions)	0.5-4 strokes, 0.05-54 ppm range, uncertainty 6% for 1-6 ppm, 8% for 6-20 ppm	follow mfr instructions, approx 0.05-1% range			

Exposure Limits							
OSHA PEL 8-hour TWA (ST) STEL (C) Ceiling Peak		**NIOSH REL** Up to 10-hour TWA (ST) STEL (C) Ceiling		**ACGIH TLV©** 8-hour TWA (ST) STEL (C) Ceiling		**CAL/OSHA PEL** 8-hour TWA (ST) STEL (C) Ceiling Peak	
PEL-TWA	1 ppm [0.5 ppm Action Level]	**REL-TWA**		**TLV-TWA**	1 ppm [1997]	**PEL-TWA**	1 ppm
PEL-STEL		**REL-STEL**		**TLV-STEL**		**PEL-STEL**	

On-Site Screening Techniques							
PEL-C	5 ppm [15 minutes]	**REL-C**		**TLV-C**		**PEL-C**	
Skin notation	N	**Skin notation**	N	**Skin notation**	N	**Skin notation**	Y
Notes: See 29 CFR 1910.1017, Vinyl chloride.		**Notes:** CARCINOGEN (Ca): REDUCE EXPOSURE TO LOWEST FEASIBLE CONCENTRATION. See Appendix A, NIOSH Potential Occupational Carcinogens.		**Notes:**		**Notes:** See California Code of Regulations, Title 8, Section 5210. Vinyl Chloride.	
Health factors: See NIH-NLM PubChem.		**IDLH**					
Carcinogenic classifications: EPA-K;A, IARC-1, NIOSH-Ca, NTP-K, OSHA-Ca, TLV-A1		**Notes:** Ca					

AIHA emergency response planning guidelines - ERPG-1/ERPG-2/ERPG-3:
500 ppm/5000 ppm/20000 ppm

Additional Resources and Literature References

NOAA: CAMEO Chemicals - Vinyl chloride

NIOSH: Pocket Guide to Chemical Hazards - Vinyl chloride

Literature References

- ACGIH: *Documentation of the Threshold Limit Values (TLVs) and Biological Exposure Indices (BEIs)* - Vinyl Chloride. See annual publication for most recent information.
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6. Site Control and Communications

The primary purposes for site controls are to establish the hazardous area perimeter, reducemigration of contaminants into clean areas, and prevent unauthorized access or exposure tohazardous materials by site personnel and the public. Site control is especially important in emergency situations.

6.1. General Site Control Safety Procedures

The following standard safe work practices apply to all CCI Environmental Services site personnel and subcontractors and shall be discussed in the safety briefing prior to initiating workon the site:

- Eating, drinking, chewing gum or tobacco, and smoking are prohibited on site except indesignated areas.
- Hands and faces must be washed upon leaving the work area and before eating,drinking, chewing gum or tobacco, and smoking.
- A buddy system will be used. Radio, cell phone, or hand signals will be established tomaintain communication.
- During site operations, each worker will consider himself/herself as a safety backup tohis/her partner.
- Visual contact will be maintained between buddies on site when performing potentiallyhazardous duties.
- No personnel will be admitted to the site without the proper safety equipment, training,and (if required) medical surveillance certification.
- All personnel must comply with established safety procedures. Any staff member who does not comply with the safety policy as established in this HASP may be subject to corrective action, potentially including but not limited to, being reprimanded or immediatedismissal.
- Proper decontamination procedures must be followed before leaving a contaminatedwork area.
- Use cones or other similar equipment to demarcate the work area around heavyequipment.

6.2. Work Area Access Control

If work is performed in public areas, the following precautions shall be taken to protect both thesite personnel and the public. Access control to the work area will be accomplished by the use of a combination of the following devices and/or method:

- Fences and/or barricades
- Traffic control devices and/or use of flaggers
- Caution tape
- Other methods to keep the site secure and provide a visual barrier to help keepunauthorized personnel from entering the site and active work areas

6.3. Hazardous Waste Site Work Control Procedures

To prevent contamination from migrating from personnel and equipment, work areas will be clearly specified as an Exclusion Zone/Hot Zone (EZ), Contamination Reduction Zone (CRZ), orSupport Zone/Clean Zone (SZ) prior to beginning operations. Each work area will be clearly identified using signs or physical barriers. At the end of each workday, the site should be secured and/or guarded to prevent unauthorized entry.

Site work zones will include:

- **Exclusion Zone/Hot Zone (EZ).** The EZ will be the "hot zone" or contaminated area inside the site perimeter. The EZ is the defined area where potential respiratory and/or health hazards exist. All personnel entering the EZ must use the required PPE, as set forth in this HASP, and meet the appropriate training and medical clearance. Entry to andexit from this zone will be made through a designated point. Appropriate warning signs toidentify the EZ should be posted (e.g., DANGER, AUTHORIZED PERSONNEL ONLY, PROTECTIVE EQUIPMENT REQUIRED BEYOND THIS POINT). Personnel and equipment decontamination must be performed upon exiting the EZ.
- **Contamination Reduction Zone (CRZ).** The CRZ, also known as the "warm zone," is a transitional zone between the EZ and the SZ (also known as the "cold zone" or "clean zone"). The CRZ provides a location for removal and decontamination of PPE and tools leaving the EZ. A separate decontamination area will be established for heavy equipment. All personnel and equipment must exit via the CRZ. If the CRZ is compromised at any time, a new CRZ will be established.
- **Support Zone/Clean Zone (SZ).** This uncontaminated zone will be the area outside theEZ and CRZ and within the geographic perimeters of the site (including boat and processing areas). The SZ is used for support personnel, staging materials, parking vehicles; office, laboratory, and sanitation facilities; and receiving deliveries. Personnel entering this zone may include delivery personnel, visitors, security guards, and others who will not necessarily be permitted in the EZ or CRZ.

A log of all personnel visiting, entering, or working on the site shall be maintained by the FS. No visitor will be allowed in the EZ without showing proof of training and medical certification, per 29 CFR 1910.120(e),(f) (and 29 CFR 1926.1101(k)(9),(m) if appropriate). Visitors will attend a site orientation given by the FS and sign the HASP.

6.4. Field Communications

Communications between all CCI Environmental Services employees and subcontractors at the work site can be verbal and/or non-verbal. Verbal communication can be affected by the on-site background noise and various PPE. See Table 6-1 for a list of the types of communication methods and equipment to use, depending on site conditions. All staff on site will have interoperable two-way radios. Communication equipment must be checked daily to verify properoperation. All project personnel must be initially briefed on the communication methods prior to starting work; communication methods should be reviewed in daily safety meetings.

6.5. Decontamination

The decontamination process is designed to remove any contamination acquired in the exclusion zone and to keep the spread of contaminated materials from entering the support (clean) area. Care must be exercised to ensure that contaminants are removed from personneland equipment before the personnel or equipment leave the site. The decontamination line should extend from the exclusion zone boundary line to the entrance of the support zone.

Personnel Decontamination

Dry decontamination is the preferred method for CCI Environmental. This method of decontamination involves the removal of contaminated layers of personal protective clothing. Boots will be decontaminated, when necessary, by using a wet method “boot wash” station located at the CRZ. The boot wash will be comprised of two large washtubs. The first tub will be filled with water and soap solution and a brush to remove gross contamination. The second washtub will be a rinse. Preferably the boots will then be taken off and left inside the CRZ area. Once completed, personnel will exit the zone free of contamination.

An emergency eyewash will be located at the CRZ in the event that an emergency decontamination is needed. Once all the gross contamination has been removed the affected personnel shall fully decontaminate and exit through the CRZ. Site personnel shall assist withthe emergency decontamination only if they have protected themselves from exposure. The Project Manager/ Supervisor will be notified immediately of any emergency.

Equipment Decontamination

Decontamination equipment will consist of “drive over” decontamination pads and a pressure washer. Additional supplies at the site may include, but are not limited to:

- Plastic Sheeting
- Buckets
- Scrub Brushes
- Plastic Bags
- Wash Basins
- Water Hoses
- Pools
- Trash Containers
- Pump Spray Bottles
- Paper Towels
- Soap
- Caustic Neutralization Solution

Table 6-1: Field Communication Methods

Type of Communication	Communication Device	Signal
Emergency notification	On-site Telephone or Cellular Telephone	Initiate phone call using applicable emergency numbers
Emergency notification among site personnel	On-site Telephone or Cellular Telephone	Initiate phone call using applicable emergency numbers
Hailing site personnel for non-emergency	On-site Telephone or Cellular Telephone	Initiate phone call using applicable personnel numbers
Hailing site personnel for emergency evacuation	On-site Telephone or Cellular Telephone or Visual	Initiate phone call using applicable emergency numbers
Hailing site personnel for distress, need help	Visual	Arms waved in circle over head
Hailing site personnel for emergency evacuation	Visual	Arms waved in crisscross over head
Contaminated air/strong odor	Visual	Hands clutching throat
Break, lunch, end of day	Visual	Two hands together, break apart

7. Health and Safety Training and Informational Programs

This section describes the health and safety training and informational programs with which CCI Environmental Services project site personnel must comply. All certifications required in this section will be kept on internal file.

7.1. Initial Project Site Orientation

Work on all CCI Environmental Services project sites will require participation in an initial health and safety orientation presented by the PM or FS that will consist of, at a minimum, the following topics:

- A review of the contents of this HASP, including the scope of work and associated site hazards and control methods and procedures.
- Provisions of this plan are mandatory for all CCI Environmental Services personnel assigned to the project.
- CCI Environmental Services subcontractors are also expected to follow the provisions ofthis plan unless they have their own HASP that covers their specific activities related to this project and includes the minimum requirements of this HASP.
- All visitors to the work site will also be required to abide by the requirements of this plan.
- Personnel assigned to perform work at the project site, working under the provisions of this HASP, will be required to read the plan and must sign the Health and Safety Plan Acknowledgement Form to confirm that they understand and agree to abide by the provisions of this plan. Personnel not directly affiliated with the project (i.e., visitors) mayalso be required to sign the Liability Waiver.

The CCI Environmental Services PM and or SSO will perform an initial visit to participate in a walkthrough and orientation to become familiar with the Site, and to assist in discussions regarding Site staging with De Maximis.

7.2. Daily Safety Meetings

Daily safety meetings (“tailgate meetings”) make accident prevention a top priority for everyone and reinforce awareness of important accident-prevention techniques. The following daily safetymeeting procedures and practices are required:

- Daily safety meetings will be held each morning prior to conducting site activities.
- The Daily Safety Briefing form in Appendix A will be used to document each meeting.
- Copies of the completed Daily Safety Briefing forms will be maintained on site during the course of the project.

7.3. Hazardous Waste Operations Training

Personnel working on project sites that present a potential for exposure to hazardous wastes or other hazardous substances shall be trained in accordance with the requirements of the 29 CFR 1910.120 (HAZWOPER) regulation. Training requirements will consist of the following:

- Field personnel must complete a minimum of 40 hours of hazardous waste activity instruction.
- Field personnel must complete a minimum of 3 days of supervised field instruction.
- Field personnel assigned to the site will also have received 8 hours of refresher training ifthe time lapses since their previous training have exceeded 1 year.
- On-site managers and supervisors directly responsible for employees engaged in hazardous waste operations will receive an additional 8 hours of supervisory training.
- Field personnel shall be current in first aid/CPR training offered by the American Red Cross or equivalent.
- Other training may be required depending on the task to be performed (e.g., confined space, excavation/trenching, underground storage tank removal, fall protection, respiratory protection, and hazard communication).

7.4. Hazard Communication Program

The purpose of hazard communication (Employee Right-to-Know) is to verify that the hazards ofall chemicals located at the field project site are communicated to all CCI Environmental Services personnel and subcontractors according to 29 CFR 1926.59. Refer to the CCI Environmental Services Hazard Communication Program document for additional information.

Every container of hazardous materials must be labeled by the manufacturer, who must also provide an SDS upon initial order of the product and upon request thereafter. The actual format may differ from company to company (e.g., National Fire Protection Association, Hazardous Material Information System, or other), but the labels must contain similar types of information. Maintain manufacturer labels if possible. The label may use words or symbols to communicate the following:

- Introduction
- Hazard(s) identification
- Composition/information on ingredients
- First-aid measures
- Fire-fighting measures
- Accidental release response measures
- Handling and storage
- Exposure controls/personal protection
- Physical and chemical properties
- Stability and reactivity properties
- Toxicological properties
- Ecological properties
- Disposal considerations
- Transport considerations
- Regulatory information
- Other information, including at a minimum, label preparation or last revision date

SDS for all chemicals brought onto the site or anticipated to be used on site shall be provided in Appendix C of this HASP. These SDS shall be readily available for reference by site personnel and emergency response personnel.

Hazardous materials received without proper labels shall be set aside and not distributed for use until properly labeled.

If a hazardous chemical is transferred into a portable container (approved safety can), even if for immediate use only, the contents (e.g., acetone or gasoline) of the portable container mustbe identified.

8. General PPE Requirements

The minimum level of PPE should be selected according to the hazards that may be encountered during site activities in accordance with established U.S. Environmental ProtectionAgency (EPA) levels of protection (D and C). Only PPE that meets American National Standards Institute (ANSI) standards shall be worn. Site personnel must maintain proficiency inthe use and care of PPE. Damaged or defective PPE must be replaced and may not be used. CCI Environmental Services will provide all necessary PPE for its employees as described in this HASP.

8.1. Description of Levels of Protection

In choosing chemical-resistant clothing, one must be able to distinguish between the different types of fabrics and styles. Chemical compatibility must be taken into account before selectionis made to prevent permeation, degradation, and penetration of the chemical protective clothing.

Use of chemical protective clothing exacerbates the potential for heat stress. Attempts will be made to minimize physical exertion and manual labor and/or provide for engineering controls. Nevertheless, some necessary tasks may increase the worker's metabolic heat load and thus increase the potential for heat stress. The Project Manager/ Supervisor will observe environmental conditions and worker symptoms for indications of heat stress. In the event that heat stress becomes a concern, work practices and controls will be adjusted accordingly and/orwork shifts adjusted to allow for work in cooler parts of the day. As appropriate, adjustments in personal protective equipment requirements will also be considered but ***MUST*** be approved by CCI's H&S Manager. It is anticipated that no PPE in excess of Level C will be required for this project; CCI has chosen to list all levels of PPE in the remote event that situations dictate an upgrade.

8.1.1 Level A PPE

Level A provides the highest available level of respiratory, skin, and eye protection and should be used when:

- The chemical substance has been identified and requires the highest level of protection for skin, eyes, and the respiratory system based on either the measured (or potential for) high concentration of atmospheric vapors, gases, or particulate.
- The site operations and work functions involve a high potential for splash, immersion, or exposure to unexpected vapors, gases, or particulate materials that are harmful to skinor capable of being absorbed through the intact skin.
- Substances with a high degree of hazard to the skin are known or suspected to be present, and skin contact is possible.
- Operations must be conducted in confined, poorly ventilated areas until the absence of conditions requiring Level A protection is determined.

Limiting Criteria – The material of the fully encapsulating suit must be compatible with the hazardous substances involved. One must also look at the increased heat stress and reduced visibility/ movement associated with such suits.

8.1.2 Level B PPE

Level B provides the same level of respiratory protection but less skin protection than Level A.It is minimum level recommended for initial site entries until the hazards have been further identified. This level of protection should be used when:

- The type and atmospheric concentration of substances have been identified and require a high level of respiratory protection, but less skin protection. This involves atmosphereswith IDLH concentrations of specific substances that do not represent a severe skin hazard or that do not meet the criteria for use of air-purifying respirators.
- The atmosphere contains less than 19.5 percent oxygen.
- The presence of incompletely identified vapors or gases is indicated by a direct-reading organic vapor detection instrument, but the vapors and gases are known not to contain high levels of chemicals harmful to skin or capable of being absorbed through the intact skin.
- Modified Level B increases skin protection by adding a second suit, such as a Tyvek® or CPF I, underneath the primary suit. This level is often used when only dry decontamination methods are available.

Limiting Criteria: This level should be used only when the vapor or gases present are not suspected of containing high concentrations of chemicals that are harmful to skin or capable of being absorbed through the intact skin. Also use this level of protection only when it is highly unlikely that the work being done will generate either high concentrations of vapors, gases, or particulate or splashes of material that will affect exposed skin. Increased heat stress and reduced visibility need to be taken into account when using this level.

8.1.3 Level C PPE

Level C provides the same level of skin protection as Level B, but a lower level of respiratoryprotection. Level C shall be used in areas where pesticides and other contaminants may exceed the OSHA PEL or ACGIH-TLV in atmospheres where air-purifying respirators are acceptable. This level of protection shall only be used when:

- The atmospheric contaminants, liquid splashes, or other direct contact will not adversely affect or be absorbed through any exposed skin.
- The types of air contaminants have been identified, concentrations measured, and an air purifying respirator cartridge is available that can remove the contaminants.
- All criteria for the use of air-purifying respirators are met.
- Modified Level C increases skin protection by adding a second suit, such as a Tyvek® or CPF I, underneath the primary suit. This level is often used when only dry decontamination methods are available.

Limiting Criteria – Atmospheric concentration of chemicals must not exceed IDLH levels. The atmosphere must also contain at least 19.5 percent oxygen.

8.1.4 Level D PPE

Level D provides no protection for respiratory and minimal skin protection. Level D will only be used in administrative and break areas. This level of protection should be used when:

- The atmosphere contains no known hazard.
- Work functions preclude splashes, immersion, or the potential for unexpected inhalation of or contact with hazardous levels of any chemical.
- Modified Level D should be used when no atmospheric hazards exist but potential for dermal exposure or elevated levels of nuisance dust is expected or encountered.

8.1.5 Modified Level D PPE

Modified Level D increases skin protection with the addition of a single chemical-resistant suit, chemical resistant inner and outer gloves, and chemical-resistant steel toe boots as well as a face shield equipped hard hat. This level is often used when only dry decontamination methodsare available. Modified Level D may be used in areas where contaminants may be found on surfaces that may be contacted by workers, but ***NOT*** where aerosols, mists or other respiratory hazards exist other than nuisance dusts where N-95 particulate removing masks may be utilized.

8.1.6 Minimum Requirements: Level D Protection

The minimum level of protection on project sites will be Level D protection, which consists of thefollowing equipment:

- Standard work uniform/coveralls
- Work boots with safety toe conforming to ASTM International (ASTM) F2412-05/ASTM F2413-05
- Approved safety glasses or goggles (meets ANSI Z87.1 – 2010 requirements for eye protection)
- Hard hat (meets ANSI Z89.1 – 1986 requirements for head protection)
- Traffic safety vest
- Hearing protection earmuffs when there are high noise levels

Level D protection will be used only when:

- The atmosphere contains no known hazards
- Work functions preclude splashes, immersions, or the potential for unexpected inhalation of, or contact with, hazardous concentrations of chemicals
- Atmospheric concentrations of contaminants are less than the Permissible Exposure Limit (PEL) and/or Threshold Limit Value (TLV)

8.1.7 Modified Level D Protection Requirements

Depending on the scope of work and the potential hazards to be encountered, Level D protection shall be modified to include additional protective equipment such as face shields/goggles, chemical-resistant clothing, headlamps, earmuffs and disposable gloves of varying materials depending on the chemical substances involved. An upgrade to Modified Level D occurs when there is a possibility that contaminated media can contact the skin or work uniform, or if unique, site-specific hazards exist.

8.2. Respiratory Protection Requirements

Respiratory protection is not anticipated for this project. The remainder of this section is provided for reference.

Respiratory protection devices may potentially be used for protection against particulates and organic vapors during an CCI Environmental Services field project. The need for respiratory protection will be determined by air monitoring results and site conditions. However, engineeringand administrative controls must first be evaluated for use as the primary controls for protection against site respiratory hazards. In the event that engineering and administrative controls are deemed not feasible, respiratory protection will be required.

8.2.1 Level C Protection Requirements

An upgrade to Level C protection occurs when the results of air monitoring reveal that actionlevels have been exceeded.

Level C protection, in addition to Level D equipment, involves the use of full-face and/or half-face air-purifying respirators equipped with P-100 high-efficiency particulate air (HEPA)-organicvapor or equivalent (OSHA/National Institute for Occupational Safety and Health [NIOSH] approved).

Level C protection shall be used in the following situations:

- When there is a recognized need for protection against particulates, organic vapors, or other airborne contaminants during the course of the project.
- During activities where product odors or exposure symptoms are noted.

If, during the use of respiratory protection, any unusual odors or other evidence of elevated concentrations of chemicals in the workers' breathing zone is noted, the work shall be stopped,workers shall exit the work area, and the PM and H&S Manager shall be contacted for instructions.

8.2.2 Cartridge Change-Out Schedule

Field personnel must understand the limitations of air-purifying respirators and the End-of-Service Life cartridge change-out schedule for the particular type of respirator that will be used. Manufacturer's data has been evaluated for four types of respirators: Scott, MSA, 3M and North

See Table 8-1 for a cartridge change out schedule

Table 8-1: Respirator Cartridge Change-Out Schedule

Cartridge Type	Change Schedule
All Cartridges for Emergency Use	Discard after user
P100 or HEPA Filters	Restricted breathing or visibly dirty, wet, or compromised

Personnel using a respirator that is not listed above should contact their H&S Manager to determine thechange-out schedule for the particular respirator used. Any questions regarding the site-specificrespiratory protection program must be directed to the FS and/or PM.

All cartridges will be changed a minimum of once daily or more frequently if personnel begin to experience increased inhalation resistance. Cartridges will be changed immediately if breakthrough, a chemical warning property (e.g., eye, nose, or throat irritation or odor), or cartridge end-of-life indicator activation occurs. The FS will review this requirement after monitoring the employee's breathing zone for site contaminants and will revise this schedule asmay be necessary to avoid over-exposure.

8.2.3 Respirator Fit Testing

All CCI Environmental Services personnel who may be required to wear an air-supplied, or negative-pressure, air-purifying respirator in the performance of their work duties shall be fit-tested on an annual basis. Employees who wear a respirator for more than 30 days per yearshall be enrolled in a medical monitoring program as detailed in Section 10 of this HASP.

Employees shall have the opportunity to handle the respirators and wear them in normal air for a familiarity period prior to fit-testing. On each occasion that employees don a respirator for work purposes, they shall test the piece-to-face seal by use of the following positive and negative pressure tests:

- ***Positive Pressure Test:*** With the exhaust port(s) blocked, the positive pressure of slight exhalation should remain consistent for several seconds.
- ***Negative Pressure Test:*** With the intake ports blocked, the negative pressure of slight inhalation should remain constant for several seconds.

Air-purifying respirators shall not be worn when conditions prevent a seal of the respirator to thewearer. Such conditions may be the growth of a beard, sideburns, a skull cap that projects under the face piece, or temple pieces on glasses. No employee may wear a beard if it interferes with the fit of the respirator. Also, the absence of one or both dentures can seriously affect the fit of a face-piece and should be worn at all times that respirators are being used.

8.2.4 Respirator Cleaning, Maintenance, and Inspection

All respirators used on site shall be cleaned and maintained in the following manner:

- Remove filters and cartridges.
- Visually inspect face piece and parts, discard faulty items.
- Remove all elastic headbands.
- Remove exhalation cover and inhalation valves.
- Wash, sanitize, and rinse face pieces. Wash any parts that were removed separately.
- Dry the mask. Wipe face pieces and valves.
- Disassemble and clean the exhalation valve.
- Visually inspect face piece and all parts for deterioration, distortion, or other faults that might affect the performance of the respirator.
- Replace any questionable or faulty parts.
- Reassemble mask and visually inspect completed assembly.
- Seal mask in plastic bag.

9. Health and Safety Procedures and Practices

In addition to the task specific JSAs listed in Appendix B, this section lists the health and safety procedures and practices applicable to this project. For additional information, consult with the PM.

9.1. Physical Hazards and Controls

9.1.1 General Site Activities

Observe the following general procedures and practices to prevent physical hazards:

- Legible and understandable precautionary labels shall be affixed prominently to containers of potentially contaminated soil, sediment, water, and clothing.
- No food or beverages shall be present or consumed in areas that have the potential to contain COCs and/or contaminated materials or equipment.
- No tobacco products or cosmetics shall be present or used in areas that have the potential to contain COCs and/or contaminated materials or equipment.
- An emergency eyewash unit shall be located immediately adjacent to employees who handle hazardous or corrosive materials, including decontamination fluids. All operations involving the potential for eye injury or splash must have approved eyewash units locally available capable of delivering at least 0.4 gallons per minute for at least 15 minutes.
- Personnel working within 10 feet of bodies of water shall wear USCG-approved PFDs.
- Certain project sites may have newly finished work (e.g., concrete, paving, framing, habitat reconstruction, or sediment caps) that may be damaged by unnecessary contact, or that could cause dangerous conditions for personnel (e.g., slipping, sinking, or tripping). Personnel working in or around these areas shall communicate with the PM, FS, and property owner as needed to prevent damaging new work or entering dangerous conditions.
- Generally, all on-site activities will be conducted during daylight hours. If work after duskis planned or becomes necessary due to an emergency, adequate lighting must be provided.
- Hazardous work, such as handling hazardous materials and heavy loads and operating equipment, should not be conducted during severe storms.
- All temporary electrical power must have a Ground-fault Circuit Interrupter (GFCI) as part of its circuit if the circuit is not part of permanent wiring. All equipment must be suitable and approved for the class of hazard present.

9.1.2 Slips, Trips, and Falls

Observe the following procedures and practices to prevent slips, trips, and falls:

- Inspect each work area for slip, trip, and fall potential prior to each work task.
- Slip, trip, and fall hazards identified must be communicated to all personnel. Hazards identified shall be corrected or labeled with warning signs to be avoided.
- All personnel must be aware of their surroundings and maintain constant communication

with each other at all times.

- Trip hazards will be removed, marked, or guarded.
- Good housekeeping will be maintained at the work site to decrease or eliminate the risk ofinjury.
- Extreme caution shall be used when working on or around slippery surfaces.
- All necessary precautions will be taken to protect personnel from injuries caused by slick surfaces.
- Any openings in the ground that cannot be eliminated shall be covered.

9.1.3 Ergonomic Considerations

Certain field tasks may involve workers in fixed positions (e.g., observing subcontractor work) orperforming repetitive motions over a period of time (e.g., sediment sample processing). It is important that workers self-monitor for ergonomic fatigue (e.g., soreness, tightness, stiffness, orpain in muscles) and make adjustments to work tasks, body positions, or work areas so that ergonomic stressors are minimized. Suggestions for decreasing the likelihood of ergonomic stress include the following:

- Limit fixed positions. Periodically vary standing and sitting positions, take frequent short walks, and modify observation locations when possible.
- Minimize extreme postures. Conduct work tasks using comfortable postures (particularlyif the tasks are repetitive) and use tools or structures to minimize the need to hold or work with materials or access the work area.
- Limit contact stress. Be aware of soft tissue resting on hard surfaces, and limit these occurrences (e.g., use comfortable footwear, and use tools to hold materials).
- Contact the Field Mobilization Team in advance for prolonged field efforts that involve a field trailer. This group can set up field staff with a monitor, mouse, and keyboard so they are not working solely on laptops.
- Take breaks from work tasks, particularly repetitive ones.
- Consider performing stretching exercises before and during work activities, if those tasks are anticipated to be long in duration and/or strenuous.

9.1.4 Underground or Overhead Utility Line Contact Prevention

Observe the following underground/overhead utility line contact prevention procedures and practices if invasive activities are to be performed at the site:

- Prior to conducting work, the PM or FS shall verify that all existing underground or overhead utilities in the work area are located per the state or local mark-out methods. Documentation of utility mark-out shall be completed using the Utility Contact Prevention Checklist form (see Appendix A). No excavation work is to be performed until all utility mark-outs are verified.
- The PM or FS shall conduct a site survey to search for signs of other buried or overhead utilities. The results of such surveys shall be documented on the Utility Mark-out documentation form.
- The property owner or facility operator shall be consulted on the issue of underground

utilities. As-built drawings shall be reviewed, when available, to verify that underground utility locations are consistent with the utility location mark-outs. All knowledge of past and present utilities must be evaluated prior to conducting work.

- If on-site subsurface utility locations are in question, a private locating service shall be contacted to verify locations. If the investigation calls for boreholes in an area not covered by the municipal One-Call system, then a private utility locate firm shall be contacted to determine the location of other underground utilities.
- The PM shall have documented verbal contact and an agreement with the fiber optic company for all work within 50 feet of any fiber optic cables.
- Only non-destructive excavation, such as hand digging or hydro excavation, is permitted within 10 feet of underground high voltage, product, or gas lines. Once the line is exposed, heavy equipment can be used, but must remain at least 10 feet from the exposed line. Off-set distance can be decreased to 5 feet with Remediation PM approval.
- Elevated superstructures (e.g., drill rig, backhoe, scaffolding, ladders, and cranes) shall remain a distance of 10 feet away from utility lines and 20 feet away from power lines. Distance from utility lines may be adjusted by the FS depending on the actual voltage of thelines.
- Overhead utility locations shall be marked with warning tape or flags where equipment has the potential for contacting overhead utilities.

Table 9-1 shows the minimum clearances required for energized overhead electrical lines.

Table 9-1: Overhead Utility Clearance Requirements

Minimum Clearance from Energized Overhead Electric Lines	
Nominal System Voltage	**Minimum Required Clearance**
0 to 50 kV	10 feet
51 to 100 kV	12 feet
101 to 200 kV	15 feet
201 to 300 kV	20 feet
301 to 500 kV	25 feet
501 to 750 kV	35 feet
751 to 1000 kV	45 feet

Notes:
Whenever equipment operations must be performed closer than 20 feet from overhead power lines, the FS must be notified. Whenclearance to proceed is received from the FS, the electric utility company must be contacted to turn the power off or physically insulate (protect) the lines if the operation must be performed closer to the power line than is allowed in this table. For voltages notlisted on this table, add 0.4 inches per kV to obtain a safe distance between equipment and power lines.

9.1.5 Electrical Safety

Observe the following procedures and practices to prevent electric shock:

- General
  - Use only appropriately trained and certified electricians to perform tasks related to electrical equipment. A good rule of thumb is to defer any task that would not normally and reasonably be completed by the average public consumer.
  - Each circuit encountered will be considered live until proven otherwise.
  - Only proper tools will be used to test circuits.
  - No wire will be touched until the circuit is determined to be de-energized.
- Extension Cords
  - All extension cords used on any project will be three-pronged.
  - All extension cords will be in good working order.
  - Each extension cord ground will be tested for continuity on at least a quarterly basis and marked to indicate when the inspection occurred.
  - Each extension cord will be visually inspected before each use.
  - If any extension cord is found in disrepair or fails the continuity test, it will be taken out of service.
  - Any extension cord that does not have the grounding pin will be taken out of service and not used.
  - Extension cords will not be used in place of fixed wiring.
  - Extension cords will not be run through holes in walls, ceilings, or floors.
  - Extension cords will not be attached to the surface of any building.
  - No extension cord will be of the “flat wire” type. Every extension cord will have each individual wire insulated and further protected by an outside cover.
  - Be sure to locate extension cords out of traffic areas or, if this is unavoidable, flag cords and protect workers from tripping over them (i.e., use barricades, tape the cord down, etc.)
  - Do not stage extension cords or powered equipment in wet areas, to the degree possible. Elevate cords, connections, and equipment out of puddles.
- Power Tools/Plug and Cord Sets
  - Any cord that is cut in a way that exposes insulation will be removed from service.
  - All tools and plug and cord sets will be tested for continuity.
  - If grounding pins are missing, the plug and cord will be removed from service.
  - Any tool or plug and cord set failing the continuity test will be removed from service.
  - All power tools will have three-pronged plugs unless double insulated.
- Ground-Fault Circuit Interrupters
  - Each 120-volt electrical wall receptacle providing power to the job site will be protected by a portable GFCI.
  - Each GFCI will be tested quarterly and marked to indicate when the inspection occurred.
  - Each 120-volt, single-phase, 15- and 20-ampere receptacle outlet, including those on generators, will have an approved GFCI.

- GFCIs will be located in line as close to the piece of equipment as possible.
- Specific
  - If unsure if a task requires specific electrical training, err on the side of cautionand contact the PM and FS prior to proceeding.
  - If subsurface work is to be performed conduct utility locating prior to work and in accordance with local ordinances.
  - If lock out/tag out (LO/TO) procedures are required (i.e., de-energizing machineryor equipment so work may be performed), the equipment owner must provide LO/TO procedures and training. By default, the equipment owner should perform any LO/TO. If it becomes necessary for CCI Environmental Services personnel toperform LO/TO tasks, contact the PM and FS prior to doing so.
  - Maintain appropriate distance from overhead utilities (see Table 11-1).
  - If unexpected electrical equipment is encountered (i.e., buried wire) assume it islive, stop work, and contact the PM and FS immediately.
  - If working in enclosed or restricted areas where electrical hazards may be present, contact a licensed electrician or other suitably trained party to providebarriers, shields, or insulating materials to prevent electric shock.
  - If working in areas where electrical hazards are present, verify that conductive clothing and jewelry is replaced with non-conductive clothing or removed.

9.1.6 Motor Vehicle Operation

All drivers are required to have a valid driver's license, and all vehicles must have appropriate state vehicle registration and inspection stickers. **CCI Environmental Services prohibits the use of hand-held wireless devices while driving any vehicle for business use at any time,for personal use during business hours, and as defined by law**. Additionally, site-specific motor vehicle requirements must be followed, if any.

When driving to, from, and within the job site, be aware of potential hazards including:

- Vehicle accidents
- Distractions
- Fatigue
- Weather and road conditions

To mitigate these hazards, observe the following procedures and practices regarding motorvehicle operation:

- Before leaving, inspect fuel and fluid levels and air pressure in tires, and adjust mirrors and seat positions appropriately.
- Wear a seat belt at all times and make sure that clothing will not interfere with driving.
- Plan your travel route and check maps for directions or discuss with colleagues.
- Clean windows and mirrors as needed throughout the trip.
- Wear sunglasses as needed.
- Fill up when the fuel level is low (not near empty).
- Follow a vehicle maintenance schedule to reduce the possibility of a breakdown while driving.

- Stop driving the vehicle, regardless of the speed (e.g., even 5 miles per hour) or location (e.g., a private road), when the potential of being distracted by conversation exists.
- Using hand-held communication devices (e.g., cell phones) while operating any motor vehicle is prohibited.
- Get adequate rest prior to driving.
- Periodically change your seat position, stretch, open the window, or turn on the radio to stay alert.
- Pull over and rest if you are experiencing drowsiness.
- Check road and weather conditions prior to driving.
- Be prepared to adjust your driving plans if conditions change.
- Travel in daylight hours, if possible.
- Give yourself plenty of time to allow for slowdowns due to construction, accidents, or other unforeseen circumstances.
- Use lights at night and lights and wipers during inclement weather.

9.1.7 Heavy Equipment

- Daily inspections of heavy lifting equipment will be conducted to ensure all safety and operation mechanisms are in place and working properly (i.e., backup alarm, fire extinguisher, brakes, controls, etc.).
- This inspection will be documented and kept on file for review.
- Ground personnel shall communicate with the fork-truck operator before entering or leaving that operator's work area.
- The travel radius of any piece of equipment must be established and at no time are ground personnel to enter that area when the equipment is in operation.
- Only qualified personnel will be allowed to operate the equipment.
- A minimum 25' radius around all heavy equipment shall be maintained and identified as the heavy equipment exclusion zone. Field personnel may not approach upon this radius until direct communication is made with the operator. The operator is to stop work, ground machine, and remove hands from controls before signal is given to field personnel to approach.
- No work is permitted within 30 feet of a utility without advance approval from CCI SSO.
- Excavation permits will be completed and displayed and reviewed prior to the start ofsubsurface activities.
- Soils to be benched must be classified as type A or B, with at least one manual and one visual method.
- Spotters are required whenever any equipment is backing or in areas of low visibility, around corners, crossing road and carrying a load in front of machine.
- Excavators shall have protective cages over windshield when used for any excavation, stockpile management, or truck loading procedures.
- Spill kits should be readily available in all refueling locations and in local proximity to active working locations.
- All hydraulic equipment shall be lowered and grounded prior to shutting down or getting

off the equipment.

- All equipment will be stored on prefabricated secondary containments or on a containment built of poly sheeting with berms of at least 6 inches to contain any petroleum product leaks from equipment

9.1.8 Vehicular Traffic

Observe the following procedures and practices regarding vehicular traffic:

- Wear a traffic safety vest when vehicle hazards exist.
- Use cones, flags, barricades, and caution tape to define the work area.
- Use a vehicle to block the work area (if conditions allow).
- Engage a police detail for high-traffic situations.
- Always use a spotter in tight or congested areas for material deliveries.
- As necessary, develop traffic control plans and train personnel as flaggers in accordance with the U.S. Department of Transportation Manual of Uniform Traffic Control Devices and/or local requirements.

9.1.9 Noise

Excessive noise is hazardous not only because of its potential to damage hearing, but also because of its potential to disrupt communications and instructions. The following proceduresand practices shall be followed to prevent noise-related hazards:

- All employees will have access to ear protection with a Noise Reduction Rating of not less than 30.
- Ear protection must be worn in any environment where workers must raise their voices to be heard while standing at a distance of 3 feet or less.
- Ear protection must be worn by any personnel observing or operating concrete cutting or sawing equipment, pile driving, or other loud noise-generating activities.

Hearing protection is required for workers operating or working near noisy equipment or operations, where the noise level is greater than 85 A-weighted decibels (dbA) (time-weighted average [TWA]), as well as personnel working around heavy equipment. The FS will determinethe need and appropriate testing procedures, (i.e., sound level meter and/or dosimeter) for noise measurement.

When needed, a sound level meter will be used to measure noise levels at selected locations in the work area and on the site perimeter. When used, noise monitoring equipment must be calibrated before and after each shift.

If continuous noise levels are found to exceed 85 dbA at any location within the work area, warning signs will be posted. Workers and visitors will be notified that hearing protection is required. Appropriate hearing protection (i.e., earmuffs) will be worn whenever personnel orvisitors are working in that location. A supply of earmuffs will be maintained on site.

Action levels in Table 9-2 will trigger the use of appropriate hearing protection (earmuffs). Hearing protection must be able to attenuate noise below 90 dbA (8-hour TWA). Each hearing protection or device has a Noise Reduction Rating (NRR) assigned by EPA. The calculation for a hearing protection device's effectiveness is:

Equation 1

$$TWA - [(NRR - 7) \times 50\%] = \text{estimated exposure}$$

TWA	=	Time weighted average exposure level from measurement
NRR	=	Noise reduction rating from equipment
Estimated exposure	=	Actual estimated exposure using protection

Table 9-2: Noise Exposure Action Levels

Instrument	Measurement	Action
Type I or Type IISound Level Meter or Dosimeter	> 80 dbA to 85 dbA	Hearing protection recommended. Limit work duration to 8-hour shifts.
	> 85 dbA to 90 dbA	Hearing protection required. Limit work duration to 8-hour shifts.
	> 90 dbA to 115 dbA	Hearing protection required. Investigate use of engineering controls.Limit work duration to 8-hour shifts.
	> 115 dbA	Stop work. Consult H&S Manager.

9.1.10 Lifting and Material Handling

Observe the following procedures and practices for lifting and material handling:

- Use leather gloves when handling metal, wire rope, sharp debris, or transporting materials (e.g., wood, piping, drums, etc.).
- The size, shape, and weight of the object to be lifted must first be considered. No individual employee is permitted to lift any object that weighs more than 60 pounds. Multiple employees or mechanical lifting devices are required for objects heavier than the 60-pound limit.
- Plan a lift before doing it. Bend at the knees and lift with the legs; maintain the natural curves of the back; do not use back muscles.
- Check the planned route for clearance.
- Use the buddy system when lifting heavy or awkward objects.
- Do not twist your body while lifting.
- Know the capacity of any handling device (e.g., crane, forklift, chain fall, or come-along) that you intend to use.

- Use tag lines to control loads.
- Verify that your body, material, tools, and equipment are safe from such unexpected movement as falling, slipping, rolling, tripping, bowing, or any other uncontrolled motion.
- Trucks (i.e., flat beds) hauling equipment or materials must not be moved once the rigginghas been released.
- Chock all material and equipment (such as pipe, drums, tanks, reels, trailers, and wagons) as necessary to prevent rolling.
- Tie down all light, large-surface-area material that might be moved by the wind.
- When working at heights, secure tools, equipment, and wrenches against falling.
- Do not store materials or tools on ducts, lighting fixtures, beam flanges, hung ceilings, or similar elevated locations.
- Fuel-powered tools used inside buildings or enclosures shall be vented and checked for excessive noise.
- Mechanical means of lifting is the preferred method and should be used whenever possible.

9.1.11 Fire Control

Observe the following fire control procedures and practices:

- Smoke only in designated areas.
- Keep flammable liquids in closed containers.
- Keep the work site clean; avoid accumulating combustible debris such as paper.
- Obtain and follow property owner hot work safety procedures when welding or performing other activities requiring an open flame.
- Isolate flammable and combustible materials from ignition sources.
- Verify fire safety integrity of equipment installations according to National Electrical Code specifications.
- Gasoline is allowed only in 5-gallon safety cans
- Small quantities of flammable/ combustible materials shall be stored in “safety” cans with appropriate flame arrestors, self-closing lids, and labeled according to their contents.

9.1.12 Static Electricity and Transfer of Flammable Liquids

Observe the following procedures and practices regarding static electricity when transferringflammable liquids:

- Electrically bond and ground pumps, transfer vessels, tanks, drums, bailers, and probes when moving flammable liquids.
- Electrically bond and ground vacuum trucks and the tanks they are emptying.
- Do not splash fill containers with flammable liquids.
- Pour flammable liquids slowly and carefully.
- Two fire extinguishers (2A20:BC) must be available, charged, inspected, and readily accessible.
- Bulk storage containers used for flammable liquids must be properly grounded and

bonded.

- Flammable–No Smoking signs will be placed in the area so that they are clearly visible.
- Areas that are designated as a bulk fuel storage area must be capable of retaining 110% of the largest tank inside that area.

9.1.13 Confined Spaces

Although confined spaces should not be encountered as a matter of routine during this project as it is understood that no persons will be entering the excavation, all involved personnel shall review and use CCI Environmental procedures for air monitoring, training, permitting, rescue, and PPE for confined spaces present at work site. No personnel will enter a confined space until all criteria as stated by the CCI Environmental Confined Space Entry procedures are met.

9.2 Environmental Hazards and Controls

9.2.1 Fatigue Management

Because CCI Environmental Services personnel may be working during both daytime and nighttime hours several days per week, depending on the activity, it is important that all personnel are aware of the hazards related to fatigue. Fatigue can be defined as increasing difficulty in performing physical or mental activities. Signs of fatigue may include tiredness, changes in behavior, loss of energy, and reduced ability to concentrate. Fatigued workers may have a reduced ability to recognize or avoid risks on the work site, which may lead to an increase in the number and severity of injuries and other incidents. Fatigue can occur at any time when working and may cause safety concerns due to decreased manual dexterity, reactiontime, and alertness.

Fatigue results from insufficient rest and sleep between activities. Contributing factors to fatiguemay include the following:

- The time of day that work takes place
- The length of time spent at work and in work-related duties
- The type and duration of a work task and the environment (e.g., weather conditions and ambient noise) in which it is performed
- The quantity and quality of rest obtained prior to, during, and after a work period
- Non-work activities
- Individual factors such as sleeping disorders, medications, or emotional state

Personnel suffering from fatigue may exhibit both physical and mental effects, such as thefollowing:

- Slower movements
- Poor coordination
- Slower response time to interaction
- Bloodshot eyes
- Slumped or weary appearance
- Nodding off
- Distractedness or poor concentration
- Inability to complete tasks

- Fixed gaze
- Appearing depressed, irritable, frustrated, or disinterested

Employees are strongly encouraged to get sufficient pre-work rest, maintain sufficient nutritionalintake during work (i.e., eat and drink at regular intervals), and communicate with team members and leaders if their level of fatigue elevates.

Use the following procedures to help detect and address fatigue-related issues:

- Periodically observe and query coworkers for signs or symptoms of fatigue.
- Site personnel that express concern over their level of fatigue, or that are observed to be fatigued such that elevated worker risk is evident, will be relieved or their work tasks adjusted so that they may rest sufficiently.
- Work schedules will consider fatigue factors and optimize continuous periods available for uninterrupted sleep. The employee is responsible for reporting to work properly restedand fit for duty. In case of an emergency or operational difficulty (e.g., limited access dueto water levels or boat repairs), work hours may require adjustment.
- Maintain a routine exercise program and regular sleep schedule as much as possible over the course of the work.
- Avoid heavy meals or caffeine and minimize or eliminate the consumption of alcohol and nicotine before sleeping.

9.2.2 Heat Stress

All personnel at the site will be required to drink plenty of water, take breaks in environmentally controlled areas as needed, monitor one another for the symptoms of heat-and-cold related injury and illness, and demonstrate their ability to respond to heat-related disorders. Additionally, administrative controls may also be required. Signs and symptoms of heat-related injury/illness are incorporated into the CCI Environmental procedure. Personnel operating in impermeable PPE will be interviewed and/ or physiologically monitored to assess the effects of heat on the body and reevaluate current protocols as necessary. When the body is unable to cool itself by sweating while wearing PPE, several heat-induced illnesses such as heat stress orheat exhaustion and the more severe heat stroke can occur and can result in death.

Factors Leading to Heat Stress

High temperature and humidity; direct sun or heat; limited air movement; physical exertion; poorphysical condition; some medicines; and inadequate tolerance for hot workplaces.

Symptoms of Heat Exhaustion

- Headaches, dizziness, lightheadedness, or fainting.
- Weakness and moist skin.
- Mood changes such as irritability or confusion.
- Upset stomach or vomiting.

Symptoms of Heat Stroke

- Dry, hot skin with no sweating.
- Mental confusion or losing consciousness.

- Seizures or convulsions.

Preventing Heat Stress

- No signs/symptoms of heat-related illnesses; monitor yourself and coworkers.
- Block out direct sun or other heat sources.
- Use cooling fans/air-conditioning, rest regularly.
- Drink lots of water; about 1 cup every 15 minutes.
- Wear lightweight, light colored, loose-fitting clothes.
- Avoid alcohol, caffeinated drinks, or heavy meals.

What to Do for Heat-Related Illness

- Call 911 (or local emergency number) at once.

While waiting for help to arrive:

- Move the worker to a cool, shaded area.
- Loosen or remove heavy clothing.
- Provide cool drinking water.
- Fan and mist the person with water

The following general precautions should be taken to avoid Heat Stress:

- Training in the prevention and recognition of heat stress symptoms
- Encourage proper physical fitness and diet in employees
- Maintain fluid intake (prevent dehydration)
- Administratively modify the work/rest schedule to incorporate more frequent breaks (i.e. 15-minute break per hour worked) based ambient temperature and humidity
- Use of the buddy system
- Availability of shaded and cooled rest areas and personal cooling devices

9.2.3 Cold Stress

All personnel at the site will be required to drink plenty of water, take breaks in environmentally controlled areas as needed, monitor one another for the symptoms of heat-and-cold related injury and illness, and demonstrate their ability to respond to heat-related disorders. Additionally, administrative controls may also be required. Signs and symptoms of heat-related injury/illness are incorporated into the CCI Environmental procedure. Personnel operating in impermeable PPE will be interviewed and/or physiologically monitored to assess the effects of heat on the body and reevaluate current protocols as necessary.

How cold is too cold?

When most people think of hypothermia, they think of frigid temperatures or blizzard-like conditions. Hypothermia occurs most often in the spring and fall, rather than winter. Four factors contribute to cold stress: cold temperatures, high or cold wind, dampness, and cold water. A cold environment forces the body to work harder to maintain its temperature. Cold air, water, and snow all draw heat from the body. Wind chill is the combination of air temperature and wind speed. For example, when the air temperature is 40°F, and the wind speed is 35

mph,your exposed skin receives conditions equivalent to the air temperature being 11° F. So, while it is obvious that below freezing conditions combined with inadequate clothing could bring aboutcold stress, it is important to understand that it can also be brought about by temperatures in the 50's coupled with some rain and wind.

How your body reacts to cold conditions

When in a cold environment, most of your body's energy is used to keep your internal temperature warm. Over time, your body will begin to shift blood flow from your extremities(hands, feet, arms, and legs) and outer skin to the core (chest and abdomen). This allows exposed skin and the extremities to cool rapidly and increases the risk of frostbite and hypothermia. Combine this with cold water, and trench foot may also be a problem.

Observe the following procedures and practices regarding cold stress:

- Take breaks in heated shelters when working in extremely cold temperatures.
- Modify, as needed, the anticipated work rate.
- Upon entering the shelter, remove the outer layer of clothing and loosen other layers to promote evaporation of perspiration.
- Drink warm liquids to reduce the susceptibility to cold stress but try to avoid stimulants such as coffee or tea.
- Be aware of cold stress symptoms, including shivering, numbness in the extremities, and sluggishness.
- Provide adequate insulating dry clothing to maintain warmth if work is performed in air temperature below 40°F. Wind chill cooling rates and the cooling power of air are critical factors. The higher the wind speed and the lower the temperature in the work area, the greater the insulation value of the protective clothing required.
- If the air temperature is 32°F or less, hands should be protected.
- If only light work is involved and if the clothing on the worker may become wet on the job site, the outer layer of the clothing in use should be impermeable to water. With more severe work under such conditions, the outer layer should be water repellent, and the outer wear should be changed as it becomes wetted. The outer garments should include provisions for easy ventilation to prevent wetting of the inner layer by sweat.
- Use of cotton or other absorbent materials to absorb sweat and maintain body warmth when wearing protective ensembles
- Utilize dry, insulated work gloves, liners for both hard-hats and work boots.
- If available clothing does not give adequate protection to prevent cold injury, work shouldbe modified or suspended until adequate clothing is available, or until weather conditions improve.
- Implement a buddy system in which workers are responsible for observing fellow workersfor early signs and symptoms of cold stress.

Signs, Symptoms, and Treatment

Cold stress can range from frostbite to hypothermia. The signs and symptoms of cold stress arelisted below. The appropriate guidelines should be followed if any personnel exhibit these

symptoms:

Frostbite. Frostbite is characterized by pain in the extremities and loss of manual dexterity. “Frostnip,” or reddening of the tissue, is accompanied by a tingling or loss of sensation in theextremities and continuous shivering.

Hypothermia. Hypothermia is characterized by pain in the extremities and loss of manual dexterity, with severe, uncontrollable shivering, and an inability to maintain the level of activity. Symptoms include excessive fatigue, drowsiness, irritability, or euphoria. Severe hypothermia includes clouded consciousness, low blood pressure, pupil dilation, cessation of shivering, unconsciousness, or death.

Move the patient to a warm, dry place. If the patient’s clothing is wet, remove it and replace it with dry clothing. Keep the patient warm. Re-warming of the patient should be gradual to avoid stroke symptoms. Dehydration, or the loss of body fluids, may result in a cold injury due to a significant change in blood flow to the extremities. If the patient is conscious and alert, warm sweet liquids should be provided. Coffee and other caffeinated liquids should be avoided because of diuretic and circulatory effects. Extremities affected by frostbite should be gradually warmed up and returned to normal temperature. Moist compresses should be applied; begin with lukewarm compresses and slowly increase the temperature as changes in skin temperatureare detected. Keep the patient warm and calm and move them to a medical facility as soon as possible.

Trench Foot Trench foot or immersion foot is caused by having feet immersed in cold water forlong periods of time. It is similar to frostbite but considered less severe.

Signs and symptoms:

- Tingling, itching, or burning sensation
- Blisters

What to do:

- Soak feet in warm water, then wrap with dry cloth bandages
- Drink a warm, sugary drink

9.2.4 Sunlight and Ultraviolet Exposure

Observe the following procedures and practices regarding ultraviolet (UV) exposure:

- Protect against extended exposure to sunlight with shade, long clothing, sunscreen, and high-SPF, broad-spectrum sunscreen applied frequently.
- Plan work to avoid unnecessary UV exposure.
- During peak daylight months, plan work for early morning or evening.
- Many factors affect the hazards associated with UV exposure, including the following:
    - Time of day: UV rays are strongest between 10 am and 4 pm.
    - Season of the year: UV rays are stronger during spring and summer months. Thisis less of a factor near the equator.
    - Distance from the equator (latitude): UV exposure goes down as you get farther from the equator.

    - Altitude: More UV rays reach the ground at higher elevations.
    - Cloud cover: The effect of clouds can vary. Sometimes cloud cover blocks some UV from the sun and lowers UV exposure, while some types of clouds can reflect UV and increase UV exposure. What is important to know is that UV rays can get through, even on a cloudy day.
    - Reflection off surfaces: UV rays can bounce off surfaces like water, sand, snow, pavement, or grass, leading to an increase in UV exposure.
- Cloud cover does not necessarily protect from UV exposure. Consider monitoring the UV index for your work area: http://www2.epa.gov/sunwise/uv-index.
- Evaluate site-specific factors affecting UV exposure and address work practices as appropriate.

Signs, Symptoms, and Treatment

The best way to treat sunburn is to prevent it using the guidelines listed in the bullets above. Signs of sunburn include the following:

- Pinkness or redness
- Skin that feels warm or hot to the touch
- Pain, tenderness, or itching
- Swelling
- Small, fluid-filled blisters, which may break
- Headache, fever, chills, and fatigue if the sunburn is severe

If signs of sunburn are noticed, avoid further exposure, and immediately implement treatment. If the sunburn is blistering *and* covers 15% or more of the body, seek medical attention.

Prevention

UV exposure hazards and their impacts on each worksite should be evaluated to determine the best practices for risk mitigation. The most effective way to prevent skin damage from UV exposure is to protect bare skin from exposure. This can be accomplished with shade, clothing (e.g., pants, long sleeves, or hats), sunscreen, and sunglasses. Plan work to either create shade or take advantage of natural shade and avoid peak UV times during the day when possible.

9.2.5 Inclement Weather

Observe the following procedures and practices regarding inclement weather:

- Evaluate the worksite for hazards that may be amplified during inclement weather, such as traction issues, ingress and egress, slope stability, or wind-driven hazards (e.g., dust, debris, or falling trees).
- Stop outdoor work during electrical storms (lightning strikes), hailstorms, high winds, and other extreme weather conditions such as extreme heat or cold.
- Take cover indoors or in a vehicle that will provide adequate protection. In some cases, this may require exiting the worksite, such as during windstorms in areas with overhead hazards (e.g., trees or power lines).
- Listen to local forecasts for warnings about specific weather hazards such as tornadoes,

hurricanes, and flash floods.

- Verify that on-site equipment and resources are adequately protected from inclement weather.
- If working in an unfamiliar geographic location, consult with local resources for unique weather hazards.

During severe weather, any out-of-doors site operations will be stopped under the following conditions:

- Lightning is within 15 miles of the site.- Operations will begin to come to a close.
- Lightning is within 8 miles of the site.
- The Site Project Manager/ Supervisor will measure the time from when the lightning is viewed until the thunder is heard. Since sound travels approximately one mile in five seconds, thunder heard in 15 seconds or less will result in operations shutdown in open areas. Depending on the severity of the storm the speed at which it can move into the immediate area can be swift and the Project Manager/ Supervisor may opt for a more conservative work stoppage. Crews shall discontinue operations, meet at a predetermined staging area and wait for further instructions. WeatherBug's Lightning App may also be used.
- Heavy precipitation that affects visibility, mobility, or the overall conditions in which equipment and personnel can operate safely.

In evaluating the time when it is safe for crews to resume work, the Project Manager/ Site Manager will determine if operations can continue in a safe manner. The wait may be as longas 30 minutes to ensure that the foul weather has passed. The "all clear" signal will be given, and personnel will return to work.

9.2.6 Insects and Spiders

Observe the following general procedures and practices regarding insects/spiders:

- Tuck pants into socks.
- Wear long sleeves.
- Use insect repellent.
- Avoid contact by always looking ahead to where you will be walking, standing, sitting, leaning, grabbing, lifting, or reaching.
- Check for signs of insect/spider bites, such as redness, swelling, and flu-like symptoms.

The most dangerous spiders to humans in North America are black widows and brown spiders(also known as brown recluse or fiddleback spiders). A guide to identifying these spiders is presented in Table 9-3.

Table 9-3: North American Hazardous Spider Identification Guide

Hazardous Spider Identification Guide	
Black Widow Spider • Abdomen usually shows hourglass marking • Female is 3 to 4 centimeters in diameter • Have been found in well casings and flush-mount covers • Not aggressive, but more likely to bite if guarding eggs • Light, local swelling and reddening are early signs of a bite, followed by intense muscular pain, rigidity of the abdomen and legs, difficulty breathing, and nausea • If bitten, see a physician as soon as possible	
Brown Spiders (aka Brown Recluse or Fiddleback) • Found in the central and southern United States, although in some otherareas, as well • 1/4-to-1/2-inch-long body, and size of a silver dollar • Hide in baseboards, ceiling cracks, and undisturbed piles of material • Bite may either go unnoticed or may be followed by a severe localized reaction, including scabbing, necrosis of the affected tissue, and very slow healing • If bitten, see a physician as soon as possible	

9.2.7 Bees and Wasps

Many encounters with bees and wasps occur when nests built in well casings or excavation areas are disturbed. Before opening a well casing, take a few moments to observe whether insects are entering or exiting. If they are flying to and from the casing, avoid it if possible. Ifyou must be in an area where disturbing a nest is likely, be sure to wear long pants and a long-sleeved shirt. Stinging insects fly around the top of their target, so if you get into trouble, pull a portion of your shirt over your head and run away.

If you get stung, look for a stinger and, if present, remove it as soon as possible. Several over- the-counter products or a simple cold compress can be used to alleviate the pain of the sting. Ifthe sting is followed by severe symptoms, or if it occurs in the neck or the mouth, seek medicalattention immediately because swelling could cause suffocation.

If you need to destroy a nest, consult with the PM, and project FS first. Commercially availablestinging insect control aerosols are very effective but could potentially contaminate the well.

Once the nest is destroyed, fine mesh may be applied over the exit and entry points of a wellcasing to prevent re-infestation.

9.2.8 Ticks

Ticks in North America can be carriers of several diseases, including Lyme's Disease, Rocky Mountain Spotted Fever, and ehrlichiosis. Limiting exposure to ticks reduces the likelihood of infection when exposed to tick-infested habitats. Measures to prevent tick exposure include thefollowing:

- Remove leaf litter and brush in areas where you will be working prior to tick season.
- Wear light-colored clothing so that ticks are visible.
- Tuck your pant legs into your socks.
- Apply repellents to discourage tick attachment.
- Promptly inspect your body and remove crawling or attached ticks when you leave a tick-infested area.
- Conduct tick checks on buddies upon exiting any suspect area (may be needed multiple times per workday).
- Be aware of seasonal activity; ticks are often most active in the spring.

Observe the following procedures and practices if you are bitten by a tick:

- Use fine-tipped tweezers or shield your fingers with a tissue, paper towel, or rubber gloves.
- Grasp the tick as close to the skin surface as possible and pull upward with steady, even pressure. Do not twist or jerk the tick; this may cause mouthparts to break off and remainin the skin.
- Do not squeeze, crush, or puncture the body of the tick because its fluids may contain infectious organisms.
- Do not handle the tick with bare hands because infectious agents may enter through mucous membranes or break in the skin.
- After removing the tick, thoroughly disinfect the bite site and wash your hands with soap and water.
- You may wish to save the tick for identification in case you become ill within 2 to 3 weeks. Place the tick in a sealed plastic bag in the freezer and mark the bag with the date of the bite.

Tickborne Diseases

LYME DISEASE

Lyme disease is an illness caused by a bacterium which may be transmitted by the bite of a tick(Ixodes Dammini), commonly referred to as the "Deer Tick". The tick is about the size of a sesame seed, as distinguished from the Dog Tick, which is significantly larger. The Deer Tick isprincipally found along the Atlantic coast, living in grassy and wooded areas, and feeds on mammals such as mice, shrews, birds, raccoons, opossums, deer, and humans. Not all ticks are infected with the bacterium, however. When an infected tick bites, the bacterium is passed into the bloodstream of the host, where it multiplies. The various stages and symptoms of the disease are well recognized and, if detected early, can be treated with antibiotics.

Removal of ticks is best accomplished using small tweezers. Do not squeeze the tick's body. Grasp it where the mouth parts enter the skin and tug gently, but not firmly, until it releases itshold on the skin. Save the tick in a jar labeled with the date, body location of the bite, and the place where it may have been acquired. Wipe the bite thoroughly with an antiseptic and seek medical attention as soon as possible.

The illness typically occurs in the summer and is characterized by a slowly expanding red rash,which develops a few days to a few weeks after the bite of an infected tick. This may be accompanied by flu-like symptoms along with headache, stiff neck, fever, muscle aches,

and/orgeneral malaise. At this stage treatment by a physician is usually effective; but, if left alone, these early symptoms may disappear, and more serious problems may follow. The most common late symptom of leaving the disease untreated is arthritis. Other problems which may occur include meningitis and neurological and cardiac abnormalities. It is important to note that somepeople do not get the characteristic rash but progress directly to the later manifestations.
Treatment of later symptoms is more difficult than early symptoms and is not always successful.

When in an area suspected of harboring ticks (grassy, bushy, or woodland area) the following precautions can minimize the chances of being bitten by a tick:

- Wear long pants and long-sleeved shirts that fit tightly at the ankles and wrists.
- Wear light colored clothing so ticks can be easily spotted.
- Wearing tick repellents may be useful.
- Inspect clothing frequently while in tick habitat.
- Inspect your head and body thoroughly when you return from the field.
- Remove any attached ticks by tugging with tweezers where the tick's mouth parts enter the skin. Do not squeeze or crush it.

ROCKY MOUNTAIN SPOTTED FEVER
In the eastern and southern United States this tickborne disease is transmitted by the infected Dog Tick (Dermacentor Variabilis). It is important to note that the Dog Tick is significantly largerthan the Deer Tick. Nearly all cases of infection occur in the spring and summer, generally several days after exposure to infected ticks. The onset of illness is abrupt and often accompanied by high fever, headache, chills, and severe weakness. After the fourth day of fever, victims develop a spotted pink rash that usually starts on the hands and feet and gradually extends to most of the body. As with Lyme disease, early detection and treatment significantly reduces the severity of illness. The disease responds to antibiotic therapy with tetracycline or chloramphenicol.

9.2.9 Mosquitoes

Mosquitoes in the United States have been known to carry West Nile virus, St. Louisencephalitis, and Dengue fever. Avoid mosquito bites by doing the following:

- Apply insect repellent containing DEET (N,N-diethyl-meta-toluamide) when outdoors. DEET is very effective but could potentially contaminate samples.
- Read and follow the product directions whenever you use insect repellent.
- Wear long-sleeved clothes and long pants treated with repellent to further reduce your risk or stay indoors during peak mosquito feeding hours (dusk until dawn).
- Limit the number of places available for mosquitoes to lay their eggs by eliminating standing water sources from around the work area.
- If you need to destroy a nest, consult with the PM and project FS first.
- Check to see if there is an organized mosquito control program near the project site. If no program exists, work with the local government officials to establish a program.

9.2.10 Venomous Snakebites

Reactions from snakebite are aggravated by acute fear and anxiety. Other factors that affect theseverity of local and general reaction from poisonous snakebite include: the amount of venom injected and the speed of absorption of venom into the victim's circulation; the size of the victim;protection from clothing, including shoes and gloves; quick antivenin therapy; and location of thebite.

First Aid Procedure

The objective of first aid is to reduce the circulation of blood through the bite area, to delay absorption of venom, to prevent aggravation of the local wound, and to sustain respiration. The most important step is to get the snakebite victim to the hospital quickly. Meanwhile, take the following first aid measures:

1. Keep the victim from moving around.
2. Keep the victim as calm as possible and preferably in a lying position.
3. Immobilize the bitten extremity and keep it at or below heart level. If the victim can reacha hospital within 4 to 5 hours and if no symptoms develop, no further first aid measures need be applied.
4. If mild-to-moderate symptoms develop, apply a constricting band 2 to 4 inches above the bite, but not around a joint (the elbow, knee, wrist, or ankle) and not around the head, neck, or trunk. The band should be 3/4 to 1 1/2 inches wide, not thin like a rubber band. The band should be snug but loose enough for a finger to slip underneath. Watch out for swelling. Loosen the band if it is too tight, but do not remove it. Periodically checkthe pulse in the extremity beyond the bite to ensure that the blood flow has not stopped.

Several other factors must be considered in cases of snakebite:

- Shock. Keep the victim lying down and comfortable and maintain his or her body temperature.
- Breathing and heartbeat. If breathing stops, give mouth-to-mouth resuscitation. If breathing stops and there is no pulse, start cardiopulmonary resuscitation (CPR) if you have been trained to do so.
- Identifying the snake. If you can kill the snake without risk or delay, bring it to the hospital for identification, but exercise extreme caution in handling the snake.
- Cleaning the bitten area. You may wash the bitten area with soap and water and blot it dry with sterile gauze. You may apply dressings and bandages, but only for a short period of time.
- Medicine to relieve pain. Do not give the victim alcohol, sedatives, aspirin, or any medicine containing aspirin. Some painkillers, however, may be given. Consult doctor or other medical personnel for specific medications that may be used.
- Snakebite kits. Keep a kit accessible for all outings in primitive areas or areas known or suspected to be snake infested.

It is not recommended that cold compresses, ice, dry ice, chemical ice packs, spray refrigerants,or other methods of cold therapy be used in the first aid treatment of snakebite.

9.2.11 Poisonous Plants

Poisonous plants include poison ivy, poison oak, and poison sumac as shown in Table 9-4. Observe the following procedures and practices regarding poisonous plants:

- Avoid entering areas infested with poisonous plants.
- Immediately wash any areas that come into contact with poisonous plants.
- Use PPE when there is a possibility of contact with poisonous plants.

Table 9-4: North American Hazardous Plant Identification Guide

Hazardous Plant Identification Guide		
Poison Ivy • Grows in the West, Midwest, Texas, and the East Coast • Several forms—vine, trailing shrub, or shrub • Three leaflets (can vary from three to nine) • Leaves are green in summer and red in fall • Yellow or green flowers • White berries		
Poison Oak • Grows in the East (New Jersey to Texas) and Pacific Coast • 6-foot-tall shrubs or long vines • Oak-like leaves in clusters of three • Yellow berries		
Poison Sumac • Grows in boggy areas, especially in the Southwest and Northern United States • Shrub up to 15 feet tall • Seven to 13 smooth-edged leaflets • Glossy pale yellow or cream-colored berries		

If you have been exposed to poison ivy, oak, or sumac, act quickly because the toxin in the plants penetrates the skin within minutes. If possible, stay outdoors until you complete the first two steps:

- Cleanse the exposed skin with generous amounts of isopropyl alcohol.
- Wash the skin with water.
- Take a regular shower with soap and warm water. Do not use soap until this point because it will pick up the toxin from the surface and move it around.
- Wash clothes, tools, and anything else that may have been in contact with the toxin with alcohol and water. Be sure to wear hand protection during that process.

Signs and symptoms of exposure include redness and swelling that appears 12 to 48 hours after exposure. Blistering and itching will follow. If you have had a severe reaction in the past,

you should see a physician right away. Over-the-counter products that are available to alleviatesymptoms include Cortaid®, Lanacort®, baking soda, Aveeno® oatmeal baths, and calamine lotion.

9.2.12 The Public at Large

The community residents around worksites may pose their own specific hazards. Theseconditions may include the following:

- Unintentional disruption of work
- Benign or malicious trespass
- Criminal intent

Scenarios may include the following:

- Pedestrians, cyclists, or motorists disregarding site boundaries due to distraction or willful disobedience.
- Public use of private site facilities for shelter, relief, and other reasons with no ill-intention.
- Public use of private site facilities for mischievous or criminal activity, such as loitering, vandalism, or theft.
- Encounters with community members who are disgruntled with the project activity.
- Encounters with criminal activities on or near a project site.

If any of the above are anticipated to be likely, take the following precautions as appropriate:

- Verify that the site is adequately marked and barricaded to limit unintentional disruptions of the work by the public.
- Review the site for attractive nuisances (e.g., hazards or conditions that are likely to attract children) and mitigate those.
- Secure all equipment and site facilities to prevent unauthorized access or use.
- Remove valuable items from the site or adequately secure them on site to limit the temptation for potential criminals.
- Have contact information for the client's or owner's public relations office while on site, and direct disgruntled community members to that office. If necessary, vacate the site to relieve the situation and notify the PM or FS.
- Work in pairs when uncertain of the public safety situation at a site. In questionable situations, postpone work as necessary until a plan of action can be developed to verify a safe working environment.

9.2.13 Personal Health and Safety

In addition to hazards associated with chemicals of concern, equipment, operations, or site conditions discussed above, there may be additional personal safety issues to consider at a site, including those related to one or multiple protected classes, such as race, gender, religion,ability, sexual orientation, or gender identity. These conditions may involve the following, perpetrated by the public or those associated with the work:

- Malicious disruption of work

- Harassment, including unwanted comments, gestures, or actions
- Threats of violence, either implied (using derogatory language) or explicit
- Assault

It is critical that the work environment be discussed within the project team to evaluate risks, ways to avoid those risks, and communication protocols. CCI Environmental Services requiresthat work be performed in teams.

Specifically, if any of the above are anticipated, take the following precautions as appropriate:

- Alert the PM, FS, H&S Manager, and/or Human Resources Department of potential issue(s).
- Formulate a plan of action to verify and maintain a safe working environment prior to field work, which may include the following:
  - Working in pairs and/or within a certain physical distance of other work groups.
  - Coordinated check-ins (calls to or from the office or visual check-ins with other field members).
- Whenever possible, schedule work only within daylight hours (which fluctuate seasonally)or on weekends when questionable scenarios may be more minimal.
  - If night work is required, always maintain a minimum of two field personnel, and potentially increase the total number of personnel.
  - If working in high-risk areas, discuss the possibility of hiring security if work needsto be performed at night, in low light, or near potentially dangerous areas (e.g., abandoned buildings, public displays of hostility, discrimination, or gang-related activity).
- Always maintain a field phone with active GPS and non-locking 911 capability whileout in the field.
- If a need arises for a change in field work (e.g., additional sampling or moving to an area that was not planned) or travel plans (e.g., dead battery or flat tire), immediately alert the FS and PM as to the event.

In addition, practice active awareness of your environment. Discuss personal health and safetyconcerns at the daily tailgate meeting. If you feel unsafe based on the potential behavior of others, immediately bring it up to field team coworkers. If the issue is not resolved to your satisfaction, alert the PM, FS, H&S Manager, and/or Human Resources Department to assist in resolving any potential issue(s).

10. Medical Monitoring Program

This section describes the medical monitoring program that CCI Environmental field personnelmust comply with when working on sites where there is a potential for exposure to hazardous wastes or other hazardous substances.

10.1 General Requirements

CCI Environmental Services employees shall be enrolled in a medical monitoring program in compliance with OSHA standards (29 CFR 1910.120(f)) under the following circumstances.

If they are involved with any of the following operations:

- Cleanup operations required by a governmental body, whether federal, state, local, or other involving hazardous substances that are conducted at uncontrolled hazardous waste sites (including, but not limited to, the EPA's National Priority List [NPL] sites, statepriority list sites, sites recommended for the EPA NPL, and initial investigation of government-identified sites that are conducted before the presence or absence of hazardous substances has been ascertained)
- Corrective actions involving cleanup operations at sites covered by the Resource Conservation and Recovery Act of 1976 (RCRA) as amended (42 U.S.C. 6901 et seq)
- Voluntary cleanup operations at sites recognized by federal, state, local, or other governmental bodies as uncontrolled hazardous waste sites
- Operations involving hazardous wastes that are conducted at treatment, storage, and disposal facilities regulated by 40 CFR Parts 264 and 265 pursuant to RCRA or by agencies under agreement with the EPA to implement RCRA regulations
- Emergency response operations for releases of, or substantial threats of releases of, hazardous substances without regard to the location of the hazard

And, if they meet the following criteria:

- Are or may be exposed to hazardous substances or health hazards at or above the established PEL, above the published exposure levels for these substances, without regard to the use of respirators, for 30 days or more per year

In addition, employees are required to be enrolled in the medical surveillance program if they meet any of the following conditions:

- Wear a respirator for 30 days or more per year
- Are injured, become ill, or develop signs or symptoms due to possible overexposure involving hazardous substances or health hazards from an emergency response or hazardous waste operations
- Are members of a Hazardous Materials (HAZMAT) team

CCI Environmental Services employees required to be enrolled in a medical surveillance program under 29 CFR 1910.120(f) shall have medical examinations and consultations made available to them by CCI Environmental Services on the following schedule:

- Prior to assignment
- At least once every 12 months unless the attending physician believes a longer interval(not greater than biennially) is appropriate
- At termination of employment or reassignment to an area where the employee would notbe covered if the employee has not had an examination within the last 6 months
- As soon as possible upon notification that the employee has developed signs or symptoms indicating possible overexposure to hazardous substances or health hazards,or that the employee has been injured or exposed above the PEL or published exposurelevels in an emergency situation
- At more frequent times, if the examining physician determines that an increased frequency of examination is medically necessary
- Biological monitoring shall be implemented on Pb clean-up sites in accordance with 29CFR1910.1025 if an employee exceeds the airborne action level based on 8-hourTWA

The content of medical examinations or consultations made available to employees shall be determined by the attending physician but shall include, at a minimum, a medical and work history with special emphasis on symptoms related to the handling of hazardous substances and health hazards, and to fitness for duty including the ability to wear any required PPE under conditions (i.e., temperature extremes) that may be expected at the work site.

The attending physician shall provide CCI Environmental Services with a written opinion for each examined employee that contains the following information:

- Whether the employee has any detected medical conditions that would place the employee at an increased risk of impairment of the employee's health from hazardouswaste operations work, emergency response, or respirator use
- Any recommended limitations on the employee's assigned work
- A statement that the employee has been informed of the results of the medical examination and any medical conditions that require further examination or treatment

The written opinion obtained by CCI Environmental Services shall not reveal specific findings or diagnoses unrelated to occupational exposures. Medical surveillance and other employee- related medical records shall be retained for at least the duration of employment plus 30 years.

10.2 Crew Self-Monitoring

All personnel will be instructed to look for and inform each other of any deleterious changes in their physical or mental condition during the performance of all field activities. Examples of such changes are as follows:

- Headaches
- Dizziness
- Nausea
- Blurred vision
- Cramps
- Irritation of eyes, skin, or respiratory system

- Skin chafing from damp or wet clothing
- Changes in complexion or skin color
- Changes in apparent motor coordination
- Increased frequency of minor mistakes
- Excessive salivation or changes in papillary response
- Changes in speech ability or speech pattern
- Symptoms of heat stress or heat exhaustion
- Symptoms of hypothermia

If any of these conditions develop, the affected person will be moved from the immediate work location and evaluated. If further assistance is needed, personnel at the local hospital will be notified, and an ambulance will be summoned if the condition is thought to be serious. If the condition is the result of sample collection or processing activities, procedures and/or PPE willbe modified to address the problem.

APPENDIX A- Health and Safety Forms

CCI- Daily Tailgate Safety Meeting

Project Name:		**Project No:**	**Date:**
Site Address:		**PM:**	**Client:**
Supervisor:		**Supervisor Signature:**	
Hospital and Urgent Care Info		Weather Conditions:	
		Temp:	Humidity:
		Decon Info:	**Daily Work to Be Performed:**
MEDCOR: 1-800-775-5866	CCI ER Line: 1-888-624-6555		
Daily Near Miss Discussion			
Were there any Near Misses encountered yesterday? Were any Near Miss(es) reported on an CCI Near Miss form or at 704-576-8181? (If "No", call them in immediately following the Tailgate Briefing For Near Misses encountered, what was the hazard addressed and how was the situation resolved?			
Permits/Plans Required (general, Specialized, etc.):			
Specialized tools/equipment:			

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT

☐ ANSI/ISEA 107-2010 Class 2 or 3 vest or ANSI/ISEA 107-2015 Type R, Class 1 or 2 vest

☐ Long pants

☐ Shirt with sleeves

☐ Safety glasses, wraparound or with side shields labeled with ANSI Z87.1 rating, or a certification card for lenses and frames

☐ Safety footwear meeting ASTM F2413-05 standard with chemical or oil resistant soles

☐ Gloves, either leather or cut resistant

☐ Hard hat that complies with ANSI Z89.1

TASK SPECIFIC: Personal Protective Equipment (PPE) Determination*

Eye Protection

Must comply with ANSI Z87.1

☐ Impact Goggles

☐ Flexible goggles

☐ Welding goggles/helmet or face shield. Tinted lenses required

☐ Laser safety glasses

Head Protection

☐ Type E Hardhat (Electrical)

☐ Hardhat with chin strap, miner's helmet with chin strap or mountaineering helmet with chin strap

Hazardous Atmosphere

☐ Photoionization Detector (PID)

☐ Flame Ionization Detector (FID)

☐ Dust Monitor

☐ LEL / O_2 Meter

☐ H_2S Meter

Hearing Protection

☐ Ear Plugs (noise 80 db)

☐ Ear Muffs with Ear Plugs (noise 105 db)

Body Protection

☐ Chemical resistant clothing recommended on SDS
SPECIFY TYPE: _____

☐ Chain saw chaps

☐ Snake chaps or boots marketed as "snake proof"[3]

☐ ANSI/ISEA 107-2010 Class 3 vest or ANSI/ISEA 107-2015 Type R, Class 2 vest if low light conditions or traffic flow at 50 mph or more

☐ ANSI/ISEA 107-2010 Class 2 or 3 *BREAKAWAY* vest or ANSI/ISEA 107-2015 Type R, Class 1 or 2 vest

☐ Sunscreen lotion >= SPF30

☐ Insect repellant (DEET: flying insects)

☐ Insecticide (Permethrin: ticks)

☐ US Coast Guard approved personal flotation device (PFD) – Type I, II or III

Face Protection

☐ Chemical protective goggles that comply with ANSI Z87.1

☐ Face Shield over safety glasses

Respiratory Protection

☐ Half-face Air Purifying Respirator

☐ Full-face Air Purifying respirator

☐ SCBA or Supplied Air

Fall Protection

☐ Personal fall arrest system designed or approved by a qualified person OR other means of fall protection determined by qualified person

Hand Protection

☐ Chemical resistant gloves per SDS

☐ Cut-resistant gloves or liners

☐ Leather/Work gloves

☐ Welding gloves

☐ Leather gloves, insulated

☐ Nitrile gloves

☐ Impact resistant gloves

☐ ANSI Cut Level 4 Gloves with exoskeleton

☐ Other: _____

Foot Protection

☐ Safety shoes or boots with metatarsal guards

☐ Safety boots with puncture-resistant midsoles or that have built-in puncture resistance (PR rated)

☐ Safety boots with electric hazard (EH) protection (standard in most footwear)

☐ Rubber-sole boots or grips

☐ Chemical resistant boot covers

☐ Lace-up safety boots conforming to ASTM F2413-05 or equivalent in non-US jurisdictions

Heat, Flame, Flash Fire or Arc Hazard

☐ Cooling vest

☐ Fire retardant clothing (FRC)

THIS PERMIT IS REQUIRED TO BE COMPLETED PRIOR TO THE START OF EVERY SHIFT AND IS TO BE MAINTAINED AND DISPLAYED AT THE SUPERVISOR'S VEHICLE

CCI- Daily Tailgate Safety Meeting

Crew will discuss specific hazards identified for the work scheduled for the day and the defenses in place to mitigate those hazards.	
SPECIFIC HAZARDS OF WORK (Chemical or Physical)	**DEFENSE(S) IN PLACE TO ADDRESS HAZARD**
A.	A.
B.	B.
C.	C.
D.	D.
E.	E.

WORK SAFETY COMMITMENT

I understand the expectations of this project; I understand the potential hazards associated with the work tasks detailed above and I will take appropriate action to mitigate those hazards, or any other hazards identified during the work. If, at any time, I observe that an unsafe condition exists, or an unsafe practice is being employed I have COMPLETE STOP WORK AUTHORITY and pledge to stop any unsafe work immediately.

Sign below indicating you understand your responsibilities on this job site and your participation in this Daily Tailgate Briefing:

		COVID-19 Screening	
Name	**Signature**	**Symptoms ? Y/N**	**Fever ? Y/N**

REPORT NEAR MISSES IMMEDIATELY USING THE CCI NEAR MISS HOTLINE 1-888-624-6555 OR 704-576-8181

Near Miss Report Form

A near miss is an event that has not resulted in any personal injury or property damage. It is every employee's responsibility to report near misses as soon as possible to eliminate future events. Reporting a near miss allows us to identify lapses or hazards that exist within our safety program. Such lapses and hazards can then be corrected to bring us closer to our goal of zero safety incidents.

Date of near miss:	Time:	☐am ☐pm
Exact location of near miss:		
Describe the near miss (*in as much detail as possible*):		
Safety Suggestions:		
Name (*Optional*):	Date Reported:	

Please file near miss report in completed drop box immediately, if reporting near miss digitally please email reporting form to Spencer.epps@cci-env.com or text to 704-576-8181.

HEAVY EQUIPMENT ACCEPTANCE/SAFETY INSPECTION CHECKLIST

Equipment Id No._____ Inspector's Name_____ Equipment Name_____ Job Number_____ Beginning Hours_____ End Hours_____ Date_____

INSTRUCTIONS: Each shift shall inspect all applicable items indicated. If an unsatisfactory condition is observed, suspend operation of the equipment and report the unsatisfactory condition to the site supervisor immediately.

ITEM INSPECTED	SATISFACTORY (YES, NO or N/A)	COMMENTS
Equipment Damage		
Falling Object Protection (FOP)		
Seat Belts		
Operator Seat Bar(s)		
Side Shields, Screens or Cab		
Lift Arm Device		
Grab Handles		
Back-up Alarm – Working		
Lights		
Guards		
Horn		
Windshield Wipers		
Glass, Mirrors		
Anti-Skid Tread Clear of Mud		
Safety Signs (i.e., swing area)		
Fire Extinguisher		
General Condition		
Fuel Connection		
Oil (fuel and no leaks)		
Clear of Extra Materials		
Controls Function Properly		
Damaged Parts		
Hydraulic System (full and no		
Parking Brake		
Lift Arm and Bucket		
Tires/Tracks		
Steering		
Breathing Air System		
Blast Shields		
Gallons of Fuel Added		
Quarts of Oil Added		

Operator Signature _____

Field Log

Excavation Permit

This form must be completed and signed by the CCI Excavation Competent Person or a Professional Engineer before any excavation work may begin. Note that sloping or benching in excavations greater than 20 feet in depth require approval of a professional engineer.

CCI Project Number: _____

Date: _____

Expected Duration of Excavation: _____

Excavation Location (specific):	Purpose of Excavation:	Equipment To Be Used:

Soil Type o Stable Rock o Type A o Type B o Type C

Size of Excavation Length:_____Width:_____Depth: _____

ANSWER ALL QUESTIONS BELOW PRIOR TO EXCAVATING	**Yes**	**No**	**N/A**
Has 811 been called to locate utilities? List Ticket Number here:			
Has a Private Utility Locate been performed at this site? Review results with staff. *NO MECHANICAL EXCAVATION allowed within 30 inches (in all directions) of any identified subsurface utility; Hand/vacuum excavation only.*			
Have existing drawings/blueprints been reviewed and identified utilities marked?			
Is appropriate equipment on-site to protect excavation (fence, railings, barricades, signs)?			
CCI Excavation Competent Person On-Site? List Name here:			
Requirement to keep excavated material a minimum of two feet from edge of excavation reviewed with all operators?			
Protective measures (shoring, sloping, benching) reviewed and understood by all operators?			

Permit Completed By:_____Date: _____

Permit Valid Until: _____

REVIEW AND COMPLETE REVERSE SIDE FOR ENTRY ACTIVITY INTO ANY EXCAVATION GREATER THAN 4 FEET

THIS PERMIT IS REQUIRED FOR ALL EXCAVATION ACTIVITIES AND SHOULD BE MAINTAINED AT THEJOB SITE UNTIL COMPLETION

Initial and daily inspections of excavations and protective systems are required to be performed by the CCI Excavation Competent Person:

1) prior to the start of excavation or any entry into the excavation,
2) after lunch break, and,
3) as needed throughout the workday and/or dependent on changing site conditions.

Job Location: _____

Date and Time:_____ _____am/pm

	Prior to First Entry TIME: am pm		Follow-up Inspection No. 1 TIME: am pm		Follow-up Inspection No. 2 TIME: am pm	
INSPECTION CHECKLIST REQUIREMENTS	YES	N/A	YES	N/A	YES	N/A
Have excavation site hazards/expectations been communicated to all affected site personnel?						
Is traffic properly directed away from the excavation area?						
Are adequate barriers in place to protect affected personnel and equipment?						
Is the excavation sloped correctly (1.5 H : 1.0 V)?						
Are spoils piles at least two feet from the edge of the excavation?						
Are spoils piles sloped properly away from the excavation (1.5 H :						
Are walls and bottom of excavation free of the following:						
Water seepage/accumulation?						
Shrinkage cracks?						
Caving or sloughing of soils since previous inspection?						
Significant fracture planes?						
Are ladders in place within 25 feet of all workers for egress?						
Do ladders extend at least 3 feet above the top of the excavation?						
For excavations greater than 4 feet deep, has an CCIConfined Space Entry Permit been completed?						
Have ventilation and/or air monitoring been performed?						
Is rescue retrieval equipment available, if necessary?						
Comments or Notes:						

Excavation Competent Person Name: _____

Excavation Competent Person Signature:_____ Date:_____

Daily Air Monitoring Report

Air Monitoring Log	1. Project Name	2. Date	3- Shift	4- Safety Officer and Contact Number:	
5- Site Location	6- Hazards of Concern	7- Action Levels		8- Weather	
9- Instrument ID	Monitoring Person	Results	Location	Time	Comments
10- Safety Officer Review		Comments:			

APPENDIX B- Job Safety Analysis

Job Safety Analysis / Job Hazard Analysis	Step #
Mobilization / Demobilization	1-3
Vehicle Operation	4
General Working Outdoors	5
Proper Lifting Techniques	6-10
Spotting Ground – Ground Personnel	11-14
Truck Loading Operations	15-17
Unloading Materials from Truck or Trailer	18-21
Air Monitoring	22-27
Equipment Facility & Set-up	28
Fueling & Lubing Equipment	29-32
Moving, Cutting & Handling Geotextile & other fabric	33-34
Construction / Farm Fence Installation	35-41
Water Truck Operation	42-45
Skid Steer Operation	46-50
Dozer Operations / Dozer Grading	51-53
Wheel Loader Operation	54-57
Excavator Operation	58-60
Heavy Demolition Operations	61-66
Excavating	67
Backfilling	68
Equipment & Truck Decon	69-73

Job Safety Analysis Form (JSA)

Task: **Remediation of FPE Site**

Name: Spencer Epps Position/Title: Health & Safety Manager Date: 2023

Task #	Task/Step	Potential Hazard(s)	Recommended Control Measures
1.	Check vehicles before trip	Slip, trip, and fall while walking around vehicle	• Identify and remove trip hazard to reduce chances of injury. If hazard cannot be removed, move vehicle to an alternate location. • Check for wet/slippery walking surface by scanning area and walk around area to avoid injury. If wet/slippery surface is observed, move vehicle to an alternate location.
		Struck by other vehicles after parking and/or exiting vehicle due to lack of traffic controls or poor visibility	• Perform inspection in parking lots or areas with observed minimal traffic conditions. • Stay out of the flow of traffic. • Wear reflective vest/shirt to increase visibility to other motorists.
2.	Load equipment	Struck by other vehicles due tolack of traffic controls or visibility	• Perform loading in parking lots or areas with observedminimal traffic conditions, if possible. • Use cones to designate loading area to other vehicles. • Wear reflective vest/shirt to increase visibility to othermotorists.
		Slip, trip, and fall while loading equipment	• Identify and remove trip hazard to reduce chances of injury. If hazard cannot be removed, move vehicle to analternate location. • Check for wet/slippery walking surface by scanning area and walk around area to avoid injury. If wet/slippery surface is observed, move vehicle to an alternate location.
		Exertion/muscle strain from unpacking equipment	• Do not lift over 45 pounds without assistance from another person. • Lift using legs and keep back straight, do not bend at • waist or twist. Keep a wide base of support, hold theload close, and stay in line with the spine.
		Hit head on tailgate/hatch back when setting up	• Keep tailgate/hatchback closed when not unloadingequipment. • Wear hard hat to prevent struck against head injurieswhen the tailgate/hatchback are open.

		Dropping equipment on self orothers	• Carry small loads. Do not lift over 45 pounds without tassistance from another person. Wear steel toed boots to prevent foot injury from dropped equipment.
		Lacerations/pinch points withequipment and equipment cases	• Identify pinch points such as equipment case hinges and any contact points between objects and keep hands/fingers away from these areas. • Wear level 4 cut resistant gloves when loading any objects.
		Equipment falls from truck andgets damaged during travel.	• Use straps to secure boxes, coolers, etc. in the back of atruck bed. • Inspect load a minimum of once every 2 hours duringtravel to reduce potential for load becoming unsecureand causing damage to other vehicles.
3.	Drive to/from site	Collision with other vehicles/objects	• Drive defensively and use Smith System techniques. • Obey speed limits and traffic signs. • Check mirrors every 2-3 seconds. • Keep a minimum of a two car length distance from othercars. Adjust speed in heavy traffic to maintain clearance with the vehicle in front of you. • Always wear a seatbelt when vehicle is in motion.
		Fatigue caused by driving longdistances	• When driving long distances (>100-miles), switch driversevery 2-hours and/or take 10 minute breaks.
		Striking vehicle/objects whenbacking up	• Avoid backing up whenever possible. • Check clearances before entering vehicle. • If vehicle is not equipped with a back-up alarm, use hornas warning prior to backing. • Have spotter direct vehicle while backing.
		Striking debris/animals in theroad	• Keep eyes on roadway and scan your travel area. • Use Smith System techniques and Aim High in Steering.
		Slippery road conditions/lowvisibility	• Reduce speed 5 to 10 miles per hour less than the posted speed limit, or more depending on conditions, when driving in snow, rain, fog or any other hazardousroad condition that increases likelihood of a vehicular crash. • Increase distance from vehicle in front of you.
		Striking vehicle/objects whenparking	• Choose location that minimizes chance for vehicle to bestruck by another vehicle. • Use spotter to back vehicle into parking area if backing isrequired. • Leave 3-feet of clearance from objects when parking.
4.	Vehicle Operation	Equipment no functioning properly	• Inspect vehicle prior to operation to ensure headlights, taillights and turn signals are functioning

			• Check tire pressure, fuel and fluid levels for adequate amounts
		Backing / Reversing	• Back into spaces upon arrival, whenever possible • Walk around vehicle before backing to identify any new conditions or obstructions • Use a spotter when backing whenever possible • Sound horn prior to backing • Check all mirrors prior to backing • Back slowly into areas of obstructed vision
		Unfamiliar with the vehicle	• Familiarize yourself with the vehicle before moving • Review the dashboard controls, steering radius, overhead and side clearances • Properly adjust mirrors and seat • Locate windshield wipers and lights
		Speed	• Obey all posted speed limits • Radar Detectors are prohibited in company owned, leased, or rented vehicles • Reduce travel speed during hazardous conditions • Identify if your vehicle has anti-lock brakes (ABS). If it does Do Not pump the brakes to stop if the vehicle has begun to skid. Apply steady pressure to the brakes. If the vehicle does not have (ABS) you will want to pump the brakes to stop during slippery conditions
		Distance / Spacing	• Follow the 3 second rule • Increase the 3 second rule as necessary during hazardous driving conditions • Always leave yourself an “out” during travel • When stopping always leave enough space between you and the car in front • Drive defensively • Do not tailgate
		Skids	• If the vehicle has begun to spin out of control, turn the steering wheel in the direction of the skid and re-adjust the wheel as necessary • Slow travel speeds during hazardous travel conditions • Do not take vehicles off roads if they cannot be operated safely
		Blind Spots	• Become familiar with any blind spots associated with your vehicle • Adjust mirrors properly • Use directional signals • Always look over your shoulder to make sure the lane is clear

			• Be cautious when approaching other drivers blind spots
		Loss of concentration, not paying attention, vehicle accident	• Do not use hand held cell phones while operating motor vehicle
5.	Walking to and from work location	Slip, trip, and falls from uneven terrain/surfaces	• Scan the walking path ahead for potential slip, trip, or fall hazards. Alert others in group and use an alternate route around these impediments. • Identify and remove hazards to reduce chances of injury. If hazards cannot be removed, mark with paint or flagging and notify others. • Check for wet/slippery walking surface by scanning area and walk around area to avoid injury.
		Struck by vehicle due to lack of traffic controls or poor visibility	• Back into a parking spot or park along the edge of the access road, so you can pull forward when leaving. • Do not walk around the parking area while talking on cell phone. • Wear reflective vest/shirt to increase visibility to drivers.
		Bites to body from contact with ticks/chiggers/misc. insects	• Clear work area so as to not have to walk against flora. • Tuck pant legs into boots in high vegetation areas. • Use insect repellant on clothing and skin as indicated by manufacturer. • Conduct buddy checks for ticks throughout the day, at the end of the day, and check yourself prior to taking a shower.
		Cuts from branches/ plants/briars or reaction to poisonous flora	• Find a clear path, if available. • Scan the walking path ahead for poisonous or sharp plants. Alert others in group and use an alternate route around these impediments. • Disclose any plant allergies to site manager and site personnel; have TecNu available if poison ivy in area. • Wear hard hat to protect head from being hit or cut. • Wear level 4 cut-resistant, impact resistant gloves to protect hands.
		Fire ant bites	• Do not go into heavily vegetated areas if it is not necessary to complete task. • Scan the walking path ahead for fire ant mounds. • Place orange flagging or bright colored pin flag within 10-feet of ant mound to alert others of its presence. • Do not stand near fire ant mounds.

			• If fire ant mounds are present, tuck pants into boots to reduce potential of ants getting under your clothing and biting.
		Bites from animals/snakes	• Scan the area for animals/snakes. If biological hazards are observed alert others in the group and exit the area immediately. • Wear snake chaps as protection against bites when potential for bites from snakes exist.
		Mosquito bites or Bees/Wasp stings	• Identify those field personnel that are allergic to bees/wasps and ensure they have an EpiPen onsite. EpiPen needs to be within 10-feet of personnel who are allergic to bees. • All site personnel are required to understand how to use EpiPen in case of an emergency. • Scan work area for bee/wasp activity. If bees/wasps are identified in the work area contact the PM to discuss. • Wear insect repellant when biting bugs are present if there is no potential to contaminate samples. • Move work area/sample location to reduce potential for bee/wasp sting(s). • Do not wear perfumes/deodorants with strong odors. • Cover all food and drinks. • Do not swat at bees or wasps.
		Eye injury from contact with vegetation	• Watch for vegetation that may be at eye level when walking, and for lower vegetation if squatting or bending over. • Use hand clippers/shears to remove vegetation that may pose a risk of eye injury near work area before starting work. • Wear safety glasses at all times.
		Exposure to Weather (Heat Stress, rain, lightning, sun)	• Check weather conditions prior to starting activities. Wear clothing appropriate for the expected weather conditions (light weight and wicking for hot weather). • Do not work in extreme weather conditions (strong winds or lightening/thunder). • Take shelter in the nearest vehicle or permanent structure in the event of lightning, thunder, or heavy rain. Wait at least 30 minutes from the last occurrence before returning to work. • Drink a minimum of 2-liters of water throughout the day (increase depending on body weight, physical activity, and climate). Drink water consistently, not just when thirsty. Follow Heat Management Guidance for work/rest as necessary during exposure to elevated temperatures.

			• Avoid caffeinated beverages throughout the day as they are a diuretic which dehydrate the body. • When temperature are greater than 90 degrees: • Take rest breaks every hour and consume water and/or sports drinks to hydrate and replenish salts in body. • Monitor your buddy and yourself for signs of dehydration which include lack of sweating, dizziness, and nausea. Seek medical attention, if necessary. • Wear sunscreen with a minimum of 15 SPF on exposed skin in sunny conditions to prevent burns if prone to sunburn.
6.	Determining weight of load	Injury to back	• Plan ahead and get help if load is heavy. • Personal Protective Equipment: Steel toe shoes and gloves
7.	Bending Down	Injury to back	• Bend with your knees not your Back. • DO NOT bend over with legs straight or twist while lifting. • PPE: Steel toe shoes and gloves
8.	Lifting load	Injury to back	• Lift with your legs and hold objects only chest high. • Avoid trying to lift above shoulder level. • PPE: Steel toe shoes and gloves.
9.	Stand on a solid level surface	Slip or fall	• ALWAYS be sure of footing. • PPE: Steel toe shoes and gloves.
10.	Moving the load	Injury to back	• Never twist your body to move a load. • Turn your feet.
11.	Receiving trucks and collecting weight tickets	**Contact** - Struck by vehicle resulting in bone crushing injuries	• Communicate daily tasks at morning safety meetings. • Cell Phones will not be used in exclusion zone to prevent distractions and contact hazards with oncoming vehicles. • Wave truck ahead and use hand signals to stop truck at mandatory stop locations. • Wait until truck has completely stopped and get driver's attention and acknowledgment first before approaching. • Walk at least 6' in front of truck, maintaining eye contact with driver. • Wear high visibility safety vest to be more visible to truck drivers.
		Exposure - to sun, dust resulting in sunburn and respiratory issues	• Keep hydrated 4:1 water to sports drink. • Call for water truck when it gets dry and dusty. • Wear long sleeved shirt to protect skin from sun radiation.
12.	Escort/Spot trucks into work area	**Contact** - Struck by equipment, site traffic,	• All trucks must be escorted in and out of the work area.

		trucks resulting in severe bone crushing injuries	• All drivers must receive site-specific safety orientation prior to being escorted to work area. • Do not exceed site speed limit of 10 mph while traveling onsite. • Talking on cell phone while driving is not allowed. • Stay in line of sight of driver at all times (if you can't see the driver, the driver can't see you). The driver must Stop Work if the spotter can't be seen physically or in mirrors. • Do not pass moving vehicles on site access roads. • Position trucks to allow forward egress. Sound horn and inspect travel path for obstructions before backing. • Wear high-visibility traffic vests while walking onsite for increased visibility.
		Falls - while exiting and entering truck cab and while spotting	• Truck drivers are to stay inside cab at all times. • Do not walk backwards or through standing water. • Remove tripping hazards from walk area or plan an alternate route. Mark out trip hazards that cannot be moved. • Do not walk backwards while spotting trucks. • Wear cut 4 work gloves and long-sleeved shirts to protect against scrapes/cuts in case of fall.
		Contact - Electrocution, fires, or explosions due to contact with utilities	• Inspect travel paths before escorting truck. • Protect underground utilities from truck weight by installing road plates – stabilize plates to prevent movement (cover with rock, install stakes, etc.). • Stay at least 10' away from overhead powerlines.
		Exposure - to dust resulting in respiratory issues	• Use a water truck or water trailer with sprayer to suppress or eliminate dust. • Keep windows rolled up when traveling onsite and while in work area. • Do not exceed 10 mph while traveling on site. • Spoggles shall be worn if winds are over 25 mph.
13.	Spot trucks during loading/unloading	**Caught** - Injury from truck tipping over resulting in fatal bone crushing injuries	• Conduct dumping on level ground. • If the load in the bed appears to be stuck (not dumping) while bed is being raised, Stop Work before bed is over half-way up by waving at the driver. Load shall be lowered and tried again until load moves to avoid top-heavy bed. • Truck bed or cover will not be raised or lowered if wind speeds exceed 25 mph sustained for 15 minutes. • Spotter to remain out of the tip zone of the truck dumping 1.5 times bed length.
		Contact - Struck by falling debris resulting in cuts and lacerations	• Loads shall never be swung over truck cab. • Ground personnel shall stay out of exclusion zone.

		and bone fractures	• Truck drivers are to remain inside cab at all times.
		Contact - Uncontrolled movement of trucks / vehicles resulting in a collision and bone crushing injury	• Ensure driver sets parking brake after parking truck/vehicle. • Do not approach truck until air brake is set. • Wear high visibility safety vest to be more visible to drivers.
14.	Escort/Spot trucks out of work area	**Contact** - Struck by falling or flying objects from truck bed resulting in broken bone injuries	• Spotter will inspect truck for and remove loose objects before escorting the truck out of the work area. • Loose mud and rock must be removed before allowing the truck to exit the site.
		Contact - Electrocution and/or struck by from overhead objects (electrical lines, trees, etc.)	• Ensure that truck bed is completely lowered before making a full • forward motion.
15.	Inspection of excavator	See JSA for Excavator Operation	• See JSA for Excavator Operation
16.	Loading roll-offs using excavator	**Falls** - Slip, Trip, Fall at when mounting and dismounting equipment	• Inspect terrain for uneven surfaces, avoid walking on uneven surfaces. • Remove debris and trip hazards along path to equipment. If debris cannot be removed, mark it out. • Always use 3-points of contact when mounting and dismounting machinery. • Ensure ladders or steps are free from dirt and debris. • Always face ladders/machine when mounting/dismounting. • If checking fluids above 6', fall protection required. • Wear safety-toed boots with good tread due to possible debris in work area
		Contact - Striking ground personnel while operating resulting in bone crushing injuries	• Only qualified and authorized operators can operate excavator. • Do not use cell phone or text message while operating equipment. • Use established hand signals to communicate intentions with the ground personnel prior to ground personnel entering the swing radius of the equipment. • Work area will be demarcated to prevent ground personnel from entering work area. • Excavator must be turned off with parking brake engaged before operator acknowledges approval to allow ground personnel to approach as well as hands removed from controls.

			• Verify backup alarm is operational before backing. Observe before backing. Back-up alarm must be operational. Take equipment out of service if it is not. • Stop work when ground personnel enter the work area without authorization.
		Caught - Rollover from steep inclines / edge of excavation and suffering crushing injuries	• Approach slopes perpendicular to the base of the excavation. • Haul roads and traffic areas adjacent to excavations must be inspected by the site management prior to work in that area to identify potential areas of sloughing so the area can be demarcated with cones, caution tape, or construction fencing. • Tracks will be parallel or horizontal to slope according to equipment to be utilized. Consideration of center of gravity is to be evaluated. • Slope excavation work will be done with experienced and qualified operators only. • Seat belts must be worn at all times.
		Exposure - Noise while operating equipment resulting in hearing loss	• Close cab door to reduce noise level during operation. • Noise assessment has been conducted and hearing protection will not be required while operator is operating excavator/backhoe.
		Exposure - Dust and soil during equipment operation resulting in respiratory issues	• Note wind direction throughout the day. • Close cab door to reduce exposure to dust. • Implement dust suppression via water truck if dust is visible. • When visible dust or if winds over 25mph spoggles will be worn to protect eyes when outside the excavator or backhoe
		Contact - Falling materials such as debris, soil resulting in cuts and lacerations	• Personnel will not attempt to loosen “stuck” items by hand. • **GROUND PERSONNEL ARE NOT ALLOWED** inside the work area. • Vehicles and equipment shall not be allowed alongside of roll-offs being loaded. • Operators will have windshields closed in excavators. • Cabs will be closed when loading is taking place. • Operator will not overload roll-off bin. • Loaded material will be spread evenly. Back of roll-off will not be overloaded. • Roll-offs will be covered and wrapped prior to shuttling across berm to the staging area.
		Contact - Overhead powerlines and	• Have spotter in place to communicate with the

		equipment in the area resulting in electrocution	operator if within 20' of power lines/tower/poles. • Look up and check for powerlines. Stay at least 10' from overhead powerlines. Increase distance for higher voltages. • Survey work area and mark wells or objects that cannot be removed.
17.	Loading and shuttling roll-off bins	**Contact/Caught** – Employees contacted by shuttle truck or caught between shuttle truck and roll-off.	• No ground personnel to be located in the backing area or loading area while roll-off bins loaded onto shuttle truck. • Spotter should be used when necessary to assist in directing and maneuvering while backing. • Ground personnel shall stay clear of loading area when cable is under load and bins are being lifted.
18.	Positioning of truck/trailer for unloading materials	**Contact** - Striking or getting struck with other heavy equipment in the work area resulting in bone crushing injuries	• Communicate daily task during morning safety meeting. • Meet delivery truck at the site entrance and review traffic management plan with the driver. • Escort the driver to the site to get unloaded. • Follow speed limit of 5 mph on site. • No cell phone use while driving on site or within exclusion zone. • When walking around the work site, wear hard hat, safety glasses with side shields, high visibility vest or shirt to be more visible. • Wear safety-toed boots with good tread.
		Falls – Slip, Trip, Fall when surveying the area and spotting into position the truck to get unloaded resulting in strain/sprain and cuts and lacerations	• Spotter and driver must inspect terrain for uneven surfaces. • Spotter must avoid walking on uneven surfaces. Keep eyes on walking surface when spotting trucks. • Do not walk backwards when spotting. • Wear cut 2 work gloves or higher work gloves when walking around the work area to prevent cuts and lacerations to the hands in case falling. • Wear safety-toed work boots with good tread to protect feet from debris on the ground and prevent slips.
		Contact – The truck driver striking the spotter and or ground personnel in the work area	• Delivery trucks must always have a spotter when backing. • Assign workers to traffic control when unloading materials in an area that is open to site traffic. • Ground personnel must make positive contact (receive acknowledgement) with the driver before approaching truck • Clearly demarcate unloading area once truck is positioned to keep unauthorized personnel out.

			• Driver must maintain communication with spotter at all times. • Spotter must have on high visibility vest when spotting truck into position to increase visibility.
		Contact - striking overhead, surface utilities resulting in electrocution	• Power poles, surface utilities, utility stick-up, or wells must be identified, marked, and protected from contact with equipment. • Look up and around for above and below ground utilities. • Spotter must be in place when the truck is backing up to prevent contact with surface utilities.
		Exposure – Noise resulting in hearing loss	• Spotter to stay at least 10' away from running truck motor to avoid high noise exposure. • Turn engine off when truck is not moving. • Wear single hearing protection when within 10' of running truck motor or when noise levels are above 85 dB
		Contact - Bites/stings/allergic reactions from insects, bees, snakes, fire ants, mosquitoes, or plants	• Refer to General Site Work JSA.
19.	Evaluation and inspection of materials and removal of rigging	**Fall** - Slips, Trips, and Falls off truck when inspecting resulting in broken bones	• Always use 3-points of contact when accessing truck cab/trailer. • Use permanently affixed ladders or secure a site ladder to the truck to access the truck bed • Ensure ladders or steps are free from loose soils when mounting and dismounting machinery. • If inspection is above 6', fall protection is required.
		Contact – Getting struck by or against vehicle or heavy equipment resulting in bone breaking injuries	• Demarcate staging area with cones to prevent vehicles from entering the work area. • Assign workers to traffic control when unloading materials in an area that is open to site traffic • Wear safety vest to be more visible.
		Caught – Getting hands and fingers in between rigging and load resulting in cuts and lacerations and or amputation	• Keep hands/fingers clear of pinch points created between rigging and load when removing come-along and tie down ratchets during rigging removal. • Wear cut 2 work gloves throughout task to protect hands from cuts and lacerations if hands are pinched.
		Fall – Slip, Trip, Fall when carrying material from delivery truck resulting in strain/sprain and or cuts and	• Trash / debris must be picked up and removed from operating and walking areas before unloading. • Inspect walk areas and communicate possible

		lacerations	hazards. • If trip hazards cannot be removed, mark them and communicate. • Use spotter when carrying materials that limit a worker's visibility, or when carrying in areas where trip hazards exist. • Wear safety-toed work boots to protect feet from debris on the ground.
20.	Unloading materials by hand	**Caught** – Getting hands and fingers caught when setting down material being unloaded resulting in cuts and lacerations	• Do not place hands/fingers underneath a load when setting it down. • Do not place hands/fingers between items when placing them together. • Cut 2 work gloves must be worn to prevent cuts and lacerations.
		Contact - Ground personnel getting struck by heavy equipment resulting in bone crushing injuries	• Heavy equipment shall be inspected prior to work. • Do not use cell phone while operating equipment. • Follow speed limit of 5mph. • Set an exclusion zone of 25' so that non-essential ground personnel cannot enter the work area. • Only qualified and authorized operator can operate the heavy equipment. • Confirm load capacity of equipment prior to unloading with equipment. • Trucks will not be tarped or untarped while the truck is in motion. • Trucks will not move with the truck bed elevated higher than ½ the length of the truck.
		Contact - Overhead powerlines and equipment in the area resulting in electrocution	• Have spotter in place to communicate with the operator if within 20' of power lines/tower/poles. • Look up and check for powerlines. Stay at least 10' from overhead powerlines. Increase distance for higher voltages. • Survey work area and mark wells or objects that cannot be removed.
21.	Unloading materials by use of heavy equipment	**Caught** - Operator get caught in equipment if tipped over resulting in bone crushing injuries	• Unload trailer on level ground. • Confirm load capacity of equipment used to unload. • Seat belt shall be worn at all times. • Trucks will not be tarped or untarped while the truck is in motion. • Trucks will not move with the truck bed elevated higher than ½ the length of the truck.
22.	Tailgate Safety Meetings	Unaware of job site hazards, conditions and critical safety actions	• Conduct a tailgate safety briefing each day prior to the start of work and if job site and/or conditions change during the day. Review appropriate sections of the Field Safety & Health Handbook. Ensure that all employees are fully aware of all hazards and are wearing all necessary PPE.

			Ensure all employees are aware of the locations of emergency equipment and contacts.
23.	Calibrating PID'/FID meters	Exposure to calibration-span gas during bump test	• When bump testing PID meter, make sure to open doors and window for increased ventilation. • When placing the regulators on the gas cylinders, ensure that it is hand tight.
		Exposure to dust and fine debris in/on meters	• Prior to bump testing, clean the meters off. • Do not blow directly on the equipment to clean the meters. • When possible, wipe meters down with wet towel. • Nitrile gloves shall be worn when cleaning meters if impacted with material.
24.	Setting up Particulate Pumps	Cutting and connecting hose for particulate pumps	• Wear cut IV gloves when preparing hose and connecting to pumps. • Use self retracting safety knives for any cutting. • Do not be connecting hoses while walking.
25.	General Environmental/ Excavation Area Conditions	Heat Stress/Cold Stress	• Dress appropriately for the weather. • Take frequent breaks as necessary to cool off. • Stay hydrated by drinking plenty of water • Stay out of direct sunlight when possible.
		Severe weather	• Monitor the weather forecast for each day's activities. • Take immediate shelter in a protected structure or field vehicle in the event of lightning, hail, high winds, or flooding.
		Bites/Stings - Insects/Spiders/Snakes	• Wear insect repellant during outdoor activities. • Avoid disturbing area that may be a habitat for insects, spiders, or snakes. Use caution when moving rocks, equipment, or other items that may be providing shelter for these animals. • Wear sturdy boots to protect from snake bites.
		Heavy equipment operation in vicinity	• Establish clearly marked work areas using barrier tape, cones, or other highly visible material. • Wear safety vests to increase visibility. • Notify the site contact of the work area. • Acknowledge presence, establish dialogue or hand signal with equipment operators when within 200 ft of heavy equipment.
		Uneven terrain	• Survey the working area prior to set up or approaching excavations. Be mindful of any holes, pits, or other hazardous terrain. • Wear sturdy safety shoes.
		Head and body injuries by getting stuck by	• Scan area for moving vehicles and heavy equipment before mobilizing through work

		vehicles and other heavy equipment or debris	areas to monitoring locations. • Communicate using radio and/or hand signals with heavy equipment operators in the work area. • Only approach or pass through with acknowledgement from operators. Maintain communication at all times when in the work area. • Do not walk next to or behind equipment without contacting equipment operator first. • High visibility vest shall be worn to be more visible to operators.
		Exposure to vapors produced by disturbing cinder/ash (inhalation hazard).	• Stay upwind of potential sources of vapors. • Ensure personnel using gas meter have been trained on instrument use. • **Implement Stop Work when action levels are reached** and determine • plan for continuation of work activities (i.e. implement engineering controls, evacuate work area, upgrade PPE, further investigation/air monitoring).
		Getting struck by excavated debris	• Stay at least 30 feet back from excavators and 25 feet back from backhoes. • Safety glasses with side shields shall be worn.
		Exposure to dust while walking through work areas	• Stand upwind of work area when possible to conduct readings. • Where there is visible dust, spoggles shall be worn.
		Hearing damage from noisy equipment or operations	• Wear hearing protection when working around high noise areas.
26.	Equipment/Site Set Up	Materials handling/heavy lifting	• Utilize appropriate lifting techniques. • Team lift objects over 45 lbs. • Utilize material handling equipment whenever possible
27.	Monitoring/Data Collection	Heat stress/Sunburn	• Work in shaded areas when possible. • Use sunscreen and consider use of canopy if staying in one area. • Drink plenty of water and take breaks as necessary.
		Attention to surroundings	• Position yourself or identify potential for hazards prior to recording measurement
28.	Equipment / facility set-up	Handling heavy objects	• Avoid actions/activities that contribute to overexertion • Warm up muscles before engaging in lifting activities • Review lifting posture/techniques regularly at safety meeting

		High noise levels	• Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period) • Assess noise level with sound level meter if possibility exists to exceed 85 db A TWA
		Electrical Shock	• De-energize or shut off utility lines at their source before work begins • Use double insulated or properly grounded electric-power, operated tools • Maintain tools in a safe condition • Provide an equipment-grounding conductor program or employ ground-fault circuit interrupters • Use qualified electricians to hook up electrical circuits • Inspect all extension cords daily for structural integrity, ground continuity, and damaged insulation • Cover or elevate electric wire or flexible cord passing through work areas to protect from damage • Keep all plugs and receptacles out of water • Use approved water-proof, weather-proof type if exposure to moisture is likely • Inspect all electrical power circuits prior to commencing work • Label all electrical boxes > 200 volts with circuit voltage • Follow Lockout-Tagout procedures in accordance with Contaminant Control's Safety and Health Procedures
		High / low ambient temperature	• Monitor for Heat/Cold stress in accordance with Contaminant Control's Safety and Health Procedures
29.	Pulling equipment up to fuel tank	**Contact** - ground personnel getting struck by equipment or fuel truck resulting in bone breaking injuries	• Communicate daily tasks during morning safety meeting. • Fuel in designated area. • Personnel performing fueling and lubing will verify location of ground personnel before moving. • Equipment to be greased will be staged away from the fueling area while other equipment is being fueled. • All personnel will have on high visibility vest while in the work area.
		Contact - with other heavy equipment resulting in damage	• Personnel performing fueling and lubing will verify location of other equipment before moving. • Equipment to be greased will be staged away from the fueling area while other equipment is

			being fueled. • If using fuel truck to get fuel, place wheel chocks after exiting fuel truck.
		Falls - Slip, Trip, because of fuel hose, un-even ground resulting in strains/sprain or cuts and lacerations	• Use three points of contact at all times when mounting / dismounting equipment. When dismounting, no twisting, both feet must be on secure ground before walking away. • Face equipment/ladders when mounting/dismounting. • Park equipment in staging area with proper footing, i.e., Gravel or a prepared surface that is kept clean from debris or ruts. • Wear safety-toed work boots to protect feet against debris on the ground.
30.	Tank and Equipment Inspection	**Exposure** - Petroleum and Fumes resulting in skin irritation and inhalation/ respiratory issues	• Inspect fuel tank / hoses / nozzles and connections for visible damage, leaks, noticeable odors, discolored soils adjacent to tank. • Inspect all drains and outlets and, if necessary, tighten, adjust or replace to prevent liquid discharge. • Store fuel hose properly to not crimp or stress hose or hose / nozzle connection. • Report all deficiencies immediately to supervisor. Do not use fueling equipment if any equipment deficiency is observed. • Do not store full or empty fuel cans within 35' of generator. • Wear long sleeved shirt and safety glasses to protect against exposure to petroleum.
31.	Equipment maintenance lubing	**Falls** - Slip, Trip, because of fuel hose, un-even ground resulting in strains/sprain or cuts and lacerations	• Use three points of contact at all times when mounting / dismounting equipment. When dismounting, no twisting, both feet must be on secure ground before walking away. • Face equipment/ladders when mounting/dismounting. • Park equipment in staging area with proper footing, i.e., Gravel or a prepared surface that is kept clean from debris or ruts. • Wear safety-toed work boots to protect feet against debris on the ground.
		Contact - Struck by or against other personnel or other equipment resulting in bone crushing injuries	• Use cones to demarcate equipment/work area prior to starting maintenance. • Communicate with other personnel and operators in the work area. • When opening compartments, secure the compartment lid. • Wear high visibility vest to be more visible to other operations in the area.

			• Hardhat shall be worn to protect head from unsecured compartment lid.
		Exposure - Stored energy from hydraulics broken bone or cuts and lacerations	• Stored energy may be suddenly released from springs or hydraulic lines, refer to the operating manual before conducting service to equipment. • Open valves and fittings slowly to bleed down residual pressure. • Pull keys from the ignition and tag the machine out of service prior to starting maintenance. Remove the 'out of service' tag and notify that equipment is operational when maintenance is complete. • De-energize all hydraulic systems, pressurized lines, or electrical systems before service. • Keep body parts away from damaged hoses under pressure.
32.	Dispense fuel and oil	**Exposure** - Petroleum and Fumes resulting in skin irritation and inhalation/ respiratory issues	• When possible, position upwind when refueling. • Wear long sleeved shirt to prevent from getting on skin.
		Contact - Spills of fuel and oil products resulting in environmental release	• Shut down equipment before fueling and oiling. • Attend nozzle while fueling and oiling. • Do not top off. • Spill kit located on fuel tank. • Use spill kit in case of spill. • Use spill kit and have with nozzle to prevent drip on ground. • Stow fuel nozzle when finished. • Do not lock out fuel nozzle when refueling. Keep your hand on it the entire time.
		Exposure - Spark/Arcing or flame resulting in burns	• Eliminate spark or flame hazards within 25' of refueling activity. • Ground and bond tank if refueling hose is not internally grounded. • Ensure that pump is OFF before making connections. • Ensure that there is a fire extinguisher outside the refueling area. • No cell phone use in the fueling area or in exclusion zone. • No smoking in the fueling area.
		Fall - Falling of equipment while fueling resulting in broken bone injuries	• When possible fuel from less than 6'. • When fueling above 6' without guard rails, fall protection is required. • When accessing equipment to fuel, clean off debris on tracks.

33.	Moving Geotextile using skid steer	**1a. Contact -** Getting struck or striking ground personnel or equipment resulting in injury	• Utilize spotter when driving skid steer through high traffic areas. • Spotter will utilize hand signals to communicate with operator of heavy equipment. • Communicate to all personnel during safety meeting of the activity. • Mark work area out before starting work. • All ground personnel shall wear high visibility vest or shirt and safety glasses.
		1b. Fall- tripping and falling resulting in cuts lacerations, sprained ankle	• Remove trip hazard and clear debris. • Steel toe puncture resistant work boots shall be worn to protect feet from debris from the ground.
		1c. Exposure - to biological hazards resulting in allergic reaction.	• Inspect rolls of fabric and or pallets. Don't reach into roll without looking inside for hazards such as stinging, biting insects or animals. • Wear a minimum of cut 2 resistant work gloves to protect hands.
		1d. Exertion- Strains / sprains to back	• Do not attempt to lift roll of fabric. Utilize skid steer to reposition.
34.	Cutting geotextile in warehouse/field	**2a. Contact** – cuts and laceration from use of knife	• Cut away from body and legs. • Use self retractable knife only. • Inspect knives for any defects. • Wear cut 4 work gloves to prevent cuts and laceration.
		2b. Exertion – strains / sprains to back	• Bend at knees not at waist when cutting. • When pulling fabric use buddy system.
		2c. Exposure – Biological hazards resulting in allergic reactions.	• Inspect roll for biological hazards (spiders, mice etc…). • Look before you stick your hand inside the roll. • Wear cut 4 gloves and long-sleeved shirt.
		2d. Fall- tripping and falling resulting in strain and sprain, and cuts and lacerations.	• Pick up trip hazard before laying down liner. • Lay geotextile down as flat as possible. • When possible do not walk on the liner if not working on prepared surface. • Steel toe work boots shall be worn to protect feet from debris.
35.	Inspect tools and equipment	Lacerations due to worn or broken tools or not using the proper tool for the task.	• Perform a "hands-on" inspection of each tool (drill, auger, T-post pounder, etc.) prior to use. Red tag defective items and replace. • DO NOT utilize faulty equipment, tag out of service. Report to site supervisor.

			• Do not handle equipment/materials by sharp edges and • wear cut resistant 4 gloves to prevent cuts and lacerations.
36.	Inspect the work area	Slip, trip, and falls resulting in strains/sprains to wrist, ankles.	• Make sure footing is secure when walking. • Keep work area free of trip hazards. Be aware of your surroundings. Remove all potential trip hazards and mark the obstructions that can't be moved with paint/surveyor ribbon. • Scan path before starting to walk. • Wear steel toed boots with good tread to prevent slips.
37.	Installation of fence posts with post pounder and/or drill with auger attachment	Lacerations/ bruises/ fractures to head or hand from contact with post pounder.	• If using post pounder, do not lift post pounder overhead. Mark a line, ~6 inches below the top of post to indicate not to lift higher than line. • Stay 5 feet away from someone using a post pounder. • Keep hands firmly on handles at all times. Do not lift and drop. • Wear hard hat and safety glasses/ spoggles to help prevent cuts and lacerations caused by being struck by pounder. • Wear cut resistant 2 or leather gloves to prevent cuts and lacerations.
		Lacerations due to contact with the auger drill bit	• Do not connect battery to drill until auger is ready to be used. • Keep fingers and other body parts clear of rotating auger when in use. • Only engage drill trigger when auger is pointed down towards the ground. • Stay 5 feet away from someone using the auger drill. • Wear cut resistant 2 or leather gloves to prevent cuts and lacerations.
		Electrocution from striking underground utilities.	• Do not drive posts or use drill auger in areas that are within 10' of a known buried utility. • Confirm that utility location mark outs are current and visible. Review subsurface utility checklist.
		Exhaustion from repetitive chest level tasks	• Use drill auger to create starter hole if ground is hard. • Alternate post driver personnel approximately 15 minutes or 5 posts. • Take break as needed.
		Back strain from pounding posts or using drill auger.	• Bend at knees not waist when picking up posts and pounder and while operating auger. Do not twist back.

			• Keep back straight and vertical when pounding posts.
38.	Unrolling plastic construction fencing material	Back strain from unrolling fence.	• Bend at knees not waist when rolling fence sections. Do not twist back.
		Cuts and lacerations to hands/arms while cutting fence material	• Utilize shears or a self-retracting knife. Locking blade knives are not allowed. • Always cut away from body. All other workers stay a minimum of 5 feet away when cutting device is in use. • Wear cut resistant 4 gloves to protect against cuts and abrasions.
39.	Unrolling metal wire fencing material	Back strain from unrolling fence.	• Bend at knees not waist when rolling fence sections. Do not twist back.
		Cuts, lacerations, or punctures to hands/arms	• Utilize wire cutters. • Do not leave pieces of metal sticking out that could create a puncture hazard. • Wear cut resistant 4 gloves to protect against cuts and abrasions.
40.	Installing fence material	Back strain when lifting, pulling, and placing fence sections.	• Use buddy system, one holds fence while other secures to line post. • Do not lift fence material over 45 lbs without assistance. • Keep back straight and do not twist when securing fence to posts.
		Cut and lacerations to hands/arms from contact with fence material.	• Inspect material as it is being installed and keep hands from sharp and rough edges. • Place caps on posts as you install. Do not wait.
41.	Clean up	Back strain from lifting trash and walking around site.	• Bend at the knees when collecting trash. • Keep loads close to body with elbows in. • Scan work area before cleaning up. Do not walk backwards when cleaning up site.
42.	Equipment Inspection	**Falls –** Slip, Trip, or Fall resulting in a fractured arm or spinal injury	• Do not walk and write at the same time. • Do not walk through water which may be accumulating from water leaking. • Three points of contact must be maintained when mounting/dismounting water truck. Both feet must be firmly on • ground before walking away.
43.	Loading Water Truck	**Falls** – Slips, Trips, and Falls resulting in broken arms, legs, and wrist	• Garbage and debris will be picked up and removed from operating and walking areas. • Water hoses will be placed away from walking areas. Both feet must be firmly on ground before walking away. • Ladder rungs/steps shall be cleaned to avoid build up of mud or soils.

			• Three points of contact must be maintained when mounting/dismounting water truck. • No jumping off of equipment. • Face ladders when ascending / descending. • Safety-toed work boots must be worn to protect feet from debris on the ground.
		Caught – Pinch Points resulting in broken finger	• Keep hands/feet clear of all potential pinch points on equipment (doors, handles, seat belt). • Use hand tools when attaching/detaching hose couplers. • Wear cut 4 work gloves underneath heavy-duty rubber gloves when handling tools and connecting/disconnecting hose couplers.
		Contact – Exposure to Water Hazards resulting in skin irritation	• Use the proper tool (hydrant wrench) for filling water truck. Do not overexert yourself when opening the hydrant. • Keep track of the water. Do not over fill the truck.
		Contact – Water truck striking ground personnel resulting in bone breaking injuries	• Before connecting truck to water source, pull keys from the ignition and hang near hose connection to prevent driving away with hose still connected which could break hose or possibly breaking the water valve station. • Chock wheels of water truck before connecting truck to water source • Set up exclusion zone around the truck utilizing traffic cones when filling the truck • Watch for traffic when walking around water truck to place/remove chocks. • Wear high visibility vest/shirt to be more visible to traffic.
		Ergonomics – Manual lifting and pulling water hoses resulting in back and arm strain	• Lift with legs at all times regardless of the weight to be lifted, including water hoses and buckets of water for pump priming. • Do not lift and twist. • Personnel shall not lift items more than 45 lbs. • Drain all hoses before attempting to lift.
44.	Disconnecting Water Hose	**Exposure** – Water/Pressure resulting in cuts and lacerations	• Bleed/vent pipe with valve before disconnecting. • Double check to make sure hose is disconnected from water truck and placed clear of backing area. • Walk around water truck before exiting loading area to inspect equipment for hazards and verify water hose is disconnected.
		Contact – Getting struck by field vehicle resulting in bone breaking injuries	• Watch for traffic when walking around water truck to remove chocks and retrieve traffic cones.

			• Wear high visibility vest/shirt to be more visible to traffic.
45.	Operating Water Truck for dust control	**Contact** – Striking ground personnel or equipment resulting in bone breaking injuries and equipment damage	• Set up dust control routes to minimize interference with established foot and equipment traffic. • Loaded haul truck shall have the right of way. • Traffic patterns shall be communicated to all personnel on site. • Use hand signals to communicate with operators and ground personnel. • Ground personnel is to stay back at least 25' from work truck during operation. • Back up alarms must be operational. If backing up in tight areas, spotter will be needed. • Seat belts will be worn at all times when equipment is in motion. • Use hazard lights when parked for refilling when visibility is low.
		Contact – Equipment tip over/rolling resulting in bone breaking injuries	• Drive no more than 5 mph on site when watering. • Chock tires when water truck is parked.
		Exposure - Dust from performing dust suppression	• Keep windows closed while performing dust suppression. • Do not drive over the 10-mph speed limit on site.
46.	Inspection of Skid Steer	**Falls -** Slip, Trip, Fall at same level or, when entering equipment, checking fluid levels, when mounting and dismounting equipment resulting in sprained ankles, broken bones, and cuts and lacerations.	• Inspect terrain for uneven surfaces, avoid walking on uneven surfaces. • Remove debris and trip hazards along path to equipment. If debris cannot be removed, mark it out. • Always use 3-points of contact when mounting and dismounting machinery. When dismounting, no twisting and two feet must be on secure ground before walking away. • Ensure steps are free from dirt and debris. • Always face machine when mounting/dismounting. • Cell Phones will not be used in exclusion zone to prevent distraction and slip, trips, and falls. • Wear safety-toed boots due to possible debris in work area
		Exertion - Strains and sprains due to climbing on equipment and/or open doors and hatches	• Use fixed steps on equipment and grab bars when climbing on equipment. • When opening hatches, use handles. If it is stuck, do not force open. • Open the equipment door slowly.
		Caught - Pinch points due to doors, hatches, and engine compartment resulting in cuts and	• Keep hands clear of hinges when opening doors/hatches. Use handles when opening engine compartments.

		lacerations.	• Wear cut level 4 gloves when inspecting machinery to protect hands from possible burrs and sharp edges.
		Contact - Getting struck by other equipment in inspection area resulting in crushing injury.	• Communicate daily task in morning and afternoon safety meetings. • Demarcate work area with a cone for recognition to vehicles of inspection in progress or move equipment to staging area. • Do not inspect equipment in an area that is open to site traffic if possible. • Cell Phones will not be used in exclusion zone to prevent distraction and possible contact injury. • High visibility vest or long sleeve shirt must be worn for visibility to traffic.
		Exposure - to fluids such as oil, hydraulic fluid, grease resulting in skin irritation.	• During inspection hold dip stick by handle and do not touch oil, hydraulic fluid, or grease to prevent contaminating body and clothing • Long sleeved shirts, nitrile gloves, and safety glasses will be worn due to possible fluid exposure.
		Contact - Striking aboveground utilities while operating equipment during inspection resulting in electrocution and equipment damage	• Use a spotter when moving equipment near aboveground utilities. • Inspect pathway prior to moving. • Subsurface utilities, utility stick-up, or wells must be identified, marked, and protected from contact with equipment.
		Contact - striking your head on hatches, doors, and other compartments while conducting inspection resulting in cuts and lacerations.	• When opening compartments for inspection make sure to secure lid so it will not swing closed. • Open doors and hatches slowly. • Hard hat will be worn to prevent head injuries from strike.
		Contact - Bites/stings/allergic reactions from insects, bees, snakes, fire ants, mosquitoes, or plants	• Avoid high vegetation areas. • Use buddy system and communicate through crew when and where biological hazards are located.
47.	Entering and exiting the skid steer	**Falls -** Slips, trips, and falls from entering and exiting skid steer resulting in cuts and lacerations and strains and sprain injuries	• Equipment must be completely turned off. • Use three points of contact when entering / exiting skid steer. • Keep steps clean and free of debris on solid ground. • Park on a level, debris free, solid ground.
		Contact – Striking head on door frame when entering and exiting skid steer resulting in cuts	• Exit equipment slowly. • Take time to inspect head clearance before entering / exiting cab.

		and lacerations to the head	• Wear hard hat to protect head.
48.	Select and install correct attachment	**Contact -** Lacerations and/or amputation during installation of attachment	• When attaching the attachment, do not place hands in between the attachment and the equipment. • Visually inspect after attaching to confirm that locking mechanisms / locking pins are fully engaged. • Conduct an inspection of equipment after the midday safety meeting.
		Energy Source - Cuts/ injections from high pressure hydraulic fluid	• Ensure positive connections (i.e., snug fit) of hydraulic hoses when installing powered attachments. • Inspect attachment hoses prior to installing. • Remove from service any attachment with leaking/bulging/frayed hoses. • Only use attachments specifically designed for skid steer. • Wear level 4 cut resistant gloves to protect hands from cuts/injections.
		Contact – Getting an injection into the hand / finger or a pin shearing resulting in a laceration to the hand / finger	• Ensure that connections (i.e., snug fit) of hydraulic hoses when installing powered attachments. • Remove from service any attachment that is leaking/bulging/frayed. • Remove from service any attachment pins with noticeable bends or cracks. • Only use attachments specifically designed for that skid steer. Do not mix and match different manufacturer's attachments. • Do not use your hand (place along the hose) or any body parts to check for potential leaks to prevent accidental injection from high pressure leaks.
49.	Operation of skid steer	**Caught** - Loose clothing being caught on levers or controls creating sudden movement resulting in a fall which can result in cut and lacerations	• Equipment shall be completely de-energized prior to entering or exiting equipment. • Do not start equipment until seated in cab with seatbelt on and safety bar in place. • Do not wear loose clothing. Keep safety vest zipped so that it does not catch on equipment controls when entering / exiting the cab, causing sudden motion of the equipment when started.
		Contact - Striking ground utilities while operating equipment on site resulting in electrocution	• Inspect pathway prior to moving. Identify objects or obstacles that can impede or cause damage to operator or equipment. Remove or identity with spray paint / ribbon and stakes or use a spotter. • Power poles, subsurface utilities, utility stick-up, or wells must be identified, marked, and protected from contact with equipment.
		Contact – Striking	• Only qualified personnel authorized by CCI

		ground personnel while operating with flying debris or with unattended pieces of equipment. Damage to skid steer from other equipment	management may operate the skid steer. • Do not use cell phone or text message while operating equipment. • Use established hand signals to communicate intentions with the ground personnel prior to ground personnel from coming within 25ft of the equipment. • Work area should be demarcated (with panel fence / T-Posts and caution tape or safety fencing or traffic cones or delineators) to prevent ground personnel from entering work area. • Skid steer must be turned off with parking brake engaged and hands shown away from controls before operator acknowledges approval to allow ground personnel to approach. • Back-up alarm must be operational. Take equipment out of service if it is not. • Set an exclusion zone of 50ft for skid steer operation. • Operator is to look behind before backing.
		Caught - Rollover from steep inclines / edge of excavation and suffering crushing injuries	• Approach slopes perpendicular to the base of the slope. • Haul roads and traffic areas adjacent to excavations must be inspected by the site management prior to work in that area to identify potential areas of sloughing so the area can be demarcated with cones, caution tape, or construction fencing. • Seat belts must be worn at all times.
		Ergonomics - Strains and sprains from sitting in equipment	• Take a break every hour and stretch back, neck, and legs to prevent strains and sprains.
50.	Transporting material with attachments with forks or bucket	**Caught -** Potential rollover if load shifts resulting in a broken arm or lacerations from glass cuts.	• Before transporting gravel, shake bucket to ensure load is stable and uniformly placed in bucket. • Do not transport stone over steep banks. Remain at least six (6) ft from the edge. • When using forks to transport material. Secure the loads prior to transport. • Keep attachment low to the ground so not to limit visibility. • If visibility is limited during transportation of material, utilize a spotter.
51.	Inspection of Dozer	**Falls** - Slip, Trip, Fall at same level over metal objects or elevated, when entering equipment, checking	• Inspect terrain for uneven surfaces. Do not walk on uneven surfaces. • Remove debris and trip hazards along path to equipment. If debris cannot be removed, mark it out.

		fluid levels, when mounting and dismounting equipment.	• Always use 3-points of contact when mounting and dismounting machinery. • Ensure ladders or steps are free from dirt and debris. • Always face ladders/machine when mounting/dismounting. • Cell phones will not be used in exclusion zone to prevent distractions and slip, trips, and falls while approaching equipment. • If checking fluids above 6', fall protection required. • Wear safety-toed work boots to protect feet from debris on the ground.
		Ergonomic - Strains and sprains due to climbing on equipment and or open doors and hatches (over reaching)	• Use fixed ladder/steps on equipment and handrail when climbing on equipment. Ensure ladders or steps are free from dirt and debris. • When opening hatches, use handles. If it is stuck do not force open.
		Caught - Hands, fingers caught between doors and hatches and engine compartment	• Keep hands clear of pinch points and hinges when opening doors/hatches, and when engaging seat belt. Use handles when opening engine compartments. • Do not reach past arm's length. • Wear cut 4 work gloves to protect hands from possible burrs and sharp edges.
		Contact - Getting struck by other equipment in inspection area resulting in bone crushing injuries	• Communicate daily task during morning safety meeting. • Demarcate work area with cones for recognition to vehicles of inspection in progress or move equipment. • Do not inspect equipment in an area that is open to site traffic. • Cell Phones will not be used during inspection to prevent distractions leading to contact with other equipment. • High visibility vest or long sleeve shirt must be worn for visibility to traffic.
		Exposure - to fluids such as oil, hydraulic, grease resulting in skin infection	• During inspection hold dip stick by handle and do not touch oil, hydraulic, or grease to prevent contaminating body and clothing. • Long sleeved shirts, nitrile gloves, and safety glasses will be worn due to possible fluid exposure.
		Contact - Striking overhead and ground utilities while operating equipment on site resulting in electrocution	• Use a spotter when moving equipment near overhead utilities. • Inspect pathway prior to moving. • Power poles, subsurface utilities, utility stick-up or wells must be identified, marked, and protected from contact with equipment. • Look up and identify any overhead utilities.

		Contact - Striking your head on hatches, doors and other compartments while conducting inspection resulting in cuts and lacerations	• Exit equipment slowly. • When opening compartments for inspection make sure to secure lid so it will not swing closed. • Hard hat will be worn to prevent head injuries from strike.
		Contact - Bites/stings/ allergic reactions from insects, bees, snakes, fire ants, mosquitoes, or plants	• When opening compartments, look for bee hives. If observed, stop Inspection and plan to remove first before continuing inspection. • Refer to General Site Work JSA.
52.	Entering/Exiting Dozer	**Falls -** Slips, trips and falls from exiting dozer resulting strain and sprain and or cuts and lacerations	• Use three points of contact when entering and exiting bulldozer. • Don't twist while exiting dozer. Wait until feet are firmly on the ground and then turn carefully in the direction that you want to go. • Keep steps clean and free of debris. • Park on level ground free of debris.
		Contact - Striking head on door frame when exiting dozer resulting in cuts and lacerations	• Enter and exit equipment slowly. • Take time to inspect head clearance before entering or exiting cab • Hard hat will be worn to reduce any impact of overhead hazards while entering or exiting cab.
53.	Grading Soil	**Contact** – Dozer tipping over due to uneven terrain resulting in operator death	• Inspect terrain for uneven surfaces and slopes. Operate equipment perpendicular to the slope, not parallel to prevent the machine from tipping to the side. • Wear seat belt when operating dozer.
		Contact - Striking ground personnel while operating or with unattended pieces of equipment; damage to dozer from other equipment resulting in bone crushing injuries	• Maintain visual contact with other personnel/ equipment in the area. Use hand signals to communicate. • Non-Essential ground personnel are to stay out of the work area. • No use of cell phone or text messaging while operating equipment. • Make sure exclusion zones are identified in planning meeting and clearly marked. Changes to exclusion zone will be communicated to the team. • Stop Work and ground blade when ground personnel enter the exclusion zone, within **25 ft**. • Operators must ground and de-energize all attachments before leaving equipment unattended. • Operator will stay clear of trucks tip zone while dumping, which is one and a half times the length of the bed lifted. • Verify backup alarm is operational before

			backing. Observe before backing. • Open areas will be marked out with flagging or fencing to keep personnel from entering. Spotters will be used in congested areas of personnel and equipment. • Operator is to look behind before backing.
		Exposure - Noise while operating equipment resulting in hearing loss	• Close cab door to reduce noise exposure during operation. • Keep non-essential personnel out of the work area.
		Exposure - Dust and Soil during equipment operation resulting in respiratory issues	• Note wind direction through-out the day. • Close cab door to reduce exposure to dust. • Implement dust suppression via water truck if dust is visible. • When visible dust or if winds over 25mph spoggles will be worn to protect eyes if outside of equipment.
		Contact - Overhead powerlines and equipment in the area resulting in electrocution	• Have spotter in place to communicate with the operator if within 20' of power lines/tower/poles. • Look up and check for powerlines. Stay at least 10' from overhead powerlines. Increase distance for higher voltages. • Survey work area and mark wells or objects that cannot be removed.
54.	Equipment Inspection	**1a. Falls** – Slip, Trip, Fall at same level over metal objects or elevated, when entering equipment, checking fluid levels, when mounting and dismounting equipment resulting in sprain ankle or broken bones and cuts and lacerations.	• Inspect terrain for uneven surfaces, avoid walking on uneven surfaces. • Always use 3-points of contact when mounting and dismounting. When dismounting, no twisting, both feet must be on secure ground before walking away. • Ensure ladders or steps are free from dirt and debris. • Always face ladders/machine when mounting/dismounting • If checking fluids above 6 feet, fall protection required. • Wear steel-toed safety puncture resistant boots due to possible debris in work area.
		1b. Exertion – Strains and sprains due to climbing on equipment and or open doors and hatches	• Use fixed ladder/steps on equipment and handrail when climbing on equipment. • When opening hatches, use handles and if it is stuck do not force open.
		1c. Caught – Pinch points due to doors and hatches and engine compartment resulting in cuts and	• Keep hands clear of pinch points and hinges when opening doors/hatches. Use handles when opening engine compartments.

		lacerations.	• Wear cut 2 gloves when inspecting machinery to protect hands from possible burrs and sharp edges.
		1d. Contact – Getting struck by other equipment in inspection area resulting in cuts and lacerations.	• Communicate daily tasks during morning safety meetings. • Demarcate work area with a cone for recognition to vehicles of inspection in progress or move equipment. • Do not inspect equipment in an area that is open to site traffic. • No cell phone use policy during operation to prevent distraction and possible contact with equipment. • High visibility vest must be worn for visibility to traffic.
		1e. Exposure- to fluids such as oil, hydraulic, grease e resulting in skin irritation.	• During inspection, hold dip stick by handle and do not touch oil, hydraulic, or grease to prevent contaminating body and clothing. • Nitrile gloves and safety glasses will be worn due to possible fluid exposure.
		1f. Contact - Striking overhead and ground utilities while operating equipment on site resulting in electrocution.	• Use a spotter when moving equipment within 20' of overhead utilities. • Inspect pathway prior to moving. • Power poles, subsurface utilities, utility stick-up or wells must be identified, marked and protected from contact with equipment. • Stay a minimum of 10 feet from overhead powerline.
		1g. Contact -striking your head on hatches, doors and other compartments while conducting inspection resulting in cuts and lacerations.	• • When opening compartments for inspection make sure to secure lid so it will not swing close. • Hard hat will be worn to prevent head injuries from strike.
		1h. Exposure – to bees, wasp, insects and mosquitos resulting in allergic reactions.	• Before opening compartments, bump or tap on equipment for bees and insects and avoid disturbing them. If beehives encountered, Stop Inspection and plan to remove first before continuing inspection. • Use insect repellent to prevent bites. • Wear long sleeve shirt and cut 2 work gloves when opening compartments to prevent getting stung.
55.	Loading/Transport of soils/materials	**2b. Contact** – Equipment Rollover resulting in crush injuries.	• Only trained loader operator will perform task. • Do not operate equipment on slopes steeper than a (45-degree angle or 1:1 slope.) • Only operate equipment up and down slopes. Never operate across slopes. • Load bucket with soil or rip rap evenly so

			that the loader is stable during transport. • Seat belt must be used at all times.
		2c. Contact – – Striking ground personnel while operating or with unattended pieces of equipment resulting in crushing injuries.	• Maintain radio contact with other personnel/equipment in the area. • Make sure exclusion zones are identified in planning meeting. Changes to exclusion zone will be communicated to the team. • Stop Work when ground personnel enter the exclusion zone, within 25 ft. • Operators must ground and lock all attachments before leaving equipment unattended. • Verify backup alarm is operational before backing. • Look before backing or use spotter if needed.
		2d. Exposure – Noise while operating equipment resulting in hearing loss.	• Close cab door to reduce noise level during operation.
		2e. Exposure – Dust and Soil during equipment operation resulting in respiratory issues.	• Note wind direction throughout the day. • Close cab door to reduce exposure to dust. • Implement dust suppression via water truck if dust visible. • When visible dust or wind over 25mph, spoggles will be worn to protect eyes when outside of loader or if loader is open cab.
		2f. Contact- equipment damage from running over debris that can puncture tires	• The areas of operation should be inspected periodically looking for deleterious materials which could cut tires. These should be picked up • or painted orange/demarcated.
56.	Stage equipment	**3a. Contact**- damage to loader from other equipment, site conditions and trespassers	• Park loader in a safe and designated area and level ground. • Idle the loader down and lower bucket to the ground. Set parking switch. • Lock all windows and doors at end of shift.
57.	Exiting loader	**4a. Falls**- Slips, trips and falls from exiting loader resulting in sprained ankle, broken bone and cuts and lacerations.	• Use three points of contact when exiting loader. • Keep steps clean and free of debris. • Park on level debris cleared area. • Steel toed puncture resistant safety boots with good treads must be worn at all times.
		4b. Contact – striking head on door frame when exiting loader resulting in cuts and lacerations.	• Exit equipment slowly. • Take time to inspect head clearance before exiting cab. • Hard hat must be worn to reduce any impact of overhead hazards while exiting and entering cab.
58.	Inspection of excavator	**Falls** - Slip, Trip, Fall at same level over metal objects or elevated,	• Inspect terrain for uneven surfaces, avoid walking on uneven surfaces.

		when entering equipment, checking fluidlevels, when mounting and dismounting equipment.	• Remove debris and trip hazards along path to equipment. If debris cannot be removed, mark it out. • Always use 3-points of contact when mounting and dismountingmachinery. • Ensure ladders or steps are free from dirt and debris. • Always face ladders/machine when mounting/dismounting. • If checking fluids above 6', fall protection required. • Wear safety-toed boots with good tread due to possible debris in work area.
		Exertion - Strains and sprains due to climbing on equipment and or open doors and hatches	• Use fixed ladder/steps on equipment and handrail when climbing onequipment. • When opening hatches, use handles and if it is stuck do not force open
		Caught - Pinch points due to doors and hatchesand engine compartment, rough edges on nylon straps and shackles	• Keep hands clear of pinch points and hinges when opening doors/hatches. Use handles when opening engine compartments. • Avoid placing hands within pinch zone of buckle when engaging seatbelt. • Wear cut 4 gloves when inspecting machinery, shackles, and nylonstraps to protect hands from possible burrs and sharp edges.
		Contact - Getting struck by other equipment in inspection area resulting in equipment damage and broken bone injuries	• Communicate daily tasks at morning safety meeting. • Delineate work area with a cone for recognition to vehicles of inspectionin progress or move equipment. • Do not inspect equipment in an area that is open to site traffic. • Cell phones will not be used in exclusion zone to prevent distraction and possible contact with equipment. • High visibility vest or long sleeve shirt must be worn for visibility to traffic
		Exposure - to fluids suchas oil, hydraulic fluid, grease resulting in skin irritation or infection	• During inspection hold dip stick by handle and do not touch oil, hydraulicfluid, or grease to prevent contaminating body and clothing • Long sleeved shirts, nitrile gloves, and safety glasses will be worn due topossible fluid exposure
		Contact - Striking overhead and ground utilities while operating equipment on site	• Use a spotter when moving equipment near overhead utilities. • Inspect path way prior to moving. • Power poles, subsurface utilities, utility stick-up, or wells must be identified, marked, and protected from contact with equipment. • Stay at a minimum of 10' away from overhead powerline.
		Contact - Striking your head on hatches, doors, and other compartments	• When opening compartments for inspection make sure to secure lid so it will not swing close.

		while conducting inspection	• Hard hat will be worn to prevent head injuries from strike.
		Contact - Bites/stings/ allergic reactions from insects, bees, snakes, fire ants, mosquitoes, or plants	• If bee hive encountered when opening compartment, Stop Inspection and plan to remove first before continuing inspection.
59.	Operation of excavator	**Contact** – Excavator tipping over due to uneven terrain resulting in operator death	• Inspect terrain for uneven surfaces and slopes. Operate equipment perpendicular to the slope, not parallel to prevent the machine from tipping to the side. • Use excavator arm to help brace the machine when traversing uneven terrain. • Wear seat belt when operating excavator.
		Contact - Striking ground personnel while operating equipment. Damage to excavator from other equipment resulting in serious injuries to ground personnel	• Only qualified operators can operate excavator. • Do not use cell phone or text message while operating equipment. • Make eye contact and use established hand signals to communicate intentions with the ground personnel prior to ground personnel enteringthe swing radius of the equipment. • Work area should be demarcated to prevent ground personnel fromentering work area. • Excavator must be turned off with parking brake engaged before operatoracknowledges approval to allow ground personnel to approach. • Verify backup alarm is operational before backing. Observe, look back and around before backing. Back-up alarm must be operational. Take equipment out of service if it is not. • Set up work area to keep non-essential personnel out. Stop work when non-essential personnel enter work area. • Use spotter when/if needed • The spotter will stay behind a hard barrier if possible. If not possible,spotter will position in front of the excavator and maintain visual withoperator at all times. • Operator is to look behind before backing. • Spotter in the work zone will wear high visibility reflective clothing for better visibility to the operator, hard hat, safety glasses with side shields, level 4 cut proof gloves, and safety-toed boots with good tread
		Exposure – Noise while operating equipment	• Close cab door and all windows to reduce noise level during operation. • Hearing protection will not be required while operator is operating excavator; however, if noise appears elevated, use hearing protection as necessary.
		Ergonomics – Strains and sprains from sitting	• Take 10 mins every hour and stretch back, neck, and legs to preventstrains and sprains.

		in equipment	
		Contact - Electrocution and/or gas explosion resulting from contact with overhead / underground utilities	• Coordinate the movement of excavator with other site traffic. • Confirm that utility location mark outs are current and visible prior to beginning work in area. • Have spotter in place to communicate with the operator if within 20' of power lines/tower/poles. • Look up and check for powerlines. Stay at least 10' from overhead powerlines. Increase distance for higher voltages. • Survey work area and mark wells or objects that cannot be removed.
60.	Staging excavator and entering/exiting excavator	**Contact -** with other equipment and ground personnel resulting in bone crushing injuries	• Set work zone area. Make sure ground personnel are at least 50' away. • Ground all hydraulics (grading blades) before exiting. • Utilize visual contact and hand signals with other operators and groundpersonnel.
		Falls - Slips, trips, and falls from exiting excavator resulting in cuts and lacerations and potential concussion	• Use three points of contact when exiting excavator. • Keep steps clean and free of debris. • Park level in debris filled area. • Wear safety-toed safety boots with good treads to protect feet fromdebris from ground.
		Contact – striking head on door frame when exiting excavator resulting in cuts and lacerations	• Enter and exit equipment slowly. • Take time to inspect head clearance before exiting cab. • Hard hat will be worn to reduce any impact of overhead hazards whileexiting and entering cab.
61.	Locating, securing any nearby utilities	Electrical Shock, Fire & Explosion	• Ensure that all utilities have been located and secured prior to beginning demolition.
62.	Fire & evacuation	Being trapped during a collapse or fire.	• Continuing to provide a means of egress during the removal of debris. • Fire extinguisher at several locations around demolitions site.
63.	Eye, face, head, hand & foot protection	Flying objects in the eyes, face, cuts to the hands & sharp object being stepped on during the demolition. Burns from cutting torches.	• Ensure the use all the required personnel protective equipment by each employee.
64.	Respiratory & hearing protection	Dust and fine particulates in the air within the demolitions site. High levels of noise	• Ensure the correct mask is being worn by the employee • Ear Plugs used during high levels of noise.

65.	Backhoe Operation	Potential rollover of equipment	• Person must be qualified to operate heavy equipment. • Carry load low. • Wear seat belt at all times to prevent falling off equipment. • Try to stay on level ground.
		Objects and personnel (Spotters)	• Be aware of all objects and personnel in the area. • Make sure there is plenty of room for maneuvering equipment. • Be aware of pinch points during swinging of the boom & bucket.
		Crushing of feet or hands	• Personnel must avoid equipment when lowering outriggers and buckets.
66.	Transporting equipment	Other Vehicles	• Be sure that all hazard lights work. • Wear seat belt at all times. • It is good to have someone follow behind equipment in a vehicle • Be sure boom is in locked position.
67.	Excavating	Digging near buildings and road	• Complete appropriate Safe Work Permit (varies by customer)
		Digging with the possibility of striking foreign underground utilities and pipelines: • Potential for fires, spills, high noise and damaged underground utilities	• Call 811 prior to excavating • Verify equipment operator training • Utilize a qualified spotter with a probe bar • Utilize appropriate PPE: hard hat, safety glasses, steel toed shoes, ear plugs, gloves and coveralls as necessary.
		Employees working in the ditch: • Potential for cave-in • Potential for atmospheric hazards • Striking personnel within radius of boom	• Have a certified competent person to evaluate the ditch • Excavations over 5 foot deep shall be sloped or shored • Excavations over 4 feet deep requires confined space permit • Utilize a 4 way calibrated monitor at all times while employees are in the ditch • Only one person is to act as a signalman; however anyone can call emergency STOP
		Equipment damage: • Excavations left open and unattended near roadways & walkways • Equipment roll over hazard • High noise • Airborne dust	• Verify location of all power lines. If lines cannot be shut-in maintain a minimum of 10 feet clearance from equipment. Verify and increase distance (per approach charts) for lines in excess of 50,000 volts. • Maintain spotter with no other duties than watching for interference, if power lines are within swing radius. • Inform local operations & any remote operations of activities. • Do not use cell phones while operating equipment. • Tape and/or barricade unattended excavations.

		Bad weather	• If rain and/or lightning starts, stop all activities and reassess the situation
		Incident or Accident	• Watch out for stinging insects and notify your supervisor if anyone is allergic to bees. Report all accidents immediately and make sure you know who to contact, if an emergency occurs
68.	Backfilling	Struck by/against heavy equipment	• Wear reflective warning vests when exposed to vehicular traffic • Isolate equipment swing areas • Make eye contact with operators before approaching equipment • Understand and review hand signals • Step away from equipment when bucket adjustments are made • Park equipment in areas where operator can see clearly to dismount equipment • Report minor incidents to site supervisor • All heavy equipment will have operable back-up alarms • Spotters will be used to back up equipment and direct traffic in all “blind” areas
		High noise levels	• Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period)
		Sharp objects	• Wear cut resistance work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects • Maintain all hand and power tools in a safe condition • Observe work area and location of other personnel before lifting/moving objects with sharp edges
69.	Set up decon area	Struck by other vehicles due to lack of traffic controls or poor visibility	• Follow site plan to set up decon station in proper low traffic area. • Park support vehicle away from active traffic or in a position toprotect workers from traffic. • Place cones to demarcate decon area. • Wear reflective vest/orange shirt to increase visibility to drivers.
		Back strain from unpacking equipment	• Do not lift over 45 pounds without assistance from another person. • Empty 55-gallon drums should be handled by 2 people due to bulk and uneven load. • Lift using legs while keeping back straight, do not bend at waist or twist body.
		Slip, trip and fall due to site hazards or equipment on the ground	• Visually check for hazards on ground. Identify and remove trip hazards if possible. If hazards cannot be removed mark with paintor flagging and notify others.

			• Designate equipment storage area within work area to preventclutter and reduce trip hazards.
		Pinched fingers from moving/opening drums and buckets	• Identify and avoid placing hands between adjacent objects and drums/buckets. • Do not place hands in the pinch points created by the drum ring around the lid or the bolt hole when moving/opening drums; or thelid of 5-gallon buckets when moving/opening buckets. • Wear level 4 cut resistant gloves while handling drums and bucketsto prevent pinch.
		Hit head on tailgate/hatchback when setting up	• Keep tailgate/hatchback closed when not unloading equipment. • Wear hard hat to prevent struck against head injuries when thetailgate/hatchback is open.
		Cuts from cutting plastic sheeting	• Do not use fixed-open blades, use scissors • Cut away from hands & body. • Maintain 4' clearance to nearest person when using cutting tools. • Wear level 4 cut-resistant gloves to prevent lacerations.
70.	Staging equipment in decon area	**Contact** - Struck by heavyequipment/ truck resulting in cuts/scrapes/bruises, head trauma, or death	• Communicate to drivers/operators prior to maneuvering through thesite that if they ever lose sight of the spotter, to STOP IMMEDIATELY until visual communication is restored. • Stay visible in driver's/operator's mirrors or in front of heavy equipment/truck and maintain eye contact. • Do not stand or walk between heavy equipment/ truck until the airbrakes to all vehicles have been set. • Wear high visibility vest to be more visible to driver.
		Fall - Back, ankle, knee, orwrist injury from slips, trips, and falls over equipment or fixed hazards on site	• Inspect work area for trip hazards prior to the task. • Demarcate or remove trip hazards in work area. • Travel on established walking paths. • Wear safety-toed work boots to protect feet from debris on ground.
71.	Using hand tools for dry decontamination	**Strains** - Back or arm strains from overexertion orusing wrong tool (over reaching)	• Use an extendable pole with brush attachment to provide easyreach to the top rail of trucks. • Use a short-handled brush to gain leverage for deconning the backtailgate of trucks.
		Contact - Struck by heavyequipment/ truck resulting in cuts/scrapes/bruises, head trauma, or death	• Communicate to field crew of work plan during the morning andafternoon safety meetings. • Do not use cell phone in the work zone. Step out of the area to makeand take calls.

			• When heavy equipment or trucks approach the decon area, do not turn back towards traffic. Stand sideways to see incoming traffic. • Wait for heavy equipment or truck to be completely stopped and airbrakes set prior to approaching. • Stay visible in driver's/operator's mirrors or in front of heavy equipment or truck and maintain eye contact. • While walking in front of the heavy equipment or truck, always stay within view of the driver and >3' away from the nose of the heavy equipment/ truck. • Do not tell drivers to proceed without communicating with employee signing manifest one decon is complete. • Check path for public before allowing the drivers to proceed. • Excavator shall ground bucket and lockout controls during deconing unless the decon operation is out of the work zone of the excavator. • Wear high visibility safety vest to be more visible to the drivers.
		Fall - Back, ankle, knee, orwrist injury from slips, trips,and falls over equipment orfixed hazards on site	• Inspect work area for trip hazards prior to the task. • Demarcate or remove trip hazards in work area. • Travel on established walking paths. • Do not walk backwards. • After decon is complete, place tools to the side out of the walk path. • Wear safety-toed work boots to protect feet from debris on ground.
		Exposure - Breathing in dust or dust getting into eyes causing respiratory issues and eye injuries	• Use a stand off handle attached to the broom to distance self awayfrom falling dirt • Note wind direction and position upwind when deconing heavy equipment/ trucks. • Spoggles are to be worn to prevent dust/debris from getting intoeyes.
72.	Inspecting truck's secondary tailgate lock	**Fall -** Back, ankle, knee, orwrist injury from slips, trips,and falls over equipment orfixed hazards on site	• Inspect work area for trip hazards prior to the task. • Demarcate or remove trip hazards in work area. • Travel on established walking paths. • Do not walk backwards. • After decon is complete, place tools to the side out of the walk path. • Wear safety-toed work boots to protect feet from debris on ground
		Contact - Struck by truck resulting in	• Communicate with truck drivers you are going to check the gates and secondary locks and not to

		cuts/scrapes/bruises, headtrauma, or death	move. Once completed let the driver know. • Communicate to manifesting personnel before inspection and after completion of inspection of gate. • Wear high visibility safety vest to be more visible to drivers • Communicate to field crew of work plan during the morning andafternoon safety meetings. • Do not use cell phone in the work zone. Step out of the area to make and take calls. • When trucks approach the decon area, do not turn back towards traffic. Stand sideways to see incoming traffic. • Wait for truck be completely stopped and air brakes set prior to approaching. • Stay visible in driver's/operator's mirrors or in front of truck and maintain eye contact. • While walking in front of the truck, always stay within view of the driver and >3' away from the nose of the truck. • Check path for public before allowing the drivers to proceed. • Excavator shall ground bucket and lockout controls during deconing unless the decon operation is out of the work zone of the excavator. • Wear high visibility safety vest to be more visible to the drivers.
		Caught – hands caught in crank, and chains, resultingin cuts, lacerations, and broken bones	• Do not place fingers between hook and chain when unhooking and hooking. • Maintain a firm grip on the handle when cranking tarp at all times. • Remove handle from crank when the handle is no longer needed. • Utilize brake to prevent losing control of the crank • Only place hands onto the handle and break when tarping.
		Contact - Struck by fallingdebris while raising tarp resulting in head and bodycontusion	• Inspect tarp for hanging debris • If debris is present, remove before attempting to tarp • Inspect tarp for debris while raising the tarp • Stand to the side while raising the tarp to prevent from being struck if debris does fall.
73.	Cleanup and stage drums until waste pickup	Splash/spill of wash water due to pouring into drumsand packing for transport	• Pour wash water slowly from 5-gallon buckets into 55-gallon drums to avoid splashing. • Wear safety glasses to prevent contact with eyes.
		Pinched fingers from	• Identify and avoid placing hands between

		moving/closing drums andbuckets	adjacent objects anddrums/buckets. • Do not place hands in the pinch points created by the drum ring around the lid or the bolt hole when moving/closing drums; or the lidof 5-gallon buckets when moving/closing buckets. • Wear level 4 cut resistant gloves while handling drums and bucketsto prevent pinch.
		Back strain from lifting 5-gallon buckets and moving 55-gallon drums	• Position drums before filling to avoid moving them once waste is added. If a drum with waste in it has to be moved, two people and a drum dolly should be used. • Do not fill buckets over 4 gallons to reduce weight. • Lift using legs while keeping back straight, do not bend at waist ortwist body. Use second person to lift if bucket cannot be lifted without straining.

APPENDIX C- Safety Data Sheets (SDS)

SAFETY DATA SHEET

Creation Date 16-Jun-2009 **Revision Date** 24-Dec-2021 **Revision Number** 4

1. Identification

Product Name **Sodium hydroxide, 0.1 N standard solution**

Cat No. : **AC124190000; AC124190010; AC124190025; AC124190250**

Synonyms Caustic soda

Recommended Use Laboratory chemicals.

Uses advised against Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

Company

Fisher Scientific Company
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number

For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

2. Hazard(s) identification

Classification

This chemical is not considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

This chemical is not considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Label Elements

None required

Hazards not otherwise classified (HNOC)

None identified

3. Composition/Information on Ingredients

Component	CAS No	Weight %
Water	7732-18-5	99.6
Sodium hydroxide	1310-73-2	0.4

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Get medical attention immediately if symptoms occur.

Inhalation Remove to fresh air. If breathing is difficult, give oxygen. Get medical attention immediately if symptoms occur.

Ingestion Do NOT induce vomiting. Get medical attention.

Most important symptoms and effects No information available.

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Substance is nonflammable; use agent most appropriate to extinguish surrounding fire.

Unsuitable Extinguishing Media No information available

Flash Point No information available

Method - No information available

Autoignition Temperature No information available

Explosion Limits

Upper No data available

Lower No data available

Sensitivity to Mechanical Impact No information available

Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical

Thermal decomposition can lead to release of irritating gases and vapors.

Hazardous Combustion Products

Thermal decomposition can lead to release of irritating gases and vapors.

Protective Equipment and Precautions for Firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. **NFPA**

Health	Flammability	Instability	Physical hazards
1	0	0	N/A

6. Accidental release measures

Personal Precautions Use personal protective equipment as required. Ensure adequate ventilation.

Environmental Precautions Should not be released into the environment. See Section 12 for additional Ecological Information.

Methods for Containment and Clean Up Soak up with inert absorbent material. Keep in suitable, closed containers for disposal.

7. Handling and storage

Handling Wear personal protective equipment/face protection. Ensure adequate ventilation. Do not breathe mist/vapors/spray. Avoid contact with skin, eyes or clothing.

Storage. Keep containers tightly closed in a dry, cool and well-ventilated pl
Incompatible Materials. Strong oxidizing agents.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Sodium hydroxide	Ceiling: 2 mg/m^3	(Vacated) Ceiling: 2 mg/m^3 TWA: 2 mg/m^3	IDLH: 10 mg/m^3 Ceiling: 2 mg/m^3	Ceiling: 2 mg/m^3

Legend

ACGIH *- American Conference of Governmental Industrial Hygienists*
OSHA *- Occupational Safety and Health Administration*
NIOSH IDLH: *NIOSH - National Institute for Occupational Safety and Health*

Engineering Measures None under normal use conditions.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection No protective equipment is needed under normal use conditions.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Liquid
Appearance	Colorless
Odor	Odorless
Odor Threshold	No information available
pH	No information available
Melting Point/Range	No data available
Boiling Point/Range	No information available
Flash Point	No information available
Evaporation Rate	No information available
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	No information available
Vapor Density	> 1.0
Specific Gravity	1.000
Solubility	Soluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	No information available

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products. Excess heat.

Incompatible Materials Strong oxidizing agents

Hazardous Decomposition Products Thermal decomposition can lead to release of irritating gases and vapors

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Water	-	-	-
Sodium hydroxide	LD50 = 325 mg/kg (Rat)	LD50 = 1350 mg/kg (Rabbit)	Not listed

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation May cause skin, eye, and respiratory tract irritation

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS No	IARC	NTP	ACGIH	OSHA	Mexico
Water	7732-18-5	Not listed	Not listed	Not listed	Not listed	Not listed
Sodium hydroxide	1310-73-2	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available. **Teratogenicity** No information available.

STOT - single exposure None known

STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed No information available

Endocrine Disruptor Information No information available

Other Adverse Effects See actual entry in RTECS for complete information.

12. Ecological information

Ecotoxicity

Do not empty into drains.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Sodium hydroxide	-	LC50: = 45.4 mg/L, 96h static (Oncorhynchus mykiss)	-	Not listed

Persistence and Degradability Soluble in water Persistence is unlikely based on information available.

Bioaccumulation/ Accumulation No information available.

Mobility . Will likely be mobile in the environment due to its water solubility.

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT Not regulated
TDG Not regulated
IATA Not regulated
IMDG/IMO Not regulated

15. Regulatory information

United States of America Inventory

Component	CAS No	TSCA	TSCA Inventory notification Active-Inactive	TSCA - EPA Regulatory Flags
Water	7732-18-5	X	ACTIVE	-
Sodium hydroxide	1310-73-2	X	ACTIVE	-

Legend:
TSCA US EPA (TSCA) - Toxic Substances Control Act, (40 CFR Part 710) X - Listed
'-' - Not Listed

TSCA 12(b) - Notices of Export Not applicable

International Inventories

Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Japan (ISHL), Australia (AICS), China (IECSC), Korea (KECL).

Component	CAS No	DSL	NDSL	EINECS	PICCS	ENCS	ISHL	AICS	IECSC	KECL
Water	7732-18-5	X	-	231-791-2	X	X		X	X	KE-35400
Sodium hydroxide	1310-73-2	X	-	215-185-5	X	X	X	X	X	KE-31487

KECL - NIER number or KE number (http://ncis.nier.go.kr/en/main.do)

U.S. Federal Regulations

SARA 313 Not applicable

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Sodium hydroxide	X	1000 lb	-	-

Clean Air Act Not applicable
OSHA - Occupational Safety and Health Administration Not applicable

CERCLA This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Sodium hydroxide	1000 lb	-

California Proposition 65 This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Water	-	-	X	-	-
Sodium hydroxide	X	X	X	-	X

U.S. Department of Transportation

Reportable Quantity (RQ): Y
DOT Marine Pollutant N DOT Severe Marine Pollutant N

U.S. Department of Homeland Security This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Authorisation/Restrictions according to EU REACH

Component	REACH (1907/2006) - Annex XIV - Substances Subject to Authorization	REACH (1907/2006) - Annex XVII - Restrictions on Certain Dangerous Substances	REACH Regulation (EC 1907/2006) article 59 - Candidate List of Substances of Very High Concern (SVHC)
Sodium hydroxide	-	Use restricted. See item 75. (see link for restriction details)	-

https://echa.europa.eu/substances-restricted-under-reach

Safety, health and environmental regulations/legislation specific for the substance or mixture

Component	CAS No	OECD HPV	Persistent Organic Pollutant	Ozone Depletion Potential	Restriction of Hazardous Substances (RoHS)
Water	7732-18-5	Listed	Not applicable	Not applicable	Not applicable
Sodium hydroxide	1310-73-2	Listed	Not applicable	Not applicable	Not applicable

Component	CAS No	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Major Accident Notification	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Safety Report Requirements	Rotterdam Convention (PIC)	Basel Convention (Hazardous Waste)
Water	7732-18-5	Not applicable	Not applicable	Not applicable	Not applicable
Sodium hydroxide	1310-73-2	Not applicable	Not applicable	Not applicable	Annex I - Y35

16. Other information

Prepared By Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date 16-Jun-2009
Revision Date 24-Dec-2021
Print Date 24-Dec-2021
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates

only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

ThermoFisher SCIENTIFIC

SAFETY DATA SHEET

Creation Date 24-Nov-2010 **Revision Date** 24-Dec-2021 **Revision Number** 5

1. Identification

Product Name	**Sodium Persulfate**
Cat No. :	**BP26371, O61141, 06114500**
CAS No	7775-27-1
Synonyms	Sodium peroxydisulfate
Recommended Use	Laboratory chemicals.
Uses advised against	Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

Company

Fisher Scientific Company
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Emergency Telephone Number CHEMTRECÒ, Inside the USA: 800-424-9300
CHEMTRECÒ, Outside the USA: 001-703-527-3887

2. Hazard(s) identification

Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Oxidizing solids	Category 3
Acute oral toxicity	Category 4
Skin Corrosion/Irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2
Respiratory Sensitization	Category 1
Skin Sensitization	Category 1
Specific target organ toxicity (single exposure) Target Organs - Respiratory system.	Category 3

Label Elements

Signal Word
Danger

Hazard Statements
May intensify fire; oxidizer
Harmful if swallowed
Causes skin irritation
Causes serious eye irritation
May cause an allergic skin reaction
May cause allergy or asthma symptoms or breathing difficulties if inhaled
May cause respiratory irritation

Precautionary Statements
Prevention
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Wear protective gloves/protective clothing/eye protection/face protection
Avoid breathing dust/fume/gas/mist/vapors/spray
In case of inadequate ventilation wear respiratory protection
Contaminated work clothing should not be allowed out of the workplace
Use only outdoors or in a well-ventilated area
Keep away from heat/sparks/open flames/hot surfaces. - No smoking
Keep/Store away from clothing/ other combustible materials
Take any precaution to avoid mixing with combustibles
Inhalation
If experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing **Skin**
IF ON SKIN: Wash with plenty of soap and water
Take off contaminated clothing and wash before reuse
If skin irritation or rash occurs: Get medical advice/attention
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing If eye irritation persists: Get medical advice/attention
Ingestion
IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell Rinse mouth
Fire
In case of fire: Use CO2, dry chemical, or foam for extinction
Storage
Store in a well-ventilated place. Keep container tightly closed
Store locked up
Disposal

Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)

None identified

3. Composition/Information on Ingredients

Component	CAS No	Weight %
Sodium persulfate	7775-27-1	>95

4. First-aid measures

General Advice If symptoms persist, call a physician.

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. If skin irritation persists, call a physician.

Inhalation Remove to fresh air. If not breathing, give artificial respiration. Get medical attention if symptoms occur.

Ingestion Clean mouth with water and drink afterwards plenty of water. Get medical attention if symptoms occur.

Most important symptoms and effects May cause allergy or asthma symptoms or breathing difficulties if inhaled. May cause allergic skin reaction. Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Flooding quantities of water.

Unsuitable Extinguishing Media No information available

Flash Point No information available

Method - No information available

Autoignition Temperature No information available

Explosion Limits

Upper No data available

Lower No data available

Oxidizing Properties Oxidizer

Sensitivity to Mechanical Impact No information available

Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Oxidizer: Contact with combustible/organic material may cause fire. Containers may explode when heated or if contaminated with water. Decomposes violently at elevated temperatures. May ignite combustibles (wood paper, oil, clothing, etc.).

Hazardous Combustion Products
Sulfur oxides.
Sulfur oxides. Oxygen.
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
2	2	2	OX

6. Accidental release measures

Personal Precautions Use personal protective equipment as required. Ensure adequate ventilation. Avoid dust formation.

Environmental Precautions Should not be released into the environment.

Methods for Containment and Clean Up Keep in suitable, closed containers for disposal. Sweep up and shovel into suitable containers for disposal. Soak up with inert absorbent material. Sweep up and shovel into suitable containers for disposal.

7. Handling and storage

Handling Wear personal protective equipment/face protection. Avoid dust formation. Ensure adequate ventilation. Do not get in eyes, on skin, or on clothing. Avoid ingestion and inhalation. Keep away from clothing and other combustible materials.

Storage. Keep containers tightly closed in a dry, cool and well-ventilated place. Do not store near combustible materials. Keep away from acids. Protect from moisture. Incompatible Materials. Strong oxidizing agents. Acids. Strong reducing agents. Combustible material.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Sodium persulfate	TWA: 0.1 mg/m^3			TWA: 0.1 mg/m^3

Legend

ACGIH** - American Conference of Governm**ental Industrial Hygienists

Engineering Measures	Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.
Personal Protective Equipment	
Eye/face Protection	Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin and body protection	Wear appropriate protective gloves and clothing to prevent skin exposure.
Respiratory Protection	Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.
Hygiene Measures	Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Powder Solid
Appearance	White
Odor	Odorless
Odor Threshold	No information available
pH	5 - 7 550 g/l H2O
Melting Point/Range	100 °C / 212 °F
Boiling Point/Range	No information available
Flash Point	No information available
Evaporation Rate	Not applicable
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	No information available
Vapor Density	Not applicable
Specific Gravity	2.6
Solubility	Soluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	180 °C
Viscosity	Not applicable
Molecular Formula	Na2 O8 S2
Molecular Weight	238.09

10. Stability and reactivity

Reactive Hazard	Yes

Stability Oxidizer: Contact with combustible/organic material may cause fire.

Conditions to Avoid Incompatible products. Excess heat. Avoid dust formation. Exposure to moisture. Combustible material. Exposure to moist air or water.

Incompatible Materials Strong oxidizing agents, Acids, Strong reducing agents, Combustible material

Hazardous Decomposition Products Sulfur oxides, Oxygen

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Sodium persulfate	LD50 = 895 mg/kg (Rat)	LD50 > 10000 mg/kg (Rabbit)	LC50 > 21.6 mg/L (Rat) 4 h

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation Irritating to eyes, respiratory system and skin

Sensitization May cause sensitization by inhalation and skin contact

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS No	IARC	NTP	ACGIH	OSHA	Mexico
Sodium persulfate	7775-27-1	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Respiratory system

STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing **Endocrine Disruptor Information** No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity

Do not empty into drains. .

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Sodium persulfate	Not listed	LC50: = 771 mg/L, 96h static (Oncorhynchus mykiss) LC50: = 771 mg/L, 96h static (Lepomis macrochirus)	Not listed	EC50: = 133 mg/L, 48h (Daphnia magna)

Persistence and Degradability Soluble in water Persistence is unlikely based on information available.

Bioaccumulation/ Accumulation No information available.

Mobility Will likely be mobile in the environment due to its water solubility.

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT UN-

No UN1505

Proper Shipping Name SODIUM PERSULFATE

Hazard Class 5.1

Packing Group III

TDG

UN-No UN1505

Proper Shipping Name SODIUM PERSULFATE

Hazard Class 5.1

Packing Group III

IATA

UN-No UN1505

Proper Shipping Name SODIUM PERSULPHATE

Hazard Class 5.1

Packing Group III

IMDG/IMO

UN-No UN1505

Proper Shipping Name SODIUM PERSULPHATE

Hazard Class 5.1

Packing Group III

15. Regulatory information

United States of America Inventory

Component	CAS No	TSCA	TSCA Inventory notification Active-Inactive	TSCA - EPA Regulatory Flags
Sodium persulfate	7775-27-1	X	ACTIVE	-

Legend:
TSCA US EPA (TSCA) - Toxic Substances Control Act, (40 CFR Part 710) X - Listed
'-' - Not Listed

TSCA 12(b) - Notices of ExportNot applicable

International Inventories

Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Japan (ISHL), Australia (AICS), China (IECSC), Korea (KECL).

Component	CAS No	DSL	NDSL	EINECS	PICCS	ENCS	ISHL	AICS	IECSC	KECL
Sodium persulfate	7775-27-1	X	-	231-892-1	X	X	X	X	X	KE-12369

KECL - NIER number or KE number (http://ncis.nier.go.kr/en/main.do)

U.S. Federal Regulations

SARA 313 Not applicable

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act) Not applicable

Clean Air Act Not applicable

OSHA - Occupational Safety and Health Administration Not applicable

CERCLA Not applicable

California Proposition 65 This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Sodium persulfate	-	X	-	-	-

U.S. Department of Transportation
Reportable Quantity (RQ): N
DOT Marine Pollutant N DOT Severe Marine Pollutant N

U.S. Department of Homeland Security This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Authorisation/Restrictions according to EU REACH

Safety, health and environmental regulations/legislation specific for the substance or mixture

Component	CAS No	OECD HPV	Persistent Organic Pollutant	Ozone Depletion Potential	Restriction of Hazardous Substances (RoHS)
Sodium persulfate	7775-27-1	Listed	Not applicable	Not applicable	Not applicable

Component	CAS No	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Major Accident Notification	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Safety Report Requirements	Rotterdam Convention (PIC)	Basel Convention (Hazardous Waste)
Sodium persulfate	7775-27-1	Not applicable	Not applicable	Not applicable	Not applicable

16. Other information

Prepared By Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com
Creation Date 24-Nov-2010
Revision Date 24-Dec-2021
Print Date 24-Dec-2021
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer
The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

Safety Data Sheet

Material Name: Diesel Fuel, All Types **SDS No. 9909**
US GHS

Synonyms: Ultra Low Sulfur Diesel; Low Sulfur Diesel; No. 2 Diesel; Motor Vehicle Diesel Fuel; Non- Road Diesel Fuel; Locomotive/Marine Diesel Fuel

* * * Section 1 - Product and Company Identification * * *

Manufacturer Information

Hess Corporation
1 Hess Plaza
Woodbridge, NJ 07095-0961

Phone: 732-750-6000 Corporate EHS
Emergency # 800-424-9300 CHEMTREC
www.hess.com (Environment, Health, Safety Internet Website)

* * * Section 2 - Hazards Identification * * *

GHS Classification:

Flammable Liquids - Category 3
Skin Corrosion/Irritation – Category 2
Germ Cell Mutagenicity – Category 2
Carcinogenicity - Category 2
Specific Target Organ Toxicity (Single Exposure) - Category 3 (respiratory irritation, narcosis) Aspiration Hazard – Category 1
Hazardous to the Aquatic Environment, Acute Hazard – Category 3

GHS LABEL ELEMENTS Symbol(s)

Signal Word

DANGER

Hazard Statements

Flammable liquid and vapor.
Causes skin irritation.
Suspected of causing genetic defects.
Suspected of causing cancer.
May cause respiratory irritation.
May cause drowsiness or dizziness.
May be fatal if swallowed and enters airways.
Harmful to aquatic life.

Precautionary Statements

Prevention

Keep away from heat/sparks/open flames/hot surfaces. No smoking Keep container tightly closed.
Ground/bond container and receiving equipment.
Use explosion-proof electrical/ventilating/lighting/equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Wear protective gloves/protective clothing/eye protection/face protection.
Wash hands and forearms thoroughly after handling.
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood. Avoid breathing fume/mist/vapours/spray.

Response

In case of fire: Use water spray, fog or foam to extinguish.
IF ON SKIN (or hair): Wash with plenty of soap and water. Remove/Take off immediately all contaminated clothing and wash it before reuse. If skin irritation occurs: Get medical advice/attention.
IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a poison center/doctor if you feel unwell.
If swallowed: Immediately call a poison center or doctor. Do NOT induce vomiting. IF exposed or concerned: Get medical advice/attention.

Storage

Store in a well-ventilated place. Keep cool.
Keep container tightly closed.
Store locked up.

Disposal

Dispose of contents/container in accordance with local/regional/national/international regulations.

* * * Section 3 - Composition / Information on Ingredients * * *

CAS #	Component	Percent
68476-34-6	Fuels, diesel, no. 2	100
91-20-3	Naphthalene	<0.1

A complex mixture of hydrocarbons with carbon numbers in the range C9 and higher.

* * * Section 4 - First Aid Measures * * *

First Aid: Eyes

In case of contact with eyes, immediately flush with clean, low-pressure water for at least 15 min. Hold eyelids open to ensure adequate flushing. Seek medical attention. **First Aid: Skin**

Remove contaminated clothing. Wash contaminated areas thoroughly with soap and water or with

waterless hand cleanser. Obtain medical attention if irritation or redness develops. Thermal burns require immediate medical attention depending on the severity and the area of the body burned. **First Aid: Ingestion**

DO NOT INDUCE VOMITING. Do not give liquids. Obtain immediate medical attention. If spontaneous vomiting occurs, lean victim forward to reduce the risk of aspiration. Monitor for breathing difficulties. Small amounts of material which enter the mouth should be rinsed out until the taste is dissipated.

First Aid: Inhalation

Remove person to fresh air. If person is not breathing, provide artificial respiration. If necessary, provide additional oxygen once breathing is restored if trained to do so. Seek medical attention immediately.

* * * Section 5 - Fire Fighting Measures * * *

General Fire Hazards

See Section 9 for Flammability Properties.

Vapors may be ignited rapidly when exposed to heat, spark, open flame or other source of ignition. When mixed with air and exposed to an ignition source, flammable vapors can burn in the open or explode in confined spaces. Being heavier than air, vapors may travel long distances to an ignition source and flash back. Runoff to sewer may cause fire or explosion hazard.

Hazardous Combustion Products

Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke).

Extinguishing Media

SMALL FIRES: Any extinguisher suitable for Class B fires, dry chemical, CO2, water spray, fire fighting foam, and other gaseous agents.

LARGE FIRES: Water spray, fog or fire fighting foam. Water may be ineffective for fighting the fire, but may be used to cool fire-exposed containers.

Unsuitable Extinguishing Media

None

Fire Fighting Equipment/Instructions

Small fires in the incipient (beginning) stage may typically be extinguished using handheld portable fire extinguishers and other fire fighting equipment. Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require NIOSH/MSHA-approved pressure-demand selfcontained breathing apparatus with full facepiece and full protective clothing. Isolate area around container involved in fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water. For massive fires the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied fire fighting foam.

* * * Section 6 - Accidental Release Measures

* * *

Recovery and Neutralization

Carefully contain and stop the source of the spill, if safe to do so.

Materials and Methods for Clean-Up

Take up with sand or other oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container for reclamation or disposal. Caution, flammable vapors may accumulate in closed containers.

Emergency Measures

Evacuate nonessential personnel and remove or secure all ignition sources. Consider wind direction; stay upwind and uphill, if possible. Evaluate the direction of product travel, diking, sewers, etc. to confirm spill areas. Spills may infiltrate subsurface soil and groundwater; professional assistance may be necessary to determine the extent of subsurface impact.

Personal Precautions and Protective Equipment

Response and clean-up crews must be properly trained and must utilize proper protective equipment (see Section
8).

Environmental Precautions

Protect bodies of water by diking, absorbents, or absorbent boom, if possible. Do not flush down sewer or drainage systems, unless system is designed and permitted to handle such material. The use of fire fighting foam may be useful in certain situations to reduce vapors. The proper use of water spray may effectively disperse product vapors or the liquid itself, preventing contact with ignition sources or areas/equipment that require protection.

Prevention of Secondary Hazards

None

* * * Section 7 - Handling and Storage * * *

Handling Procedures

Handle as a combustible liquid. Keep away from heat, sparks, excessive temperatures and open flame! No smoking or open flame in storage, use or handling areas. Bond and ground containers during product transfer to reduce the possibility of static-initiated fire or explosion.

Special slow load procedures for "switch loading" must be followed to avoid the static ignition hazard that can exist when higher flash point material (such as fuel oil) is loaded into tanks previously containing low flash point products (such as this product) - see API Publication 2003, "Protection Against Ignitions Arising Out Of Static, Lightning and Stray Currents."

Storage Procedures

Keep away from flame, sparks, excessive temperatures and open flame. Use approved vented containers. Keep containers closed and clearly labeled. Empty product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition.

Store in a well-ventilated area. This storage area should comply with NFPA 30 "Flammable and Combustible Liquid Code". Avoid storage near incompatible materials. The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 "Cleaning Mobile Tanks In Flammable and Combustible Liquid Service" and API RP 2015 "Cleaning Petroleum Storage Tanks."

Incompatibilities

Keep away from strong oxidizers.

* * * Section 8 - Exposure Controls / Personal Protection * * *

Component Exposure Limits

Fuels, diesel, no. 2 (68476-34-6)

ACGIH: 100 mg/m3 TWA (inhalable fraction and vapor, as total hydrocarbons, listed under Diesel fuel)
Skin - potential significant contribution to overall exposure by the cutaneous route (listed under Diesel fuel)

Naphthalene (91-20-3)

ACGIH: 10 ppm TWA
15 ppm STEL
Skin - potential significant contribution to overall exposure by the cutaneous route
OSHA: 10 ppm TWA; 50 mg/m3 TWA
NIOSH: 10 ppm TWA; 50 mg/m3 TWA
15 ppm STEL; 75 mg/m3 STEL

Engineering Measures

Use adequate ventilation to keep vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces.

Personal Protective Equipment: Respiratory

A NIOSH/MSHA-approved air-purifying respirator with organic vapor cartridges or canister may be permissible under certain circumstances where airborne concentrations are or may be expected to exceed exposure limits or for odor or irritation. Protection provided by air-purifying respirators is limited.

Use a positive pressure, air-supplied respirator if there is a potential for uncontrolled release, exposure levels are not known, in oxygen-deficient atmospheres, or any other circumstance where an air-purifying respirator may not provide adequate protection.

Personal Protective Equipment: Hands

Gloves constructed of nitrile, neoprene, or PVC are recommended.

Personal Protective Equipment: Eyes

Safety glasses or goggles are recommended where there is a possibility of splashing or spraying.

Personal Protective Equipment: Skin and Body

Chemical protective clothing such as of E.I. DuPont TyChem®, Saranex® or equivalent recommended based on degree of exposure. Note: The resistance of specific material may vary from product to product as well as with degree of exposure. Consult manufacturer specifications for further information.

* * * Section 9 - Physical & Chemical Properties * * *

Appearance:	Clear, straw-yellow.	**Odor:**	Mild, petroleum distillate odor
Physical State:	Liquid	**pH:**	ND
Vapor Pressure:	0.009 psia @ 70 °F (21 °C)	**Vapor Density:**	>1.0
Boiling Point:	320 to 690 °F (160 to 366 °C)	**Melting Point:**	ND
Solubility (H2O):	Negligible	**Specific Gravity:**	0.83-0.876 @ 60°F (16°C)
Evaporation Rate:	Slow; varies with conditions	**VOC:**	ND
Percent Volatile:	100%	**Octanol/H2O Coeff.:**	ND
Flash Point:	>125 °F (>52 °C) minimum	**Flash Point Method:**	PMCC
Upper Flammability Limit (UFL):	7.5	**Lower Flammability Limit (LFL):**	0.6
Burning Rate:	ND	**Auto Ignition:**	494°F (257°C)

* * * Section 10 - Chemical Stability & Reactivity Information * * *

Chemical Stability

This is a stable material.

Hazardous Reaction Potential

Will not occur.

Conditions to Avoid

Avoid high temperatures, open flames, sparks, welding, smoking and other ignition sources.

Incompatible Products

Keep away from strong oxidizers.

Hazardous Decomposition Products

Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke).

* * * Section 11 - Toxicological Information * * *

Acute Toxicity

A: General Product Information

Harmful if swallowed.

B: Component Analysis - LD50/LC50

Naphthalene (91-20-3)

Inhalation LC50 Rat >340 mg/m3 1 h; Oral LD50 Rat 490 mg/kg; Dermal LD50 Rat >2500 mg/kg; Dermal LD50 Rabbit >20 g/kg

Potential Health Effects: Skin Corrosion Property/Stimulativeness

Practically non-toxic if absorbed following acute (single) exposure. May cause skin irritation with prolonged or repeated contact. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are repeatedly exposed.

Potential Health Effects: Eye Critical Damage/ Stimulativeness

Contact with eyes may cause mild irritation.

Potential Health Effects: Ingestion

Ingestion may cause gastrointestinal disturbances, including irritation, nausea, vomiting and diarrhea, and central nervous system (brain) effects similar to alcohol intoxication. In severe cases, tremors, convulsions, loss of consciousness, coma, respiratory arrest, and death may occur. **Potential Health Effects: Inhalation**

Excessive exposure may cause irritations to the nose, throat, lungs and respiratory tract. Central nervous system (brain) effects may include headache, dizziness, loss of balance and coordination, unconsciousness, coma, respiratory failure, and death.

WARNING: the burning of any hydrocarbon as a fuel in an area without adequate ventilation may result in hazardous levels of combustion products, including carbon monoxide, and inadequate oxygen levels, which may cause unconsciousness, suffocation, and death.

Respiratory Organs Sensitization/Skin Sensitization

This product is not reported to have any skin sensitization effects.

Generative Cell Mutagenicity

This material has been positive in a mutagenicity study.

Carcinogenicity

A: General Product Information

Suspected of causing cancer.

Studies have shown that similar products produce skin tumors in laboratory animals following repeated applications without washing or removal. The significance of this finding to human exposure has not been determined. Other studies with active skin carcinogens have shown that washing the animal's skin with soap and water between applications reduced tumor formation.

B: Component Carcinogenicity

Fuels, diesel, no. 2 (68476-34-6)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans (listed under Diesel fuel)

Naphthalene (91-20-3)

ACGIH: A4 - Not Classifiable as a Human Carcinogen
NTP: Reasonably Anticipated To Be A Human Carcinogen (Possible Select Carcinogen)
IARC: Monograph 82 [2002] (Group 2B (possibly carcinogenic to humans))

Reproductive Toxicity

This product is not reported to have any reproductive toxicity effects.

Specified Target Organ General Toxicity: Single Exposure

This product is not reported to have any specific target organ general toxicity single exposure effects.

Specified Target Organ General Toxicity: Repeated Exposure

This product is not reported to have any specific target organ general toxicity repeat exposure effects.

Aspiration Respiratory Organs Hazard

The major health threat of ingestion occurs from the danger of aspiration (breathing) of liquid drops into the lungs, particularly from vomiting. Aspiration may result in chemical pneumonia (fluid in the lungs), severe lung damage, respiratory failure and even death.

* * * Section 12 - Ecological Information * * *

Ecotoxicity

A: General Product Information

Keep out of sewers, drainage areas and waterways. Report spills and releases, as applicable, under Federal and State regulations.

B: Component Analysis - Ecotoxicity - Aquatic Toxicity

Fuels, diesel, no. 2 (68476-34-6)

Test & Species	Conditions
96 Hr LC50 Pimephales promelas	35 mg/L [flowthrough]

Naphthalene (91-20-3)

Test & Species	Conditions
96 Hr LC50 Pimephales promelas	5.74-6.44 mg/L [flow-through]
96 Hr LC50 Oncorhynchus mykiss	1.6 mg/L [flowthrough]
96 Hr LC50 Oncorhynchus mykiss	0.91-2.82 mg/L [static]
96 Hr LC50 Pimephales promelas	1.99 mg/L [static]
96 Hr LC50 Lepomis macrochirus	31.0265 mg/L [static]
72 Hr EC50 Skeletonema costatum	0.4 mg/L
48 Hr LC50 Daphnia magna	2.16 mg/L
48 Hr EC50 Daphnia magna	1.96 mg/L [Flow through]
48 Hr EC50 Daphnia magna	1.09 - 3.4 mg/L [Static]

Persistence/Degradability

No information available.

Bioaccumulation

No information available.

Mobility in Soil

No information available.

* * * Section 13 - Disposal Considerations * * *

Waste Disposal Instructions

See Section 7 for Handling Procedures. See Section 8 for Personal Protective Equipment recommendations. **Disposal of Contaminated Containers or Packaging**

Dispose of contents/container in accordance with local/regional/national/international regulations.

* * * Section 14 - Transportation Information * * *

DOT Information

Shipping Name: Diesel Fuel

NA #: 1993 **Hazard Class:** 3 **Packing Group:** III

Placard:

* * * Section 15 - Regulatory Information * * *

Regulatory Information

Component Analysis

This material contains one or more of the following chemicals required to be identified under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65) and/or CERCLA (40 CFR 302.4).

Naphthalene (91-20-3)

CERCLA: 100 lb final RQ; 45.4 kg final RQ

SARA Section 311/312 – Hazard Classes

Acute Health	Chronic Health	Fire	Sudden Release of Pressure	Reactive
X	X	X	--	--

SARA SECTION 313 - SUPPLIER NOTIFICATION

This product may contain listed chemicals below the de minimis levels which therefore are not subject to the supplier notification requirements of Section 313 of the Emergency Planning and Community Right- To-Know Act (EPCRA) of 1986 and of 40 CFR 372. If you may be required to report releases of chemicals listed in 40 CFR 372.28, you may contact Hess Corporate Safety if you require additional information regarding this product.

State Regulations

Component Analysis - State

The following components appear on one or more of the following state hazardous substances lists:

Component	CAS	CA	MA	MN	NJ	PA	RI
Fuels, diesel, no. 2	68476-34-6	No	No	No	Yes	No	No
Naphthalene	91-20-3	Yes	Yes	Yes	Yes	Yes	No

The following statement(s) are provided under the California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65):

WARNING! This product contains a chemical known to the state of California to cause cancer.

Component Analysis - WHMIS IDL

No components are listed in the WHMIS IDL.

Additional Regulatory Information

Component Analysis - Inventory

Component	CAS #	TSCA	CAN	EEC
Fuels, diesel, no. 2	68476-34-6	Yes	DSL	EINECS
Naphthalene	91-20-3	Yes	DSL	EINECS

* * * Section 16 - Other Information * * *

NFPA® Hazard Rating Health 1

Fire 2
Reactivity 0

HMIS® Hazard Rating			
	Health	1* Slight	2
	Fire	Moderate	0
	Physical	Minimal	
		*Chronic	

Key/Legend

ACGIH = American Conference of Governmental Industrial Hygienists; ADG = Australian Code for the Transport of Dangerous Goods by Road and Rail; ADR/RID = European Agreement of Dangerous Goods by Road/Rail; AS = Standards Australia; DFG = Deutsche Forschungsgemeinschaft; DOT = Department of Transportation; DSL =
Domestic Substances List; EEC = European Economic Community; EINECS = European Inventory of Existing
Commercial Chemical Substances; ELINCS = European List of Notified Chemical Substances; EU = European
Union; HMIS = Hazardous Materials Identification System; IARC = International Agency for Research on Cancer;
IMO = International Maritime Organization; IATA = International Air Transport Association; MAK = Maximum Concentration Value in the Workplace; NDSL = Non-Domestic Substances List; NFPA = National Fire Protection
Association; NOHSC = National Occupational Health & Safety Commission; NTP = National Toxicology Program;
STEL = Short-term Exposure Limit; TDG = Transportation of Dangerous Goods; TLV = Threshold Limit Value; TSCA = Toxic Substances Control Act; TWA = Time Weighted Average

Literature References

None

Other Information

Information presented herein has been compiled from sources considered to be dependable, and is accurate and reliable to the best of our knowledge and belief, but is not guaranteed to be so. Since conditions of use are beyond our control, we make no warranties, expressed or implied, except those that may be contained in our written contract of sale or acknowledgment.

Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, vendor assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material, even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in their use of the material.

Section 1. Identification

Product Identifier

Product Name	Multipurpose Engine Oil (All Grades)
Common Name	Motor Oil SAE 10, 30, 40, 50
Product Code(s)	63025, 63029, 63030, 63031

Recommended or Restricted Uses

Recommended Use	Lubricant for engines
Restricted Use	Not Applicable

Canadian Supplier

Supplier	49 North Lubricants 6611 45th Street, Leduc, Alberta T9E 7E3 Canada Tel: (780) 986-9260 Fax: (780) 986-9650

Emergency Telephone Number

Emergency Telephone	CHEMTREC: 1-800-424-9300

Section 2. Hazard Identification

Hazard Classification

WHMIS Regulatory Status	Not Regulated
Physical Hazards	Not Classified
Health Hazards	Not Classified
Environmental Hazards	Not Classified

Label Elements	Not Applicable
Other Hazards	Not Applicable

Section 3. Composition / Information on Ingredients

Composition

This product does not contain any hazardous ingredients, or ingredients with national workplace exposure limits.

Section 4. First Aid Measures

Route of Exposure

Inhalation: Move affected person to fresh air and keep warm and at rest. Loosen tight clothing such as collar, tie or belt. If breathing becomes difficult, properly trained personnel can assist affected person by administering oxygen. Place unconscious person on their side in the recovery position and ensure breathing continues.

Skin Contact: Rinse affected area with soap and water.

Eye Contact: Rinse immediately with plenty of water. Remove any contact lenses and open eyelids wide apart.

Continue to rinse for at least 10 minutes

Ingestion: Rinse mouth thoroughly with water. Do not induce vomiting unless under the direction of medical personnel. Move affected person to fresh air and keep warm and at rest.

Most Important Systems and Effects

Inhalation: May Cause: Coughing, Chest Tightness

Skin Contact: May Cause: Temporary Skin Irritation

Eye Contact: May Cause: Irritation or Redness in Eyes

Ingestion: May Cause: Discomfort

Immediate Medical Attention and Special Treatment

Note for the Doctor Treat Symptomatically

Section 5. Fire-Fighting Measures

Extinguishing Media

Suitable Extinguishing Media Extinguish with alcohol-resistant foam, carbon dioxide powder or water fog.
Unsuitable Extinguishing Media Do not use water jet as an extinguisher, this can spread the fire.

Specific Hazards Arising from the Hazardous Product

Specific hazards	Containers can burst violently or explode when heated. Contains Hydrocarbons. The product is immiscible with water and will spread on the water surface.
Hazardous combustion products	Hydrocarbons. Carbon Monoxide (CO). Carbon Dioxide (CO_2).

Advice for Firefighters

Protective actions during firefighting	Avoid breathing gases or vapours. Evacuate the area. Ventilate closed spaces before entering them. Cool containers exposed to heat with water spray and remove them from the fire area if it can be done without risk.
Special protective equipment for firefighters	Not Applicable.

Section 6. Accidental Release Measures

Personal Precautions, Protective Equipment and Emergency Procedures

Personal precautions Keep unnecessary and unprotected personnel away from spillage.

Wear protective clothing as described in Section 8. Follow safe handing as described in Section 7. Wash thoroughly after dealing with a spill. Ensure procedures and training for emergency decontamination and disposal are in place. Do not touch or walk into spilled material.

Methods and Material for Containment and Cleaning Up

Methods for cleaning up	Absorb spillage with non-combustible, absorbent material. For small spillages: wipe up with an absorbent cloth. Avoid discharge into drains or watercourses or onto the ground. For large spillages: Contain the spilled material, removed and dispose of contaminated material with a licensed waste disposal site. If environmental pollution occurs (sewers, waterways, soil or air) inform the relevant authorities. Large spills may require pumping of water or excavation of soil to clean up.
Methods for containment	Use berms, skimmers, and absorbent to contain the spillage where appropriate. Ensure that wildlife is deterred from entering the contaminated area.

Section 7. Handling and Storage

Precautions for Safe Handling

Usage precautions	Read and follow manufacturer's recommendations. Wear PPE as described in Section 8. Eating, drinking, and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash before eating, drinking or smoking. Handle all packages and containers carefully. Keep all containers tightly sealed when not in use.

Conditions for Safe Storage, Including any Incompatibilities

Storage Precautions	Store away from incompatible materials listed in Section 10. Store in accordance with local regulations. Keep containers in a cool, well ventilated location. The storage area floor should be leak-tight and not absorbent.
Storage Class	Not Applicable

Section 8. Exposure Controls / Personal

Protection

Control Parameters

Occupational Exposure Limits Not Applicable

Appropriate Engineering Controls

Engineering controls Provide adequate ventilation. Use engineered ventilation as the primary means to minimize worker exposure.

Individual Protection Measures

General All personal protective equipment (PPE) should comply with Canada OH&S Regulations (SOR/86-304) Eye/Face protection Recommended: Safety glasses. Where splash hazards exist use a face shield as well.

Hand protection Recommended: Nitrile gloves.

Body protection Recommended: Long sleeved coveralls.

Respiratory protection If engineered ventilation is inadequate, use a NIOSH-certified respirator with a dual cartridge for organic vapor and P95 particulates.

Section 9. Physical and Chemical Properties

Physical Properties

Physical State	Liquid
Colour	Amber
Odour	Mild
Odour threshold	Not Available

Chemical Properties

pH	Not Available
Melting point / freezing point	Not Available
Flash point	> 205 ºC (Method: Closed Cup)
Evaporation rate	< 1 (butyl acetate = 1)

Flammability (solid; gas)	Not Available
Lower Explosive Limit	Not Available
Upper Explosive Limit	Not Available
Vapour pressure	< 0.13 kPa @ 20ºC
Vapour density	Not Available
Relative density	0.88 – 0.89
Solubility	Insoluble in water
Partition coefficient: n-octanol/water	Not Available
Decomposition temperature	Not Available
Viscosity	Not Available

Section 10. Stability and Reactivity

Reactivity	Not Available
Stability	Stable under normal conditions and use
Possibility of hazardous reactions	No reactions under normal conditions and use
Conditions to avoid	Not Applicable
Incompatible Materials	Oxidizing Agents
Hazardous decomposition products	No hazardous decomposition products under normal conditions and use

Section 11. Toxicological Information

Routes of Exposure	Ingestion, Inhalation, Skin/Eye Contact
Symptoms	
Physical	Skin/Eye contact may cause irritation or redness Ingestion may cause discomfort
Chemical	No Available Data
Toxicological	No Available Data
Exposure Effects	
Delayed Effects	No Available Data
Chronic Effects	No Available Data
Acute Toxicity Estimates (ATE)	No Available Data

ATE oral (mg/kg)

ATE dermal (mg/kg) No Available Data
ATE inhalation (mg/L) No Available Data

Section 12. Ecological Information

No Available Data.

Section 13. Disposal Considerations

No Available Data. Follow local regulations.

Section 14. Transport Information

Not Applicable.

Section 15. Regulatory Information

Not Applicable.

Section 16. Other Information

SDS Revision Date: 05-24-2018
SDS Number(s) 63025 / 63029 / 63030 / 63031
Disclaimer: The information contained herein is accurate to the best of our knowledge.

Safety Data Sheet

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

Clarity Hydraulic Oil AW 32, 46, 68, 100

Product Use: Hydraulic Oil
Product Number(s): 219612, 230340, 230341, 230342, 255702, 278022, 278023, 278024
Synonyms: Clarity Hydraulic Oil AW 32 ISOCLEAN Certified; Clarity Hydraulic Oil AW 46 ISOCLEAN Certified; Clarity Hydraulic Oil AW 68 ISOCLEAN Certified
Company Identification
Chevron Products Company a division of
Chevron U.S.A. Inc.
6001 Bollinger Canyon Rd.
San Ramon, CA 94583 United States of America
www.chevronlubricants.com

Transportation Emergency Response
CHEMTREC: (800) 424-9300 or (703) 527-3887
Health Emergency
Chevron Emergency & Information Center: Located in the USA. International collect calls accepted. (800) 231-0623 or (510) 231-0623
Product Information email :
lubemsds@chevron.com
Product Information: 1 (800) 582-3835, LUBETEK@chevron.com

SECTION 2 HAZARDS IDENTIFICATION

CLASSIFICATION:

- Reproductive toxicant (fertility): Category 2.

Signal Word: Warning **Health Hazards:**

- Suspected of damaging fertility.

PRECAUTIONARY STATEMENTS:
Prevention:
- Obtain special instructions before use.
- Do not handle until all safety precautions have been read and understood.
- Use personal protective equipment as required.**Response:**
- IF exposed or concerned: Get medical advice/attention.

Storage:
- Store locked up.

Disposal:
- Dispose of contents/container in accordance with applicable local/regional/national/international regulations.

HAZARDS NOT OTHERWISE CLASSIFIED: Not Applicable

SECTION 3 COMPOSITION/ INFORMATION ON INGREDIENTS

COMPONENTS	CAS NUMBER	AMOUNT
Highly refined mineral oil (C15 - C50)	Mixture	70 - 99 %weight
N-Phenylbenzenamine, reaction products with 2,4,4-trimethylpentene	68411-46-1	0.1 - < 1 %weight

SECTION 4 FIRST AID MEASURES

Description of first aid measures
Eye: No specific first aid measures are required. As a precaution, remove contact lenses, if worn, and flush eyes with water.
Skin: No specific first aid measures are required. As a precaution, remove clothing and shoes if contaminated. To remove the material from skin, use soap and water. Discard contaminated clothing and shoes or thoroughly clean before reuse.
Ingestion: No specific first aid measures are required. Do not induce vomiting. As a precaution, get medical advice.
Inhalation: No specific first aid measures are required. If exposed to excessive levels of material in the air, move the exposed person to fresh air. Get medical attention if coughing or respiratory discomfort occurs.

Most important symptoms and effects, both acute and delayed
IMMEDIATE HEALTH EFFECTS
Eye: Not expected to cause prolonged or significant eye irritation.
Skin: High-Pressure Equipment Information: Accidental high-velocity injection under the skin of materials of this type may result in serious injury. Seek medical attention at once should an accident like this occur. The initial wound at the injection site may not appear to be serious at first; but, if left untreated, could result in disfigurement or amputation of the affected part.
Contact with the skin is not expected to cause prolonged or significant irritation. Contact with the skin is not expected to cause an allergic skin response. Not expected to be harmful to internal organs if absorbed through the skin.

Ingestion: Not expected to be harmful if swallowed.
Inhalation: Not expected to be harmful if inhaled. Contains a petroleum-based mineral oil. May cause respiratory irritation or other pulmonary effects following prolonged or repeated inhalation of oil mist at airborne levels above the recommended mineral oil mist exposure limit. Symptoms of respiratory irritation may include coughing and difficulty breathing.

DELAYED OR OTHER HEALTH EFFECTS:
Reproduction and Birth Defects: Swallowing this material may cause adverse reproductive effects based on animal data. See Section 11 for additional information. Risk depends on duration and level of exposure.
Indication of any immediate medical attention and special treatment needed
Note to Physicians: In an accident involving high-pressure equipment, this product may be injected under the skin. Such an accident may result in a small, sometimes bloodless, puncture wound. However, because of its driving force, material injected into a fingertip can be deposited into the palm of the hand. Within 24 hours, there is usually a great deal of swelling, discoloration, and intense throbbing pain. Immediate treatment at a surgical emergency center is recommended.

SECTION 5 FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA: Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames.
Unusual Fire Hazards: Leaks/ruptures in high pressure system using materials of this type can create a fire hazard when in the vicinity of ignition sources (eg. open flame, pilot lights, sparks, or electric arcs).

PROTECTION OF FIRE FIGHTERS:
Fire Fighting Instructions: This material will burn although it is not easily ignited. See Section 7 for proper handling and storage. For fires involving this material, do not enter any enclosed or confined fire space without proper protective equipment, including self-contained breathing apparatus.
Combustion Products: Highly dependent on combustion conditions. A complex mixture of airborne solids, liquids, and gases including carbon monoxide, carbon dioxide, and unidentified organic compounds will be evolved when this material undergoes combustion.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Protective Measures: Eliminate all sources of ignition in vicinity of spilled material.
Spill Management: Stop the source of the release if you can do it without risk. Contain release to prevent further contamination of soil, surface water or groundwater. Clean up spill as soon as possible, observing precautions in Exposure Controls/Personal Protection. Use appropriate techniques such as applying non-combustible absorbent materials or pumping. Where feasible and appropriate, remove contaminated soil. Place contaminated materials in disposable containers and dispose of in a manner consistent with applicable regulations.
Reporting: Report spills to local authorities and/or the U.S. Coast Guard's National Response Center at (800) 424-8802 as appropriate or required.

SECTION 7 HANDLING AND STORAGE

General Handling Information: Avoid contaminating soil or releasing this material into sewage and drainage systems and bodies of water.
Precautionary Measures: DO NOT USE IN HIGH PRESSURE SYSTEMS in the vicinity of flames, sparks and hot surfaces. Use only in well ventilated areas. Keep container closed. Do not get in eyes, on skin, or on clothing. Do not taste or swallow. Wash thoroughly after handling.
Static Hazard: Electrostatic charge may accumulate and create a hazardous condition when handling this material. To minimize this hazard, bonding and grounding may be necessary but may not, by themselves, be sufficient. Review all operations which have the potential of generating and accumulating an electrostatic charge and/or a flammable atmosphere (including tank and container filling, splash filling, tank cleaning, sampling, gauging, switch loading, filtering, mixing, agitation, and vacuum truck operations) and use appropriate mitigating procedures.
Container Warnings: Container is not designed to contain pressure. Do not use pressure to empty container or it may rupture with explosive force. Empty containers retain product residue (solid, liquid, and/or vapor) and can be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, static electricity, or other sources of ignition. They may explode and cause injury or death. Empty containers should be completely drained, properly closed, and promptly returned to a drum reconditioner or disposed of properly.

SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

GENERAL CONSIDERATIONS:
Consider the potential hazards of this material (see Section 2), applicable exposure limits, job activities, and other substances in the workplace when designing engineering controls and selecting personal protective equipment (PPE). If engineering controls or work practices are not adequate to prevent exposure to harmful levels of this material, refer to PPE information below.

Factors that affect PPE include, but are not limited to: properties of the chemical, other chemicals which may contact the same PPE, physical requirements (fit & sizing, cut/puncture protection, dexterity, thermal protection, etc.), and potential allergic reactions to the PPE material. It is the responsibility of the user to read and understand all instructions and limitations supplied with the equipment since protection is usually provided for a limited time or under certain circumstances. Refer to appropriate CEN standards.

ENGINEERING CONTROLS:
Use general ventilation, local exhaust ventilation, or a combination of both.

PERSONAL PROTECTIVE EQUIPMENT
Eye/Face Protection: Wear protective equipment to prevent eye contact. Selection of protective equipment may include safety glasses, chemical goggles, face shields, or a combination depending on the work operations conducted.
Skin Protection: Wear chemical personal protective equipment (PPE) to prevent skin contact. Selection of chemical protective clothing should be performed by an Occupational Hygienist or Safety Professional and be based upon applicable standards (ASTM F739 or EN 374). Using chemical PPE depends upon operations conducted and may include chemical gloves, boots, chemical apron, chemical suit, and complete

facial protection. Refer to PPE manufacturers to obtain breakthrough time information to determine how long PPE can be used before it needs to be replaced. Unless specific glove manufacturer data indicates otherwise, the below table is based upon available industry data to assist in the glove selection process and is intended to be used as reference only.

Chemical Glove Material	Thickness (mm)	Typical Breakthrough Time (minutes)
Butyl	0.7	120
Neoprene	0.61	120
Nitrile	0.8	120
Polyvinyl Chloride (PVC)	1.1	120
Viton Butyl	0.3	120

Respiratory Protection: No respiratory protection is normally required.
If user operations generate an oil mist, determine if airborne concentrations are below the occupational exposure limit for mineral oil mist. If not, wear an approved respirator that provides adequate protection from the measured concentrations of this material. For air-purifying respirators use a particulate cartridge.
Use a positive pressure air-supplying respirator in circumstances where air-purifying respirators may not provide adequate protection.

Occupational Exposure Limits:

Component	Agency	Form	TWA	STEL	Ceiling	Notation
Highly refined mineral oil (C15 - C50)	ACGIH	--	5 mg/m3	10 mg/m3	--	--
Highly refined mineral oil (C15 - C50)	OSHA Z-1	--	5 mg/m3	--	--	--

Consult local authorities for appropriate values.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Attention: the data below are typical values and do not con specification.

Color: Colorless to yellow
Physical State: Liquid
Odor: Petroleum odor
Odor Threshold: No data available
pH: Not Applicable
Vapor Pressure: No data available
Vapor Density (Air = 1): No data available
Initial Boiling Point: No data available
Solubility: Soluble in hydrocarbons; insoluble in water
Freezing Point: Not Applicable
Melting Point: No data available
Density: 0.8618 kg/l - 0.8694 kg/l @ 15°C (59°F) (Typical)
Viscosity: 32 mm2/s - 110 mm2/s @ 40°C (104°F)
Evaporation Rate: No data available
Decomposition temperature: No data available
Octanol/Water Partition Coefficient: No data available

FLAMMABLE PROPERTIES:
Flammability (solid, gas): Not Applicable

Flashpoint: (Cleveland Open Cup) 190 °C (374 °F) (Minimum)
Autoignition: No data available
Flammability (Explosive) Limits (% by volume in air):
Lower: Applicable

Not Applicable Upper: Not

SECTION 10 STABILITY AND REACTIVITY

Reactivity: May react with strong acids or strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.
Chemical Stability: This material is considered stable under normal ambient and anticipated storage and handling conditions of temperature and pressure. **Incompatibility With Other Materials:** Not applicable
Hazardous Decomposition Products: None known (None expected) **Hazardous Polymerization:** Hazardous polymerization will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

Information on toxicological effects
Serious Eye Damage/Irritation: The material is not considered an eye irritant. The product has not been

tested. The statement is based on evaluation of data for product components.

Skin Corrosion/Irritation: The material is not considered a skin irritant. The product has not been tested. The statement is based on evaluation of data for product components.

Skin Sensitization: The material is not considered a skin sensitizer. The product has not been tested. The statement is based on evaluation of data for product components.

Acute Dermal Toxicity: The material is not considered a dermal toxicant. The product has not been tested. The statement is based on evaluation of data for similar materials or product components.
Acute Oral Toxicity: The material is not considered an oral toxicant. The product has not been tested. The statement is based on evaluation of data for product components.

Acute Inhalation Toxicity: The material is not considered an inhalation toxicant. The product has not been tested. The statement is based on evaluation of data for similar materials or product components. **Acute Toxicity Estimate:** Not Determined

Germ Cell Mutagenicity: The material is not considered a mutagen. The product has not been tested. The statement is based on evaluation of data for similar materials or product components.

Carcinogenicity: The material is not considered a carcinogen. The product has not been tested. The statement is based on evaluation of data for similar materials or product components.

Reproductive Toxicity: This material is suspected of damaging fertility. The product has not been tested. The statement is based on evaluation of data for similar materials or product components.

Specific Target Organ Toxicity - Single Exposure: The material is not considered a target organ toxicant (single exposure). The product has not been tested. The statement is based on evaluation of data for similar materials or product components.

Specific Target Organ Toxicity - Repeated Exposure: The material is not considered a target organ toxicant (repeated exposure). The product has not been tested. The statement is based on evaluation of data for similar materials or product components.

Aspiration Hazard: The material is not considered an aspiration hazard.

ADDITIONAL TOXICOLOGY INFORMATION:
This product contains petroleum base oils which may be refined by various processes including severe solvent extraction, severe hydrocracking, or severe hydrotreating. None of the oils requires a cancer warning under the OSHA Hazard Communication Standard (29 CFR 1910.1200). These oils have not been listed in the National Toxicology Program (NTP) Annual Report nor have they been classified by the International Agency for Research on Cancer (IARC) as; carcinogenic to humans (Group 1), probably carcinogenic to humans (Group 2A), or possibly carcinogenic to humans (Group 2B).
These oils have not been classified by the American Conference of Governmental Industrial Hygienists (ACGIH) as: confirmed human carcinogen (A1), suspected human carcinogen (A2), or confirmed animal carcinogen with unknown relevance to humans (A3).

SECTION 12 ECOLOGICAL INFORMATION

ECOTOXICITY
This material is not expected to be harmful to aquatic organisms.

The product has not been tested. The statement has been derived from the properties of the individual components.

MOBILITY
No data available.

PERSISTENCE AND DEGRADABILITY
This material is not expected to be readily biodegradable. The product has not been tested. The statement has been derived from the properties of the individual components.

POTENTIAL TO BIOACCUMULATE
Bioconcentration Factor: No data available.
Octanol/Water Partition Coefficient: No data available

SECTION 13 DISPOSAL CONSIDERATIONS

Use material for its intended purpose or recycle if possible. Oil collection services are available for used oil recycling or disposal. Place contaminated materials in containers and dispose of in a manner consistent with applicable regulations. Contact your sales representative or local environmental or health authorities for approved disposal or recycling methods.

SECTION 14 TRANSPORT INFORMATION

The description shown may not apply to all shipping situations. Consult 49CFR, or appropriate Dangerous Goods Regulations, for additional description requirements (e.g., technical name) and modespecific or quantity-specific shipping requirements.

DOT Shipping Description: NOT REGULATED AS HAZARDOUS MATERIAL UNDER 49 CFR

IMO/IMDG Shipping Description: NOT REGULATED AS DANGEROUS GOODS FOR TRANSPORT UNDER THE IMDG CODE

ICAO/IATA Shipping Description: NOT REGULATED AS DANGEROUS GOODS FOR TRANSPORT UNDER ICAO

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC code: Not applicable

SECTION 15 REGULATORY INFORMATION

EPCRA 311/312 CATEGORIES:
Reproductive toxicity

REGULATORY LISTS SEARCHED:

01-1=IARC Group 1	05=MA RTK
01-2A=IARC Group 2A	06=NJ RTK
01-2B=IARC Group 2B	07=PA RTK

02=NTP Carcinogen	08-1=TSCA 5(e)
03=EPCRA 313	08-2=TSCA 12(b)
04=CA Proposition 65	

No components of this material were found on the regulatory lists above.

CHEMICAL INVENTORIES:
All components comply with the following chemical inventory requirements: AIIC (Australia), DSL (Canada), ENCS (Japan), IECSC (China), KECI (Korea), NZIoC (New Zealand), PICCS (Philippines), TCSI (Taiwan), TSCA (United States).

One or more components is listed on ELINCS (European Union). All other components are listed or exempted from listing on EINECS.

NEW JERSEY RTK CLASSIFICATION:
Under the New Jersey Right-to-Know Act L. 1983 Chapter 315 N.J.S.A. 34:5A-1 et. seq., the product is to be identified as follows: PETROLEUM OIL (Hydraulic oil)

SECTION 16 OTHER INFORMATION

NFPA RATINGS: Health: 0 Flammability: 1 Reactivity: 0

HMIS RATINGS: Health: 0* Flammability: 1 Reactivity: 0
(0-Least, 1-Slight, 2-Moderate, 3-High, 4-Extreme, PPE:- Personal Protection Equipment Index recommendation, *- Chronic Effect Indicator). These values are obtained using the guidelines or published evaluations prepared by the National Fire Protection Association (NFPA) or the National Paint and Coating Association (for HMIS ratings).

REVISION STATEMENT: SECTION 02 - Hazard Statements information was added.
SECTION 02 - Health Classification information was added.
SECTION 02 - Pictogram information was added.
SECTION 02 - Precautionary Statements information was added.
SECTION 02 - Signal Word information was added.
SECTION 03 - Composition information was modified.
SECTION 04 - Delayed Health Effects - Reproductive Toxicity information was modified.
SECTION 07 - Precautionary Measures information was modified.
SECTION 08 - Engineering Control Measures information was modified.
SECTION 08 - Personal Protective Equipment information was modified.
SECTION 11 - Reproductive Toxicity information was modified.
SECTION 12 - Ecological Information information was added.
SECTION 12 - Ecological Information information was deleted. SECTION 15 - Chemical Inventories information was modified.
SECTION 15 - SARA 311 EPCRA Score information was added.
SECTION 15 - SARA 311 EPCRA Score information was deleted. SECTION 16 - HMIS Rating information was modified.

Revision Date: November 04, 2022

ABBREVIATIONS THAT MAY HAVE BEEN USED IN THIS DOCUMENT:

TLV - Threshold Limit Value	TWA - Time Weighted Average
STEL - Short-term Exposure Limit	PEL - Permissible Exposure Limit
GHS - Globally Harmonized System	CAS - Chemical Abstract Service Number
ACGIH - American Conference of Governmental Industrial Hygienists	IMO/IMDG - International Maritime Dangerous Goods Code
API - American Petroleum Institute	SDS - Safety Data Sheet
HMIS - Hazardous Materials Information System	NFPA - National Fire Protection Association (USA)
DOT - Department of Transportation (USA)	NTP - National Toxicology Program (USA)
IARC - International Agency for Research on Cancer	OSHA - Occupational Safety and Health Administration
NCEL - New Chemical Exposure Limit	EPA - Environmental Protection Agency
SCBA - Self-Contained Breathing Apparatus	

Prepared according to the 29 CFR 1910.1200 (2012) by Chevron Technical Center, 6001 Bollinger Canyon Road, San Ramon, CA 94583.

The above information is based on the data of which we are aware and is believed to be correct as of the date hereof. Since this information may be applied under conditions beyond our control and with which we may be unfamiliar and since data made available subsequent to the date hereof may suggest modifications of the information, we do not assume any responsibility for the results of its use. This information is furnished upon condition that the person receiving it shall make his own determination of the suitability of the material for his particular purpose.

SAFETY DATA SHEET

1. Identification

Product identifier	**UNLEADED GASOLINE**
Other means of identification	
SDS number	002-GHS
Synonyms	Regular/Premium/Midgrade - Unleaded Gasoline, RFG - Reformulated Unleaded Gasoline, Conventional Unleaded Gasoline, Oxygenated Unleaded Gasoline, Non-Oxygenated Unleaded Gasoline, CARB (California Air Resource Board) Unleaded Gasoline, RBOB - Reformulated Blendstock for Oxygenate Blending, CBOB - Conventional Blendstock for Oxygenate Blending, Petrol, Motor Fuel. See section 16 for complete information.
Recommended use	Motor Fuel Motor fuels.
Recommended restrictions	None known.

Manufacturer/Importer/Supplier/Distributor information

Manufacturer/Supplier	Valero Marketing & Supply Company and Affiliates One Valero Way San Antonio, TX 78269-6000
General Assistance	210-345-4593
E-Mail	CorpHSE@valero.com
Contact Person	Industrial Hygienist
Emergency Telephone	24 Hour Emergency 866-565-5220 1-800-424-9300 (CHEMTREC USA)

2. Hazard(s) identification

Physical hazards	Flammable liquids	Category 1
Health hazards	Skin corrosion/irritation	Category 2
	Germ cell mutagenicity	Category 1B
	Carcinogenicity	Category 1B
	Reproductive toxicity	Category 2
	Specific target organ toxicity, single exposure	Category 3 narcotic effects
	Specific target organ toxicity, repeated exposure	Category 2
	Aspiration hazard	Category 1

Environmental hazards Hazardous to the aquatic environment, Category 2 long-term hazard

OSHA defined hazards Not classified.

Label elements

Signal word Danger

Hazard statement Extremely flammable liquid and vapor. Causes skin irritation. May cause genetic defects. May cause cancer. Suspected of damaging fertility or the unborn child. May cause drowsiness or dizziness. May cause damage to organs (blood, liver, kidney) through prolonged or repeated exposure. May be fatal if swallowed and enters airways. Toxic to aquatic life with long lasting effects.

Precautionary statement

Prevention Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Keep container tightly closed. Ground/bond container and receiving equipment. Use explosion-proof electrical/ventilating/lighting// equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Do not breathe gas/mist/vapors/spray. Wash thoroughly after handling. Wear protective gloves/protective clothing/eye protection/face protection. Use only outdoors or in a well-ventilated area. Avoid release to the environment.

Response If exposed or concerned: Get medical advice/attention. If inhaled: Remove person to fresh air and keep comfortable for breathing. If swallowed: Immediately call a poison center/doctor. Do NOT induce vomiting. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. If skin irritation occurs: Get medical advice/attention. In case of fire: Use alcohol-resistant foam, carbon dioxide, dry powder or water fog for extinction. Collect spillage.

Storage Store locked up. Store in a well-ventilated place. Keep container tightly closed. Keep cool.

Disposal Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard(s) not otherwise classified (HNOC) None known.

3. Composition/information on ingredients

Mixtures

Cyclohexane	110-82-7	0-3

4. First-aid measures

Inhalation	Move to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Get medical attention.
Skin contact	Remove contaminated clothing and shoes. Wash off immediately with soap and plenty of water. Get medical attention if irritation develops or persists. Wash clothing separately before reuse. Destroy or thoroughly clean contaminated shoes. If high pressure injection under the skin occurs, always seek medical attention.
Eye contact	Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention.
Ingestion	Rinse mouth thoroughly. Do not induce vomiting without advice from poison control center. Do not give mouth-to-mouth resuscitation. If vomiting occurs, keep head low so that stomach content does not get into the lungs. Never give anything by mouth to a victim who is unconscious or is having convulsions. Get medical attention immediately.
Most important symptoms/effects, acute and delayed	Irritation of nose and throat. Irritation of eyes and mucous membranes. Skin irritation. Unconsciousness. Corneal damage. Narcosis. Cyanosis (blue tissue condition, nails, lips, and/or skin). Decrease in motor functions. Behavioral changes. Edema. Liver enlargement. Jaundice. Conjunctivitis. Proteinuria. Defatting of the skin. Rash.

Chemical name	CAS number	%

Gasoline	86290-81-5	80-100
Toluene	108-88-3	0-30
Hexane (Other Isomers)	96-14-0	5-25
Xylene (o, m, p isomers)	1330-20-7	0-25
Octane (All isomers)	111-65-9	0-18.5
Ethanol	64-17-5	0-10
1,2,4, Trimethylbenzene	95-63-6	0-6
n-Heptane	142-82-5	1-5
Pentane	109-66-0	1-5
Cumene	98-82-8	0-5
Ethylbenzene	100-41-4	0-5
Benzene	71-43-2	0-4.9
n-Hexane	110-54-3	0-3

Indication of immediate medical attention and special treatment needed

In case of shortness of breath, give oxygen. Keep victim warm. Keep victim under observation. Symptoms may be delayed.

General information

If exposed or concerned: get medical attention/advice. Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Show this safety data sheet to the doctor in attendance. Wash contaminated clothing before re-use.

5. Fire-fighting measures

Suitable extinguishing media

Water spray. Water fog. Foam. Dry chemical powder. Carbon dioxide (CO2).

Unsuitable extinguishing media

Do not use a solid water stream as it may scatter and spread fire.

Specific hazards arising from the chemical

Vapor may cause flash fire. Vapors can flow along surfaces to distant ignition source and flash back. Sensitive to static discharge.

Special protective equipment and precautions for firefighters

Wear full protective clothing, including helmet, self-contained positive pressure or pressure demand breathing apparatus, protective clothing and face mask.

Fire-fighting equipment/instructions

Wear full protective clothing, including helmet, self-contained positive pressure or pressure demand breathing apparatus, protective clothing and face mask. Withdraw immediately in case of rising sound from venting safety devices or any discoloration of tanks due to fire. Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Move containers from fire area if you can do it without risk. In the event of fire, cool tanks with water spray. Cool containers exposed to flames with water until well after the fire is out. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn. Vapors may form explosive air

mixtures even at room temperature. Prevent buildup of vapors or gases to explosive concentrations. Some of these materials, if spilled, may evaporate leaving a flammable residue. Water runoff can cause environmental damage. Use compatible foam to minimize vapor generation as needed.

Specific methods Use water spray to cool unopened containers.

General fire hazards Extremely flammable liquid and vapor. Containers may explode when heated.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures **precautions** Keep unnecessary personnel away. Local authorities should be

Methods and materials

advised if significant spills cannot be contained. Keep upwind. Keep out of low

for containment and

areas. Ventilate closed spaces before entering. Do not touch damaged

cleaning up

containers or spilled material unless wearing appropriate protective clothing. See

Environmental

Section 8 of the SDS for Personal Protective Equipment.

Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Stop leak if you can do so without risk. This material is a water pollutant and should be prevented from contaminating soil or from entering sewage and drainage systems and bodies of water. Dike the spilled material, where this is possible. Prevent entry into waterways, sewers, basements or confined areas.

Use non-sparking tools and explosion-proof equipment.

Small Spills: Absorb spill with vermiculite or other inert material, then place in a container for chemical waste. Clean surface thoroughly to remove residual contamination. This material and its container must be disposed of as hazardous waste.

Large Spills: Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Prevent product from entering drains. Do not allow material to contaminate ground water system. Should not be released into the environment.

Gasoline may contain oxygenated blend products (Ethanol, etc.) that are soluble in water and therefore precautions should be taken to protect surface and groundwater sources from contamination. If facility or operation has an "oil or hazardous substance contingency plan", activate its procedures. Stay upwind and away from spill. Wear appropriate protective equipment including respiratory protection as conditions warrant. Do not enter or stay in area unless monitoring indicates that it is safe to do so. Isolate hazard area and restrict entry to emergency crew. Extremely flammable. Review Firefighting Measures, Section 5, before proceeding with clean up. Keep all sources of ignition (flames, smoking, flares, etc.) and hot surfaces away from release. Contain spill in smallest possible area. Recover as much product as possible (e.g. by vacuuming). Stop leak if it can be done without risk. Use water spray to disperse vapors. Use compatible foam to minimize vapor generation as needed. Spilled material may be absorbed by an appropriate absorbent, and then handled in accordance with environmental regulations. Prevent spilled material from entering sewers, storm drains, other unauthorized treatment or drainage systems and natural waterways. Contact fire authorities and appropriate federal, state and local agencies. If spill of any amount is made into or upon navigable waters, the contiguous zone, or adjoining shorelines, contact the National Response Center at 1-800-424-8802.

7. Handling and storage

Precautions for safe handling

be grounded. Use non-sparking tools and explosion-proof equipment. When using, do not eat, drink or smoke. Avoid release to the environment. Flammable liquid storage. Do not handle or store near an open flame, heat or other sources of ignition. This material can accumulate static charge which may cause spark and become an ignition source. The pressure in sealed containers can increase under the influence of heat. Keep

Conditions for safe storage, including any incompatibilities

Eliminate sources of ignition. Avoid spark promoters. Ground/bond container and equipment. These alone may be insufficient to remove static electricity.
Wear personal protective equipment. Do not breathe dust/fume/gas/mist/vapors/ spray. Avoid contact with eyes, skin, and clothing. Do not taste or swallow. Avoid prolonged exposure. Use only with adequate ventilation. Wash thoroughly after handling. The product is extremely flammable, and explosive vapor/air mixtures may be formed even at normal room temperatures. DO NOT handle, store or open near an open flame, sources of heat or sources of ignition. Protect material from direct sunlight. Take precautionary measures against static discharges. All equipment used when handling the product must

container tightly closed in a cool, well-ventilated place. Keep away from food, drink and animal feedingstuffs. Keep out of the reach of children.

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Components	Type	Value
Benzene (CAS 71-43-2)	STEL	5 ppm
	TWA	1 ppm

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value
Cumene (CAS 98-82-8)	PEL	245 mg/m3
		50 ppm
Cyclohexane (CAS 110-82-7)	PEL	1050 mg/m3
		300 ppm
Ethanol (CAS 64-17-5)	PEL	1900 mg/m3
		1000 ppm
Ethylbenzene (CAS 100-41-4)	PEL	435 mg/m3
		100 ppm
n-Heptane (CAS 142-82-5)	PEL	2000 mg/m3
		500 ppm
n-Hexane (CAS 110-54-3)	PEL	1800 mg/m3
		500 ppm
Octane (All isomers) (CAS 111-65-9)	PEL	2350 mg/m3
		500 ppm
Pentane (CAS 109-66-0)	PEL	2950 mg/m3
		1000 ppm
Xylene (o, m, p isomers) (CAS 1330-20-7)	PEL	435 mg/m3
		100 ppm

US. OSHA Table Z-2 (29 CFR 1910.1000)

Components	Type	Value
Benzene (CAS 71-43-2)	Ceiling	25 ppm
	TWA	10 ppm
Toluene (CAS 108-88-3)	Ceiling	300 ppm
	TWA	200 ppm

US. ACGIH Threshold Limit Values

Components	Type	Value
1,2,4, Trimethylbenzene (CAS 95-63-6)	TWA	25 ppm
Benzene (CAS 71-43-2)	STEL	2.5 ppm

US. ACGIH Threshold Limit Values

Components	Type	Value
	TWA	0.5 ppm
Cumene (CAS 98-82-8)	TWA	50 ppm
Cyclohexane (CAS 110-82-7)	TWA	100 ppm
Ethanol (CAS 64-17-5)	STEL	1000 ppm
Ethylbenzene (CAS 100-41-4)	TWA	20 ppm
Gasoline (CAS 86290-81-5)	STEL	500 ppm
	TWA	300 ppm
Hexane (Other Isomers) (CAS 96-14-0)	STEL	1000 ppm
	TWA	500 ppm
n-Heptane (CAS 142-82-5)	STEL	500 ppm
	TWA	400 ppm
n-Hexane (CAS 110-54-3)	TWA	50 ppm
Octane (All isomers) (CAS 111-65-9)	TWA	300 ppm
Pentane (CAS 109-66-0)	TWA	600 ppm
Toluene (CAS 108-88-3)	TWA	20 ppm
Xylene (o, m, p isomers) (CAS 1330-20-7)	STEL	150 ppm
	TWA	100 ppm

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value
1,2,4, Trimethylbenzene (CAS 95-63-6)	TWA	125 mg/m3
		25 ppm
Benzene (CAS 71-43-2)	STEL	1 ppm
	TWA	0.1 ppm
Cumene (CAS 98-82-8)	TWA	245 mg/m3
		50 ppm
Cyclohexane (CAS 110-82-7)	TWA	1050 mg/m3
		300 ppm
Ethanol (CAS 64-17-5)	TWA	1900 mg/m3
		1000 ppm
Ethylbenzene (CAS 100-41-4)	STEL	545 mg/m3
		125 ppm
	TWA	435 mg/m3
		100 ppm
Hexane (Other Isomers) (CAS 96-14-0)	Ceiling	1800 mg/m3
		510 ppm
	TWA	350 mg/m3
		100 ppm

n-Heptane (CAS 142-82-5)	Ceiling	1800 mg/m3 440 ppm
	TWA	350 mg/m3 85 ppm
n-Hexane (CAS 110-54-3)	TWA	180 mg/m3 50 ppm
Octane (All isomers) (CAS 111-65-9)	Ceiling	1800 mg/m3 385 ppm
	TWA	350 mg/m3 75 ppm
Pentane (CAS 109-66-0)	Ceiling	1800 mg/m3 610 ppm
	TWA	350 mg/m3 120 ppm
Toluene (CAS 108-88-3)	STEL	560 mg/m3 150 ppm
	TWA	375 mg/m3 100 ppm
Xylene (o, m, p isomers) (CAS 1330-20-7)	STEL	655 mg/m3 150 ppm
	TWA	435 mg/m3 100 ppm

US. NIOSH: Pocket Guide to Chemical Hazards

Biological limit values

ACGIH Biological Exposure Indices

Components	Value	Determinant	Specimen	Sampling Time
Benzene (CAS 71-43-2)	25 µg/g	S-Phenylmercapturic acid	Creatinine in urine	*
Ethylbenzene (CAS 100-41-4)	0.7 g/g	Sum of mandelic acid and phenylglyoxylic acid	Creatinine in urine	*
n-Hexane (CAS 110-54-3)	0.4 mg/l	2,5-Hexanedion, without hydrolysis		*
	0.4 mg/l	2,5-Hexanedion, without hydrolysis	Urine	*
Toluene (CAS 108-88-3)	0.3 mg/g	o-Cresol, with hydrolysis	Creatinine in urine	*
	0.03 mg/l	Toluene	Urine	*
	0.02 mg/l	Toluene	Blood	*

Components	Type	Value		
Xylene (o, m, p isomers) (CAS 1330-20-7)	1.5 g/g	Methylhippuric acids	Creatinine in urine	*

* - For sampling details, please see the source document.

Exposure guidelines

US - California OELs: Skin designation

Benzene (CAS 71-43-2) Can be absorbed through the skin. Cumene (CAS 98-82-8) Can be absorbed through the skin. n-Hexane (CAS 110-54-3) Can be absorbed through the skin. Toluene (CAS 108-88-3) Can be absorbed through the skin.

US - Minnesota Haz Subs: Skin designation applies

Cumene (CAS 98-82-8) Skin designation applies. Toluene (CAS 108-88-3) Skin designation applies.

US - Tennesse OELs: Skin designation

Cumene (CAS 98-82-8)	Can be absorbed through the skin.

US ACGIH Threshold Limit Values: Skin designation

Benzene (CAS 71-43-2)	Can be absorbed through the skin.
n-Hexane (CAS 110-54-3)	Can be absorbed through the skin.

US. NIOSH: Pocket Guide to Chemical Hazards

Cumene (CAS 98-82-8)	Can be absorbed through the skin.

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Cumene (CAS 98-82-8)	Can be absorbed through the skin.

Appropriate engineering controls Provide adequate general and local exhaust ventilation. Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits. Use explosion-proof equipment.

Individual protection measures, such as personal protective equipment

Eye/face protection	Wear safety glasses. If splash potential exists, wear full face shield or chemical goggles.
Skin protection	
Hand protection	Avoid exposure - obtain special instructions before use. Wear protective gloves. Be aware that the liquid may penetrate the gloves. Frequent change is advisable. Suitable gloves can be recommended by the glove supplier.
Other	Wear chemical-resistant, impervious gloves. Full body suit and boots are recommended when handling large volumes or in emergency situations. Flame retardant protective clothing is recommended.
Respiratory protection	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. If workplace exposure limits for product or components are exceeded, NIOSH approved equipment should be worn. Proper respirator selection should be determined by adequately trained personnel, based on the contaminants, the degree of potential exposure and published respiratory protection factors. This equipment should be available for nonroutine and emergency use.
Thermal hazards	Wear appropriate thermal protective clothing, when necessary.
General hygiene considerations	Consult supervisor for special handling instructions. Avoid contact with eyes. Avoid contact with skin. Keep away from food and drink. Wash hands before breaks and immediately after handling the product. Provide eyewash station and safety shower. Handle in accordance with good industrial hygiene and safety

practice.

9. Physical and chemical properties

Appearance	Light straw to red clear liquid with characteristic strong odor of gasoline.
Physical state	Liquid.
Form	Liquid.
Color	Light straw to red clear.
Odor	Characteristic Gasoline Odor (Strong).
Odor threshold	Not available.
pH	Not available.
Melting point/freezing point	44.01 °F (6.67 °C) May start to solidify at this temperature. This is based on data for the following ingredient: Cyclohexane. Weighted average: -91.9 deg C (-133.4 deg F)
Initial boiling point and boiling range	80.06 - 440.06 °F (26.7 - 226.7 °C)
Flash point	-40.0 °F (-40.0 °C) (closed cup)
Evaporation rate	10 - 11 BuAc
Flammability (solid, gas)	Not available.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	1.3 %
Flammability limit - upper (%)	7.1 %
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	60.8 - 101.3 kPa (20°C)
Vapor density	3 - 4 (Air=1)
Relative density	Not available.
Solubility(ies)	
Solubility (water)	Very slightly soluble.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	> 500 °F (> 260 °C)
Decomposition temperature	Not available.
Viscosity	Not available.
Other information	
Flash point class	Flammable IA
VOC (Weight %)	100 %

10. Stability and reactivity

Reactivity	None known.

Chemical stability Stable under normal temperature conditions and recommended use. **Possibility of hazardous reactions** Hazardous polymerization does not occur.

Conditions to avoid Heat, flames and sparks. Ignition sources. Contact with incompatible materials. Do not pressurize, cut, weld, braze, solder, drill, grind or expose empty containers to heat, flame, sparks, static electricity, or other sources of ignition; they may explode and cause injury or death.

Incompatible materials Strong oxidizing agents.

Hazardous decomposition products No hazardous decomposition products are known.

11. Toxicological information

Information on likely routes of exposure

Ingestion Swallowing or vomiting of the liquid may result in aspiration into the lungs.

Inhalation In high concentrations, mists/vapors may irritate throat and respiratory system and cause coughing. May cause drowsiness or dizziness.

Skin contact Causes skin irritation. Prolonged contact may cause dryness of the skin.

Eye contact May cause eye irritation.

Symptoms related to the physical, chemical and toxicological characteristics Irritation of nose and throat. Irritation of eyes and mucous membranes. Skin irritation. Unconsciousness. Corneal damage. Narcosis. Cyanosis (blue tissue condition, nails, lips, and/or skin). Decrease in motor functions. Behavioral changes. Edema. Liver enlargement. Jaundice. Conjunctivitis. Proteinuria. Defatting of the skin. Rash.

Information on toxicological effects

Acute toxicity Based on available data, the classification criteria are not met.

Components	Species	Test Results
1,2,4, Trimethylbenzene (CAS 95-63-6)		
Acute		
Dermal		
LD50	Rabbit	> 3160 mg/kg
Inhalation		> 2000 mg/l, 48
LC50	Rat	Hours
Oral		
LD50	Rat	6 g/kg
Benzene (CAS 71-43-2)		
Acute		
Oral		
LD50		
Cumene (CAS 98-82-8)	Rat	3306 mg/kg
Acute		
Inhalation		2000 mg/l, 7
LC50	Mouse	Hours
	Rat	8000 mg/l, 4 Hours

Components	Species	Test Results
Ethanol (CAS 64-17-5)		
Acute		
Inhalation		
LC50	Rat	30000 mg/m3
Ethylbenzene (CAS 100-41-4)		
Acute		
Dermal		
LD50	Rabbit	> 5000 mg/kg
Oral		
LD50	Rat	5.46 g/kg
n-Heptane (CAS 142-82-5)		
Acute		
Inhalation		
LC50	Rat	103 mg/l, 4 Hours
n-Hexane (CAS 110-54-3)		
Acute		
Oral		
LD50	Rat	28710 mg/kg
Octane (All isomers) (CAS 111-65-9)		
Acute		
Inhalation		
LC50	Rat	118 mg/l, 4 Hours
Pentane (CAS 109-66-0)		
Acute		
Inhalation		
LC50	Rat	364 mg/l, 4 Hours
Toluene (CAS 108-88-3)		
Acute		
Dermal		
LD50	Rabbit	14.1 ml/kg
Inhalation		8000 mg/l, 4
LC50	Rat	Hours
Oral		
LD50	Rat	2.6 g/kg
Xylene (o, m, p isomers) (CAS 1330-20-7)		
Acute		
Oral		
LD50	Rat	4300 mg/kg
Oral		
LD50	Rat	1400 mg/kg
Cyclohexane (CAS 110-82-7)		
Acute		
Oral		
LD50	Rat	12705 mg/kg

Skin corrosion/irritation Causes skin irritation.

Respiratory sensitization Based on available data, the classification criteria are not met.

Skin sensitization Based on available data, the classification criteria are not met.
This substance may have a potential for sensitization which may provoke an allergic reaction among sensitive individuals.

Germ cell mutagenicity May cause genetic defects.
In in-vitro experiments, neither benzene, toluene nor xylene changed the number of sister-chromatid exchanges (SCEs) or the number of chromosomal aberrations in human lymphocytes. However, toluene and xylene caused a significant cell growth inhibition which was not observed with benzene in the same concentrations. In in-vivo experiments, toluene changed the number of sister-chromatid exchanges (SCEs) in human lymphocytes. Toluene may cause heritable genetic damage.

Serious eye damage/eye irritation Based on available data, the classification criteria are not met.

Respiratory or skin sensitization

Carcinogenicity May cause cancer.

IARC Monographs. Overall Evaluation of Carcinogenicity

Benzene (CAS 71-43-2)	1 Carcinogenic to humans.
Cumene (CAS 98-82-8)	2B Possibly carcinogenic to humans.
Ethylbenzene (CAS 100-41-4)	2B Possibly carcinogenic to humans.
Gasoline (CAS 86290-81-5)	2B Possibly carcinogenic to humans.
Toluene (CAS 108-88-3)	3 Not classifiable as to carcinogenicity to humans.
Xylene (o, m, p isomers) (CAS 1330-20-7)	3 Not classifiable as to carcinogenicity to humans.

NTP Report on Carcinogens

Benzene (CAS 71-43-2)	Known To Be Human Carcinogen.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Benzene (CAS 71-43-2)	Cancer

Reproductive toxicity Suspected of damaging fertility or the unborn child.
Benzene, xylene and toluene have demonstrated animal effects of reproductive toxicity. Animal studies of benzene have shown testicular effects, alterations in reproductive cycles, chromosomal aberrations and embryo/fetotoxicity. Ethanol has demonstrated human effects of reproductive toxicity. Can cause adverse reproductive effects - such as birth defects, miscarriages, or infertility.
Avoid exposure to women during early pregnancy. Avoid contact during pregnancy/while nursing.

Specific target organ toxicity single exposure May cause drowsiness or dizziness.

Specific target organ toxicity repeated exposure May cause damage to the following organs through prolonged or repeated exposure: Blood. Kidneys. Liver.

Aspiration hazard May be fatal if swallowed and enters airways.

Chronic effects Repeated exposure of laboratory animals to high concentrations of gasoline vapors has caused kidney damage and cancer in rats and cancer in mice. Gasoline was evaluated for genetic activity in assays using microbial cells, cultured mammalian cells and rat bone marrow cells. The results were all negative so gasoline was considered nonmutagenic under these conditions.
Overexposure to this product or its components has been suggested as a cause of liver abnormalities in laboratory animals and humans. Lifetime studies by the American Petroleum Institute have shown that kidney damage and kidney cancer can occur in male rats after prolonged inhalation exposures at elevated

concentrations of total gasoline. Kidneys of mice and female rats were unaffected. The U.S. EPA Risk Assessment Forum has concluded that the male rat kidney tumor results are not relevant for humans. Total gasoline exposure also produced liver tumors in female mice only. The implication of these data for humans has not been determined.

Further information Symptoms may be delayed.

12. Ecological information

Ecotoxicity Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Components		Species	Test Results
1,2,4, Trimethylbenzene (CAS 95-63-6)			
Aquatic			
Fish	LC50	Fathead minnow (Pimephales promelas)	7.19 - 8.28 mg/l, 96 hours
Benzene (CAS 71-43-2)			
Aquatic			
Crustacea	EC50	Water flea (Daphnia magna)	8.76 - 15.6 mg/l, 48 hours
Fish	LC50	Rainbow trout,donaldson trout (Oncorhynchus mykiss)	7.2 - 11.7 mg/l, 96 hours
Cumene (CAS 98-82-8)			
Aquatic			
Crustacea	EC50	Brine shrimp (Artemia sp.)	3.55 - 11.29 mg/l, 48 hours
Fish	LC50	Rainbow trout,donaldson trout (Oncorhynchus mykiss)	2.7 mg/l, 96 hours
Cyclohexane (CAS 110-82-7)			
Aquatic			
Fish	LC50	Fathead minnow (Pimephales promelas)	3.961 - 5.181 mg/l, 96 hours
		Striped bass (Morone saxatilis)	8.3 mg/l, 96 hours

Components	Species	Test Results
		275 mg/l, 72 Hours
		1970 mg/l
		> 100 mg/l, 96 hours
		11200 mg/l, 96 Hours
		5012 mg/l, 48 Hours
		857 mg/l, 48 Hours
		1 - 4 mg/l, 48 hours
		4 mg/l, 96 hours

			4924 mg/l, 96 hours
			2.101 - 2.981 mg/l, 96 hours
			5.46 - 9.83 mg/l, 48 hours 6.86 - 8.48 mg/l, 96 hours
			8 mg/l, 96 Hours

Ethanol (CAS 64-17-5)

Aquatic

Algae	EC50	Freshwater algae Marine water algae
Fish	LC50	Fathead minnow (Pimephales promelas) Freshwater fish
Invertebrate	EC50	Freshwater invertebrate Marine water invertebrate

Ethylbenzene (CAS 100-41-4)

Aquatic

Crustacea	EC50	Water flea (Daphnia magna)
Fish	LC50	Rainbow trout,donaldson trout (Oncorhynchus mykiss)

n-Heptane (CAS 142-82-5)

Aquatic

Fish	LC50	Western mosquitofish (Gambusia affinis)

n-Hexane (CAS 110-54-3)

Aquatic

Fish	LC50	Fathead minnow (Pimephales promelas)

Toluene (CAS 108-88-3)

Aquatic

Crustacea	EC50	Water flea (Daphnia magna)
Fish	LC50	Pink salmon (Oncorhynchus gorbuscha)

Xylene (o, m, p isomers) (CAS 1330-20-7) **Aquatic**

Fish	LC50	Rainbow trout,donaldson trout (Oncorhynchus mykiss)

Persistence and degradability Not available.

Bioaccumulative potential Not available.

Partition coefficient n-octanol / water (log Kow)

Benzene (CAS 71-43-2)	2.13
Cumene (CAS 98-82-8)	3.66
Cyclohexane (CAS 110-82-7)	3.44
Ethanol (CAS 64-17-5)	-0.31
Ethylbenzene (CAS 100-41-4)	3.15
Hexane (Other Isomers) (CAS 96-14-0)	3.6
Octane (All isomers) (CAS 111-65-9)	5.18
Pentane (CAS 109-66-0)	3.39
Toluene (CAS 108-88-3)	2.73
Xylene (o, m, p isomers) (CAS 1330-20-7)	3.2
n-Heptane (CAS 142-82-5)	4.66
n-Hexane (CAS 110-54-3)	3.9

Mobility in soil Not available. **Other adverse effects** Not available.

13. Disposal considerations

Disposal instructions Dispose in accordance with all applicable regulations. This material and its container must be disposed of as hazardous waste. Dispose of this material and its container to hazardous or special waste collection point. Incinerate the material under controlled conditions in an approved incinerator. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container.

Hazardous waste code D001: Waste Flammable material with a flash point <140 °F D018: Waste Benzene

US RCRA Hazardous Waste U List: Reference

Benzene (CAS 71-43-2)	U019
Cumene (CAS 98-82-8)	U055
Cyclohexane (CAS 110-82-7)	U056
Toluene (CAS 108-88-3)	U220
Xylene (o, m, p isomers) (CAS 1330-20-7)	U239

Waste from residues / unused products Dispose of in accordance with local regulations.

Contaminated packaging Offer rinsed packaging material to local recycling facilities.

14. Transport information

DOT

UN number UN1203
UN proper shipping name Gasoline
Transport hazard class(es)
Class 3
Subsidiary risk
Packing group II
Environmental hazards
Marine pollutant Yes
Special precautions for user Read safety instructions, SDS and emergency procedures before handling.
Special provisions 139, B33, B101, T8
Packaging exceptions 150
Packaging non bulk 202
Packaging bulk 242

IATA

UN number UN1203
UN proper shipping name Gasoline
Transport hazard class(es)
Class 3
Subsidiary risk -
Label(s) 3
Packing group II
Environmental hazards Yes
ERG Code 3H
Special precautions for user Read safety instructions, SDS and emergency procedures before handling.

IMDG

UN number UN1203
UN proper shipping name Gasoline
Transport hazard class(es)
Class 3
Subsidiary risk -
Label(s) 3
Packing group II
Environmental hazards
Marine pollutant Yes
EmS F-E, S-E
Special precautions for user Read safety instructions, SDS and emergency procedures before handling.

Transport in bulk according to Not applicable. However, this product is a liquid and if transported in

bulk covered under **Annex II of MARPOL 73/78 and the IBC Code** MARPOL 73/78, Annex I.

15. Regulatory information

US federal regulations This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
All components are on the U.S. EPA TSCA Inventory List.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Benzene (CAS 71-43-2)	Cancer
	Central nervous system
	Blood
	Aspiration
	Skin
	Eye
	Respiratory tract irritation
	Flammability

CERCLA Hazardous Substance List (40 CFR 302.4)

Benzene (CAS 71-43-2) LISTED Cumene (CAS 98-82-8) LISTED Cyclohexane (CAS 110-82-7) LISTED Ethanol (CAS 64-17-5) LISTED Ethylbenzene (CAS 100-41-4) LISTED
Gasoline (CAS 86290-81-5) LISTED
Hexane (Other Isomers) (CAS 96-14-0) LISTED n-Heptane (CAS 142-82-5) LISTED n-Hexane (CAS 110-54-3) LISTED
Octane (All isomers) (CAS 111-65-9) LISTED
Pentane (CAS 109-66-0) LISTED
Toluene (CAS 108-88-3) LISTED
Xylene (o, m, p isomers) (CAS 1330-20-7) LISTED

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories Immediate Hazard - No
Delayed Hazard - No
Fire Hazard - No
Pressure Hazard - No
Reactivity Hazard - No

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous

Yes **chemical**

SARA 313 (TRI reporting)

Chemical name	**CAS number**	**% by wt.**

Toluene	108-88-3	0-30
Xylene (o, m, p isomers)	1330-20-7	0-25
1,2,4, Trimethylbenzene	95-63-6	0-6
Cumene	98-82-8	0-5
Ethylbenzene	100-41-4	0-5
Benzene	71-43-2	0-4.9
n-Hexane	110-54-3	0-3
Cyclohexane	110-82-7	0-3

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Benzene (CAS 71-43-2)
Cumene (CAS 98-82-8)
Ethylbenzene (CAS 100-41-4) n-Hexane (CAS 110-54-3)
Toluene (CAS 108-88-3)
Xylene (o, m, p isomers) (CAS 1330-20-7)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130) Pentane (CAS 109-66-0)

Safe Drinking Water Act (SDWA) Not regulated.

Drug Enforcement Administration (DEA). List 2, Essential Chemicals (21 CFR 1310.02(b) and 1310.04(f)(2) and Chemical Code Number

Toluene (CAS 108-88-3) 6594

Drug Enforcement Administration (DEA). List 1 & 2 Exempt Chemical Mixtures (21 CFR 1310.12(c))

Toluene (CAS 108-88-3) 35 % weight/volumn

DEA Exempt Chemical Mixtures Code Number

Toluene (CAS 108-88-3) 594

US state regulations WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

US. Massachusetts RTK - Substance List

1,2,4, Trimethylbenzene (CAS 95-63-6)
Benzene (CAS 71-43-2)
Cumene (CAS 98-82-8)
Cyclohexane (CAS 110-82-7)
Ethanol (CAS 64-17-5)
Ethylbenzene (CAS 100-41-4)
Hexane (Other Isomers) (CAS 96-14-0) n-Heptane (CAS 142-82-5) n-Hexane (CAS 110-54-3)
Octane (All isomers) (CAS 111-65-9)
Pentane (CAS 109-66-0)

Toluene (CAS 108-88-3)
Xylene (o, m, p isomers) (CAS 1330-20-7)

US. New Jersey Worker and Community Right-to-Know Act

1,2,4, Trimethylbenzene (CAS 95-63-6)
Benzene (CAS 71-43-2)
Cumene (CAS 98-82-8)
Cyclohexane (CAS 110-82-7)
Ethanol (CAS 64-17-5)
Ethylbenzene (CAS 100-41-
4) n-Heptane (CAS 142-82-
5) n-Hexane (CAS 110-54-3)
Octane (All isomers) (CAS 111-65-9)
Pentane (CAS 109-66-0)
Toluene (CAS 108-88-3)
Xylene (o, m, p isomers) (CAS 1330-20-7)

US. Pennsylvania Worker and Community Right-to-Know Law

1,2,4, Trimethylbenzene (CAS 95-63-6)
Benzene (CAS 71-43-2)
Cumene (CAS 98-82-8)
Cyclohexane (CAS 110-82-7)
Ethanol (CAS 64-17-5)
Ethylbenzene (CAS 100-41-4)
Gasoline (CAS 86290-81-5)
Hexane (Other Isomers) (CAS
96-14-0) n-Heptane (CAS 142-
82-5) n-Hexane (CAS 110-54-
3)
Octane (All isomers) (CAS 111-65-9)
Pentane (CAS 109-66-0)
Toluene (CAS 108-88-3)
Xylene (o, m, p isomers) (CAS 1330-20-7)

US. Rhode Island RTK

1,2,4, Trimethylbenzene (CAS 95-63-6)
Benzene (CAS 71-43-2)
Cumene (CAS 98-82-8)
Cyclohexane (CAS 110-82-
7) Ethylbenzene (CAS 100-
41-4) n-Hexane (CAS 110-
54-3) Pentane (CAS 109-
66-0)
Toluene (CAS 108-88-3)
Xylene (o, m, p isomers) (CAS 1330-20-7)

US. California Proposition 65

US - California Proposition 65 - Carcinogens & Reproductive Toxicity (CRT): Listed substance

Benzene (CAS 71-43-2)
Cumene (CAS 98-82-8)
Ethylbenzene (CAS 100-41-4)

Toluene (CAS 108-88-3)

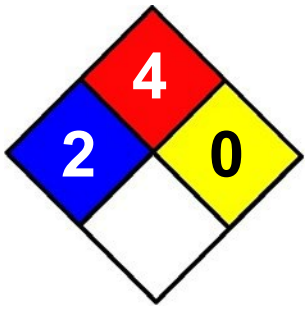
International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	No
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s).
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date 13-May-2013
Revision date 23-May-2014
Version # 03
Further information HMIS® is a registered trade and service mark of the NPCA.



NFPA Ratings

References ACGIH
EPA: AQUIRE database
NLM: Hazardous Substances Data Base
US. IARC Monographs on Occupational Exposures to Chemical Agents
HSDB® - Hazardous Substances Data Bank
IARC Monographs. Overall Evaluation of Carcinogenicity
National Toxicology Program (NTP) Report on Carcinogens

ACGIH Documentation of the Threshold Limit Values and Biological Exposure Indices

Disclaimer

This material Safety Data Sheet (SDS) was prepared in accordance with 29 CFR 1910.1200 by Valero Marketing & Supply Co., ("VALERO"). VALERO does not assume any liability arising out of product use by others. The information, recommendations, and suggestions presented in this SDS are based upon test results and data believed to be reliable. The end user of the product has the responsibility for evaluating the adequacy of the data under the conditions of use, determining the safety, toxicity and suitability of the product under these conditions, and obtaining additional or clarifying information where uncertainty exists. No guarantee expressed or implied is made as to the effects of such use , the results to be obtained, or the safety and toxicity of the product in any specific application. Furthermore, the information herein is not represented as absolutely complete, since it is not practicable to provide all the scientific and study information in the format of this document, plus additional information may be necessary under exceptional conditions of use, or because of applicable laws or government regulations.

ATTACHMENT II

O & M Support Activity Health and Safety Plan

O&M, Inc.
Environmental Solutions

HEALTH AND SAFETY PLAN

FPE Edgefield Remedial Site Edgefield, South Carolina

147 Rabbit Trail Edgefield, SC 29824

April 2023

Table of Contents

1.0 GENERAL

1.1 Introduction

This Site-Specific Health and Safety Plan (HASP) has been developed to address O&M, Inc. (O&M) project personnel activities at the FPE Edgefield Remedial Site, located in Edgefield, SC. The purpose of this HASP is to ensure that precautions are taken to protect O&M project personnel and the environment.

This HASP addresses the environmental, health, and safety activities of this project, and must be reevaluated should project conditions change. This HASP covers potential physical and health hazards associated with the site and, as such, supplements the existing health and safety programs of the project personnel. This HASP does not replace the Corporate Health and Safety Requirements or Site-Specific Health and Safety Plans (SSHASP) for each company working on the site.

The scope of this project includes development activities on a site that has historical contamination. Work activities will be guided by the Occupational Safety and Health Administration (OSHA) 1926 and Hazardous Waste Operations and Emergency Response (HAZWOPER) regulations as outlined in 29 CFR 1910.120 and 1926.65.

Although there is a low probability of personnel exposure to health hazards exceeding the OSHA Permissible Exposure Limit (PEL), the procedures and protocols in this plan have been established to ensure that a mechanism is in place to protect personnel in the event that hazards from site contamination are encountered during the project. Compliance with this HASP is required from all O&M authorized project personnel, site workers, and visitors who enter the work areas of this project.

The content of this HASP may change or undergo revision based upon field monitoring results, modifications to the technical scope of work, or additional information made available to health and safety (H&S) personnel. Any proposed changes must also be reviewed and approved by the Companies represented in this HASP. Each personnel involved with the site must sign the acknowledgment sign off form found within (Appendix D). Signing the Signoff Form indicates that you have read and understood the safety procedures for FPE Edgefield Remedial Site.

1.2 Personnel

Project Manager (PM)

(Christopher Fuerst)

The PM is responsible for ensuring that O&M project personnel are responsible for adhering to the requirements of this HASP. The PM is responsible for ensuring that O&M subcontractor personnel performing "routine work", as defined in the Subcontractor section below, adhere to the requirements of this HASP. The PM is responsible for maintaining company policy and will resolve health and safety problems with the assistance and guidance of the HSC.

Health and Safety Coordinator (HSC)

(Dan Gainer)

The HSC is responsible for ensuring overall day-to-day implementation of this HASP, and initial site-specific training. The HSC is responsible for ensuring that all site workers have current training certifications and medical clearance documentation. The HSC will review O&M subcontractor Health and Safety Plans and Activity Hazard Analyses (AHA) and will periodically audit the O&M and subcontractor work activities at the site for compliance with health and safety requirements.

O&M Operators

(Christopher Fuerst)

O&M employees are responsible for conducting their daily work according to the requirements of this HASP and O&M corporate health and safety requirements. The HSC may also assign specific health and safety duties required by this HASP to individual employees. The Operators are responsible for adhering to the Site safety requirements and maintaining the Site equipment and areas in a manner that protects the Site workers' and visitors' health and safety.

Subcontractors

(Gregory Landscaping, Curb Appeal)

Subcontractors hired by O&M may perform "routine work" such as a landscaper, plumber, electrician. These subcontractors shall receive initial site training which will include a review of this HASP. These subcontractors are responsible for adhering to the requirements of this HASP. Subcontractors hired by O&M to perform "hazardous work" such as demolition, excavating, waste treatment, intrusive work into waste areas, etc. are required to develop their own Site-Specific Health and Safety Plan that is at least as stringent as the O&M HASP.

Training requirements for outside contractors will vary according to the tasks they are expected to complete and the hazards they are expected to encounter. The HSC will make determinations when OSHA 40-hour or 24-hour HAZWOPER training is required of contractors in accordance with the requirements of 29 CFR 1926.65.

Stop Work Authorization:

All site workers have stop-work authorization, which he/she will execute upon determination of an imminent safety hazard, emergency situation, or other potentially dangerous situation. Authorization to proceed with work will be issued by the HSC or designee, after such action.

1.3 Emergency Phone Numbers

Emergency Phone numbers are listed below. Local hospital information and driving directions are located in Appendix B.

Town of Edgefield Fire Dept.	911 or (803) 637-4014
Edgefield Police Department	911 or (803) 637-4060
Hospital	300 Ridge Medical Plz, Edgefield, SC 29824 (803) 637-3174
Utility Mark Out	811
SCDNR Spill Hotline	1-888-481-0125
National Response Center (NRC) for Oil/Chemical Spills	1-800-424-8802

2.0 SITE AND PROJECT DESCRIPTION

2.1 Site Physical Description and History

Based on the historic soil data collected and reported for the FPE Edgefield Site (Site), including the *Phase II Source Area Investigation Report,* Arcadis, 15DEC2014, and *Phase III Source Area Investigation Report*, Arcadis, 27JAN2016, three primary source areas have been identified: Area 1—Drum Burial Area; Area 7—Degreasing Operational Area; and Area 8—Former Paint Bed Drying Area. A summary of work performed within each primary source areas is provided below:

Area 1—Drum Burial Area (DBA)
Drum excavation activities completed in 1999 are summarized in ATC's Report of Drum Removal Activities. The report explains the breakdown of the DBA into 11 excavation areas ranging in depths from 3 to 11 feet. The three largest areas (Area D, H, and J identified in the ATC report) covered most of the area and were excavated to depths ranging from 6 to 11 ft. Clean backfill was reported to be used in the excavated areas. Backfill was completed with the stockpiled soils from the area that were not stained or highly impacted.

Area 7—Degreasing Operational Area (DOA)
The former manufacturing building was demolished in 2015, leaving only the building slab in place. The DOA characterization included samples from under the slab and no work altering the soils was reported to be completed in that area.

Area 8—Paint Bed Drying Area (PBDA)
When excavating in 1997, ATC and their subcontractor excavated to approximately 12-14 feet. Excavation was stopped to prevent the excavation of groundwater. According to the 1997 "Former Paint Sludge Drying Bed Closure Report," the soil became increasingly moist, indicative of groundwater saturation. The report also specifies clean backfill was brought in to fill the excavated areas back to previous grade. With operation of the onsite pumping since 2009, the depth to water has increased 10-15 feet.

2.2 Site Security

The site is surrounded by an 8-foot-high perimeter barbed wire fence and an access gate that is locked during non-working hours. Site personnel routinely check the integrity of the fence and gate. Depending upon conditions, the site may be secured with barriers, fencing, and/or gate and perimeter security guards.

All contractors, subcontractors, state and federal representatives, and visitors are required to sign in upon arrival and sign out upon departure. Each visitor must adhere to the site control and health and safety guidelines established in this plan.

All personnel that desires to access a contaminated zone must meet the educational and medical requirements as set forth in 29 CFR 1910.120 and 29 CFR 1926.65. These requirements shall be satisfied by presenting certification letters or similar documentation to the Project Manager that they report to prior to working at the site.

2.3 Scope of Work

The major items of the projected scope of services to be covered by this HASP for operation and maintenance activities at the site are briefly summarized below.

- Data Collection
- Site Operation and Maintenance
- Soil Excavation
- Chem Ox Addition

3.0 HAZARD ASSESSMENT

The following is a general discussion of the hazards that may be encountered on site. Site control will be enforced and only authorized personnel will be permitted in the work area.

3.1 Introduction

At this site, potential exposure to contamination is dependent principally on the type of work activity being undertaken. This plan has established categories of work tasks based on worker exposure potential to site hazards.
Non-Contact -Work activities that have little or no reasonable potential for contact or exposure to site contaminants.
Contact -Work activities that have some reasonable potential for contact or exposure to site contaminants.

3.1.1 Non-Contact Personnel

It is anticipated that the following activities require minimal contact and should not result in contact with contaminated soil / groundwater or materials used for decontamination. These activities should not require additional health and safety considerations beyond those practices already in place for this type of remediation and maintenance project. These tasks may include:

- Project Administration
- General Operation and Maintenance of Equipment

While potential exposure to contaminated materials or vapors is not anticipated during these activities, operations will be evaluated during the project and monitored as necessary. Access to the work zone is limited to Project Personnel, site workers, and Authorized Visitors. Initially, exclusion zones will not be established for such activities. However, exclusion zones will be established if visual evidence of contamination is observed, and/or instrument readings exceeding the action levels detailed in Section 6 are encountered.

In the event that contaminated materials are encountered, all project personnel involved in such areas ***(contact or non-contact***) must meet the training requirements as defined in this HASP.

3.1.2 Contact Personnel

It is anticipated that personnel working in the following activities have some reasonable potential to come into contact with physical and chemical hazards present at the site. These activities will be evaluated and monitored by the HSC, Project Manager, and his/her designee in accordance with the task-specific hazard analysis discussed in Section 3.2. All O&M employees are responsible for evaluating the physical and chemical hazards present at the Site and bringing themt to the attention of the PM and HSC.

A variety of potential hazards exist with any remediation and maintenance project; these include, but are not limited to, the following:

- Buried Utilities
- Contact with contaminated soil and groundwater
- Hand and power tools
- Electrical
- Confined spaces

- Vehicle Use
- Working over/near water
- Noise
- Uneven terrain, Slips / Trips / Falls
- Weather Hazards
- Sunlight

3.2 Task Specific Hazard Analysis

The following tasks may be performed by O&M personnel or may be performed in areas where O&M personnel are working. Standard Operating Procedures (SOP) are included in Appendix A for tasks commonly performed by O&M personnel.

3.2.1 Heavy Equipment Requirements

O&M personnel will not be operating heavy equipment but may be in an area where heavy equipment is in use. Requirements for heavy equipment use, and work around heavy equipment, include the following:

- Personnel must make eye contact with the equipment operator prior to traveling into the area where the equipment will be used.
- Personnel must wear high visibility vest or clothing.
- Equipment operators must be trained in the operation of the equipment they will be using.
- The O&M Project Manager or HSC will ensure that intrusive work is not performed until the Underground utilities have been marked out in accordance with the SC Dig Safe requirements.
- Areas for heavy equipment use will be separated to prevent unauthorized pedestrian and/or vehicular traffic from entering the area.
- Equipment is to be operated in the areas designated for equipment use. Heavy equipment shall not be operated in public pedestrian areas.
- Pedestrians must travel in pedestrian areas only.
- Personnel must acknowledge back up alarms, horns and other communication means used to alert personnel of the direction of travel and operation of heavy equipment.
- Hearing protection may be required for personnel working around heavy equipment per OSHA requirements. In accordance with O&M's Hearing Conservation Program and Corporate Health and Safety Program.

3.2.2 Surface Landscaping Requirements

During surface landscaping activities, consideration must be made in maintaining the integrity of the landfill cap. The uneven and sloped terrain presents additional hazards. O&M personnel are responsible for ensuring that the Landscaping Contractor follows the procedures as outlined in this HASP. O&M personnel *(Christopher Fuerst)* will be performing landscaping activities.

The Landscaping Contractor has the responsibility to evaluate the terrain prior to moving equipment into an area. Landscaping activities in areas that have been affected by heavy rain, ice, snow, or heavy equipment use will be postponed until the terrain has improved.

- Pedestrian traffic should be separated from the area while equipment is in operation.
- Personnel must wear high visibility clothing/vests when exposed to vehicular traffic.
- No one should be permitted to enter the area being maintained while the equipment is in operation.
- Operators of mowers shall read the Operations Manual for the equipment that will be operating and adhere to the practices outlined in the manual. Only personnel authorized to operate Site equipment, in accordance with the equipment lease or contract terms, shall be allowed to operate such equipment.
- Cell phone use while the mower is moving is prohibited.
- Hoods or other clothing that blocks the mower operator's peripheral vision is prohibited while mowing.
- Hand tools must be inspected prior to use in accordance with Section 3.2.3.
- Gas powered hand tools (such as weed whackers) must be "off" when being fueled.
  Gasoline must be stored in approved UL safety cans (per Section 3.2.4.2) and out of direct

3.2.3 Hand Tools Requirements

O&M personnel will be using hand tools for many tasks. Hand tools that may be used include hammers, screwdrivers, pliers, HDPE welder and cutting tools.

Cutting tools:

Inspection

- Handle (securely attached to blade, free of splintering or cracks)
- Blade (sharp, free of nicks)

Use & handling

- Cut away from oneself and other people
- Cover cutting blades during transport
- Do not carry unprotected cutting tools in pockets or backpacks
- Store cutting tools with blade points/edge down
- Wear ANSI cut resistant gloves when using sharp tools
- Wear proper Personal Protective Equipment (PPE) including but not limited to safety glasses

Impact tools:

Inspection

- Handle (securely attached to head, free of splintering or cracks)
- Head (not mushroomed, free of cracks)

Use & handling

- Keep hands and fingers clear of the strike area
- Check that the swing is clear
- Wear proper PPE including but not limited to safety glasses, hand protection, and hearing protection

HDPE Welder:

Inspection

- Handle (securely attached to head, free of splintering or cracks)
- Head (no obstructions)

Use & handling

- Keep hands and fingers clear of the welding area
- Wear proper PPE including but not limited to safety glasses, hand protection, and hearing protection

3.2.4 Power Tools Requirements

3.2.4.1 Gasoline Powered Tools

O&M personnel may use gasoline powered tools to perform work. Gasoline powered tools may include brush clearing and power demolition equipment (chainsaws, generators, jackhammers.) Some gas-powered tools use gasoline, while others use a gasoline/oil mixture. The Operations Manual must be consulted prior to fueling to determine fuel requirements.

Gas powered tools shall only be used in well ventilated areas only due to potential buildup of exhaust gases (i.e. carbon monoxide). If a gas-powered tool must be used in an enclosed space, air monitoring and/or respiratory protection may be required. If respiratory protection is required, O&M will comply with the O&M Corporate Respiratory Protection Program.

Prior to making adjustments, cleaning, or performing maintenance or repairs, gas powered tools will be powered off.

Gas powered tools can generate a high level of noise. Hearing protection may be necessary when operating any power tool. Hearing protection use will be utilized in accordance with O&M's Hearing Conservation Program.

Gas powered tools can also vibrate, which can lead to injury over time. To minimize vibration exposure:

- Choose tools with effective, proven anti-vibration features.
- Keep tools maintained in accordance with the manufacturer's requirements.
- Limit the amount of time using the tool to the shortest time possible.
- Take a break if feeling fatigued or tingling in arms and hands.
- Grip the handles only as tightly as necessary to control the tool
- Use tools at the manufacturer's settings.

Fuel Storage and Handling

Gasoline will be stored in UL approved containers and will be handled and transported according to proper procedures for flammable liquids. Containers should be equipped with a funnel or flexible hose for fueling operations. Containers must be UL approved safety cans and should be stored out of direct sunlight.

Fueling operations will be conducted in well ventilated areas at least 10 feet from any source of ignition. Smoking is prohibited during fueling operations.

During fueling operations, gasoline power tools will be:

- Powered off and allowed to cool for at least 15 minutes.
- Grounded and bonded to the fuel container.

After fueling is completed, wipe any spilled fuel from the tool. Move to a different location prior to starting the tool.

3.2.5 Vehicle Use Requirements

O&M personnel will be utilizing personal vehicles and company vehicles. Complete the weekly WEX vehicle inspection to ensure the headlights, taillights, and turn signals are working properly.

- Check gauges and listen for unusual sounds that could indicate a need for maintenance.
- Check tire pressure and condition.
- If pulling a trailer, check the trailer hitch and safety chain in addition to the trailer lights and tires.
- Secure all loose equipment.
- Ensure that the windshield and side windows are clean and that rear/side view mirrors are clean and adjusted for proper vision.
- Start the engine and observe all instruments, gauges and indicating lights for proper operation. Do not operate a vehicle if any warning light is illuminated.
- Check the brake system for proper operation.
- Check windshield wipers and horn.
- Driver and all passengers must fasten their seat belts before moving.
- Handheld phones and electronic devices are prohibited while operating a vehicle.

Fueling

Vehicles are not to be fueled with the engine running. The individual performing the fueling must remain outside of the vehicle during the fueling operation. Smoking or use a cellular phone while refueling the vehicle is prohibited.

Driver's Qualifications

All O&M employees must meet the following qualifications to operate a vehicle:

- A valid driver's license, which is appropriate for the type of vehicle being driven, is required.
- Operating a vehicle under the influence of drugs or alcohol is strictly prohibited.

3.2.6 Site Restoration Requirements

All equipment used by O&M and their subcontractors must be cleaned prior to leaving the site. Regulated waste materials may be containerized and staged in a common area. The regulated waste will be subjected to waste classification testing and properly disposed following receipt of the waste classification results.

Personnel will avoid contact with waste materials. Personal protective equipment such as chemical protective clothing (such as poly coated Tyvek) and gloves will be used to prevent contact with potentially contaminated materials. Respiratory protection will be utilized if air monitoring action levels are exceeded as detailed in the CCI Site Construction HASP.

3.3 Chemical Hazard Assessment Requirements

The following is a general discussion of the hazards that may be encountered on site. Additional information on any contaminants encountered during this project may be found in standard health and safety references, such as the NIOSH "Pocket Guide to Chemical Hazards."

The HSC will perform a hazard assessment prior to the initiation of new tasks by O&M personnel to determine if additional protective measures need to be implemented.

3.3.1 Potential Site Chemical Hazards

Previous and ongoing investigations of the site have detected soil and groundwater contamination. The specified chlorinated hydrocarbon contaminants (CHCs) are 1,2-DCE, PCE, TCE, and VC. Potential for worker exposure exists when activities associated with the drilling and sampling of contaminated soil and groundwater. Soil disturbance activities may result in airborne dust that must be controlled to prevent off-site migration.

Measures must be taken to prevent an uncontrolled release or exposure to vapor, liquid, or solid contaminants by workers. Assessment and prevention strategies are discussed in other sections of this HASP and must be practiced on a continuing basis by all on-site contractors throughout this project.

3.3.2 Exposure Pathways

A brief discussion of potential pathways of exposure and exposure control methods is presented below:

Inhalation - An inhalation exposure to contaminated soil particles would typically occur if work site activities resulted in the generation of dust. Dust level monitoring and dust control measures will be implemented to minimize the airborne soil particles.

Contact with Skin and Eyes – Contaminated soil and groundwater may come into contact with skin and eyes during work activities. Personal protective equipment as well as utilizing good hygiene/work practices will minimize the potential of exposure by this route.

Ingestion - Ingestion of contaminated materials may occur as a result of a hand-to-mouth contact (eating, drinking, smoking) in contaminated areas or prior to appropriate personal decontamination. Frequent and thorough washing of hands and face, prohibition of eating and smoking in the work area, proper use of work clothing and personal decontamination is recommended to control the potential for ingestion of contaminated materials.

If unanticipated conditions are identified or if work is required in additional areas, work activities will cease until the HSC or designee develops appropriate procedures.

The project includes the excavation and stockpiling of contaminated soil. Potential hazards posed by acute exposure to contaminates within the soil and groundwater include mucous membrane irritation and skin irritation. Chronic exposure may result in central nervous system effects, GI effects, and reproductive system effects. Some contaminates are suspected carcinogens.

- Potential hazards that are most likely to be encountered at this project site include, but are not limited to:
- Weather conditions (lightning, rain, excessive heat, excessive cold, and high winds, etc.)

- Confined Space Entry
- Slips, trips, falls on uneven/slippery surfaces
- Noise
- Heavy equipment use
- Manual lifting
- Elevated work and fall protection
- Below is a summary of guidelines that may be used to eliminate/reduce the potential risk of physical hazards.

3.4 Physical Hazard Analysis Requirements

3.4.1 Weather Hazards Requirements

If severe weather occurs that may affect the safety of site workers, O&M personnel will stop affected operations. The NOAA 30/30 rule will be followed for resuming operations. The NOAA 30/30 rule requires retreat under shelter in the event of severe weather appearance (heavy clouds, high winds), thunder, and/or lightning. Outdoor activities can resume 30 minutes following the last thunderclap.

3.4.2 Heat and Cold Stress Requirements

Depending on the time of year and weather conditions, cold or heat stress present special problems to unprotected workers. The HSC or designee will be in continuous contact with workers exposed to weather extremes and document that the heat or cold stress programs are implemented in accordance with their company's SOP and site HASP. Workers will take adequate appropriate rest breaks and drink adequate amounts of cold or hot liquids.

The use of Personal Protective Clothing can increase heat-related health risks. work/rest schedules may be altered based on the existing weather conditions encountered and the level of personal protection being utilized by on-site personnel.

3.4.2.1 Heat Stress

To avoid heat stress, the following steps should be taken:

- Work schedules should be adjusted.
- Shelter (air-conditioned, if possible) or shaded areas should be provided to protect personnel during rest periods.
- Workers' body fluids should be maintained at normal levels to ensure that the cardiovascular system functions adequately. Daily fluid intake must approximately equal the amount of water lost in sweat, i.e., 8-fluid ounces (0.23 liter) of water must be ingested for approximately every 8-ounces (0.23 kilogram) of weight lost. The normal thirst mechanism is not sensitive enough to ensure that enough water will be ingested to replace lost sweat. When heavy sweating occurs, the worker should be encouraged to drink more.

3.4.2.2 Cold Stress

To avoid cold related injuries the following practices are recommended:

- Adequate insulating dry clothing should be worn. Layered clothing of

cotton and/or wool provides the best insulation.

- The head and hands should be covered. Mittens provide better insulation than gloves.
- If clothing becomes damp or wet from contact with fluids or perspiration, they should be changed.
- Heated warming shelters should be made available if work is performed continually at low temperatures.
- To prevent dehydration, warm sweet drinks and soups should be ingested. Ingestion of caffeinated beverages should be limited because of the diuretic and circulatory effects.
- Personnel should utilize the "buddy system" when working in cold environments. The onset of heavy shivering, frostbite, feeling of excessive fatigue, drowsiness, irritability, or euphoria are indications for immediate return to a shelter. The HSC will monitor the daily temperature and work activities and make adjustments to the work schedule as necessary.

3.4.3 Illumination Requirements

If work activities occur before sunrise and/or after sunset, lighting will be provided at each work area to meet the requirements of 29 CFR 1910.120(m) and 29 CFR 1926.65(m). The Standard states that while any work is in progress, the general site areas shall be lighted to not less than 5 foot-candles and first aid stations not less than 30 foot-candles.

3.4.4 Slip, Trip and Fall Hazard Requirements

O&M will assess each work area for slip, trip and fall potential hazards. Prior to work start in that area, the hazard will be mitigated or, if mitigation is not possible, delineated with appropriate warning markings. Good housekeeping procedures, including maintaining clear work areas and walking paths, are required by O&M personnel and subcontractors.

3.4.5 Underground Utilities Requirements

Call (811) system will be utilized by O&M personnel and subcontractors before digging operations commence. Underground utilities will be clearly marked out so as not to be impacted by digging operations.

3.4.6 Heavy Equipment (Noise) Requirements

Heavy equipment may be operated under the following requirements:

- The operation of heavy equipment will be limited to authorized O&M personnel and subcontractors specifically trained in its operation.
- The operator will use the safety devices provided with the equipment, including seat belts.
- Backup warning indicates and horns will be operable at all times.
- While in operation, all personnel not directly required in the work area will keep a safe distance from the equipment.
- All site personnel will make eye contact with the equipment operator to receive permission to enter the work zone PRIOR TO ENTRY into the work zone.

Noise Requirements

Excessive noise may occur during certain activities on site, such as the use of machinery or powered hand tools. When expected noise or sustained noise levels exceed 85dBA, the use of earplugs or other hearing protection equipment with a NRR of 25 or greater will be mandatory for personnel use in the immediate area. As a rule, the noise level is excessive if it is necessary to shout to be heard at a distance of three feet. If noise levels exceed an 8-hour Time Weighted Average (TWA) of 85dBA for any employee, O&M personnel will comply with O&M's Hearing Conservation Program.

3.4.7 Manual Lifting Requirements

Manual lifting of heavy objects may be required. Use of power lifting equipment will be in accordance with the manufacturer's requirements and in accordance with the lease agreement and contract terms. O&M personnel performing manual lifting must do so in accordance with their company's SOP and the following requirements.

Before attempting to move or lift materials the following items should be reviewed.

- Use mechanical assistance whenever possible.
- Assistance is required for all large, heavy, or awkward loads. Do not lift a load alone unless it is easily handled by a single individual.
- Check route to be traveled for slipping or tripping hazards or obstructions.
- Inspect the material for jagged or sharp edges, burrs, rough or slippery surfaces.
- Grasp the object with a firm grip.
- Keep fingers away from pinch points, especially when sitting the load down.
- Keep hands away from the ends of long objects such as pipes and lumber to prevent getting pinched.
- Keep hands and object to be handled free of oil and grease, as much as possible.

When lifting a load observe the following steps:

- Use proper lifting techniques; Use legs to lift the load, keep the load as close to the center of the body as possible.
- Never rotate the body (turn at the waist) while lifting or carrying an object. Use the legs to move the entire body into position.
- Minimize lifts from ground level.
- Never lift loads off of a surface above shoulder height, use a ladder or elevated work surface.

3.4.8 Elevated Work Requirements

O&M personnel and subcontractors must evaluate the work area to determine whether there is a potential fall hazard. A guardrail system or personal fall arrest system is required in the following circumstances where the employee will be working six (6) feet or higher above a lower level on the site:

3.4.8.1 Ladder Requirements

Ladders or approved scaffolds must be used for elevated work. Standing on chairs, tables, etc. is prohibited. Ladders must be

inspected prior to use and defective ladders removed from service. use.

The following are minimum site requirements:

- Ladders must be selected to hold at least four (4) times their maximum intended load.
- Make sure the ground is level and stable
- Check the area for overhead power lines. Never use metal ladders near powerlines or energized systems.
- Do not exceed the ladder's load capacity (as indicated on label on side of ladder) which includes the weight of the person and tools or equipment
- Maintain 3 points of contact and face the ladder when ascending or descending. Work may be performed on the ladder without maintaining 3 points of contact once the worker is in position on the ladder.
- Stay near the middle of the ladder; do not move your body outside of the boundaries of the ladder's frame
- Do not carry objects or loads that could cause a loss of balance and a fall while climbing up or down the ladder.

Step Ladders must be used in the following manner:

- Fully extended open position with spreaders locked into place.
- All feet must be situated flush on the ground surface. Ladders should never be used on uneven or slippery surfaces.
- Top steps or cap may not be used as a step.
- Step or A-frame ladders 10-feet or higher must be secured from falling.

3.4.9 Floor Hole Requirements

Covers for holes in floors, roofs, and other surfaces shall be capable of supporting without failure for twice the weight of the employee. All covers shall be marked with "HOLE" or "COVER" and secured when installed.

3.4.10 Biological Hazards Requirements

Worker exposure to biological hazards such as ticks, snakes, poisonous plants, and mosquitos may occur at this project location. During seasons where these present a hazard, insect repellant should be used. Long sleeves and pants help prevent contact and workers must examine themselves after working in risk areas.

3.4.11 Trench Work Requirements

This section is to establish the requirements and hazards of trench work. A trench excavation is a narrow excavation made below the surface of the ground where the depth is greater than the width when measured from the bottom is less than 15 feet. Hazards associated with the excavation include:

- Cave-ins
- Striking of underground utilities
- Falling tools, materials, and equipment
- Hazardous air contaminants or oxygen-deficient environments.

Requirements

- A competent person shall be placed in charge of all excavations.
- All materials in proximity to the excavation site must be stored, arranged, or secured in such a manner as to prevent the material from accidentally falling into the trench.
- The Department or Contractor Supervisor is responsible to ensure underground utilities are located prior to excavation work.
- While the excavation is open, the underground utilities must be protected, supported, or removed as necessary.
- Employees are not allowed in the excavation while heavy equipment is digging.
- Adequate means of egress will be maintained at all times. Excavations located near public traffic shall be barricaded and employees shall be provided with and wear warning vests.
- In excavations greater than four (4) feet in depth, or where oxygen deficiency or other hazardous atmospheres could reasonably be expected to exist, testing must be performed prior to the entry of employees.
- If a hazardous atmosphere is verified at a trenching site, emergency rescue equipment must be available and attended (SCBA, Lifelines, etc.) as required by the TAMUC Confined Space Program.
- Inspection of trenching operations for hazardous conditions must be performed daily or when changing conditions warrant (rain, different soil type, etc.). Upon detection of a hazardous condition, employees must be removed from excavation at once.
- Both visual and manual soil testing will be performed by a "competent person" to determine soil type before employees are allowed to enter a trench.
- Protective systems for excavations deeper than 20 ft. shall be designed by a registered engineer.
- Excavation beneath the level of adjacent foundations, retaining walls, or other structures must be avoided unless specific regulatory requirements for that type of activity have been met.

4.0 SITE CONTROL

A site control system has been established to assure only authorized personnel are allowed access. Radio communication, as needed, will be established between on-site personnel.

Access to the work area shall be restricted by an appropriately marked boundary. A fence, barrier tape or some other appropriate method will indicate the contaminated area (as applicable). The only exception to these requirements shall be a serious injury or life-threatening situation. A written log should be maintained of all contractors, subcontractors, state and federal representatives, and visitors.

4.1 Access and Egress from the Site

Safe access and egress will be provided to all work areas. Access ways will be kept clear of operating or construction materials, or debris that could obstruct traffic, cause a tripping hazard, etc.

Access roads will be constructed to widths suitable for safe operations of equipment. Curves will have open sight line, and as great a radius as possible. Dust will be controlled to insure safe operating at all times.

4.2 Site Security

For safety reasons, all contractors, subcontractors, state and federal representatives, and visitors should be required to sign in upon arrival and sign out upon departure. Each visitor must adhere to the site control and health and safety guidelines established in this plan.

Depending upon conditions, the site may be secured with barriers, fencing, and/or gate and perimeter security guards. Currently an 8-foot-high perimeter barbed wire fence surrounds the site. Site personnel routinely check the integrity of the fence.

All personnel that desire to access a contaminated zone must meet the educational and medical requirements as set forth in 29 CFR 1910.120 and 29 CFR 1926.65. These requirements shall be satisfied by presenting certification letters or similar documentation to the Project Manager prior to entry into the exclusion zone, contaminated zone, or contamination reduction zone (decon) as applicable.

5.0 WORK CLOTHING AND LEVELS OF PERSONNEL PROTECTION REQUIREMENTS

Personal protection for this project may include:

- Work clothing
- Work shoes and disposable overboots (if contact hazard present)
- Safety glasses
- High-Visibility vests or reflective clothing
- Chemical protective gloves as needed during contact with visibly impacted soil and decontamination.
- Ear plugs (as needed)

It is anticipated that Level D Personal Protective Equipment (PPE) will be utilized by Contact Personnel while in construction work areas. Level D PPE includes:

- Work clothing
  - Hard hat
  - Safety glasses
  - Work gloves (as needed)
  - Safety shoes or boots
  - Hearing protection (as needed)

If site conditions change personal protective equipment will be upgraded.

Good Work Practices

Good Work Practices should be employed by workers in areas where there is a potential for some contamination. Good Work Practices include:

1. Keep dust levels to a minimum.
2. Use Good personal hygiene practices prior to eating, drinking and smoking.
3. Use work gloves to minimize dirt on hands.
4. Wear work coveralls, or disposable coveralls, to minimize dirt on clothing.
5. Keep dirty clothes, shoes, tools, etc. away from personal areas such as cars and homes.

6.0 TRAINING REQUIREMENTS

6.1 Initial Site Training Requirements

Initial site briefing will be provided on-site by the HSC or designee for all O&M personnel and subcontractors prior to initial entry onto the site. Site training will also be provided on an as needed basis to specifically address the activities, procedures, monitoring, and equipment for the site operations. Such training will include site and facility layout, hazards, and emergency services at the site, and will detail all

provisions contained within this HASP. This training will be documented by the HSC.

6.2 First Aid and CPR Training Requirements

O&M will ensure that at least one employee at the site possesses current first aid and CPR certifications. O&M subcontractors will provide names and copies of certifications to the HSC prior to performing work at the site.

7.0 MEDICAL SURVEILLANCE REQUIREMENTS

All Contact Personnel engaged in on-site activities on this project must meet the requirements of 29 CFR 1910.120(f) and 29 CFR 1926.65(f). Medical surveillance applicability will be determined by each employee's employer. Additionally, any employee required to wear a respirator for Level C PPE or above must be approved by a licensed health care provider for respirator use as defined in the OSHA Respiratory Standard 29 CFR 1910.134 and O&M's Respiratory Protection Program.

In the unlikely event of an exposure occurring, the affected employee will be sent for any evaluation and treatment that may be needed to the designated hospital. See Appendix B for hospital for written directions and route map.

8.0 COMMUNICATIONS

Several means of communication are present at this project site. They include cell phones, or existing nearby telephones. O&M personnel and subcontractors will be informed of the communication procedures during daily site briefings.

8.1 Hazard Communication Requirements

O&M personnel receive Hazard Communication training in accordance with the O&M Hazard Communication Plan and site HASP. All containers being utilized at the site are labeled with the contents and appropriate hazard warnings, and Safety Data Sheets (SDS) are maintained at the site for materials that are being used at the site. O&M subcontractors must provide the HSC with a list of the chemicals that they will be using onsite.

8.2 Lone Worker Requirements

The HSC, PM or designee is required to account for each O&M or subcontractor worker throughout each work shift at regular intervals appropriate to the job assignment to ensure the worker's safety and health and at the end of the job assignment or at the end of the work shift, whichever occurs first. This can be verbal or visual. The HSC, PM or designee will:

- Set up an emergency response system for the lone worker.
- Identify a communication chain for the lone worker to follow.
- Provide a primary contact and at least one back up contact.
- Establish method of communication and frequency of "check in".
- Train their personnel in the communication procedures prior to a lone worker assignment.

9.0 DISPOSAL PROCEDURES

Personal protective equipment, decontamination materials and solutions, and other impacted waste will be disposed in accordance with federal, state and local regulations, and any site approved plans.

10.0 EMERGENCY PLAN

Emergency situations can be characterized as a fire or explosion, an environmental release, a business interruption, or an accident or injury to the field personnel. All emergency situations must be reported immediately to the HSC or designee.

Emergency equipment on site includes first aid kits, and fire extinguishers. The HSC or designee is responsible for inspecting these monthly.

Subcontractors are responsible for providing their emergency equipment as appropriate to their work onsite. All subcontractors are required to have first aid kits, eye wash, and fire extinguishers. Additional emergency equipment may be required as appropriate to their job tasks. Subcontractors are responsible for ensuring that their equipment is maintained in accordance with the manufacturer's recommendations and OSHA/ANSI requirements.

Emergency phone numbers are listed in Section 1.3 of this Health and Safety Plan. Written hospital directions and an accompanying map can be found in Appendix B.

All injuries and incidents must be reported to Site personnel who will notify the HSC. The HSC will notify the Trust Health and Safety Coordinator or Project Manager. A written incident report will be required and must include details of the incident/injury, root cause, corrective actions, and responsible person and the due date for completion of the corrective action.

11.0 RECORDKEEPING

The HSC maintains the following records onsite for their Site personnel.

- Site HASP and signed Acknowledgement Page
- Daily Safety Briefings
- Incident investigation reports
- Chemical inventory and Safety Data Sheets

12.0 AUTHORIZATIONS

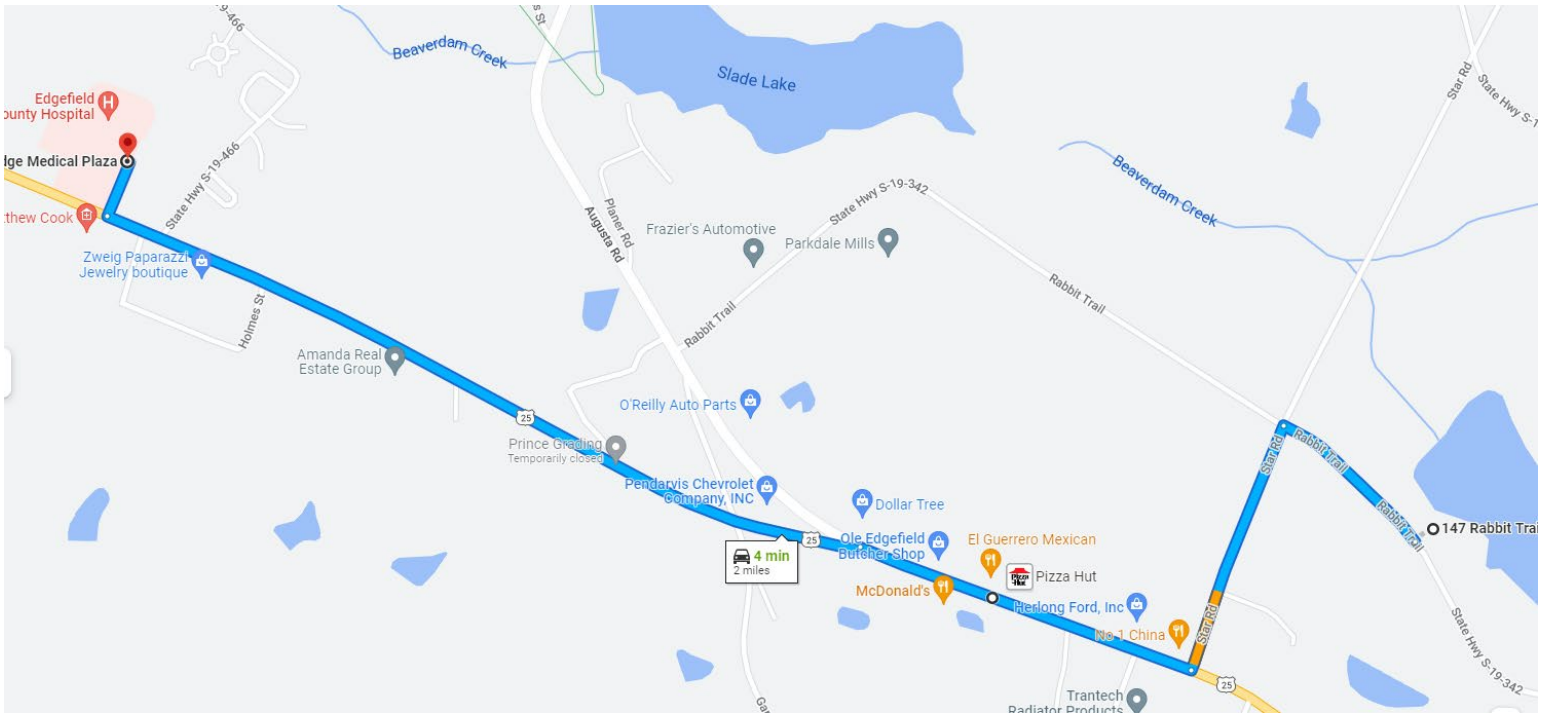
The HSC or a designee must approve all personnel authorized to enter the project work zones at the site. Authorization will involve proof of completion of appropriate training courses and medical examination requirements as outlined by this HASP, as well as the signature of the individual on the Acknowledgement Form recognizing a complete understanding of this HASP (Appendix C).

APPENDIX A - Emergency Phone Numbers

Emergency Phone Numbers

Town of Edgefield Fire Dept.	911 or (803) 637-4014
Edgefield Police Department	911 or (803) 637-4060
Hospital	300 Ridge Medical Plz, Edgefield, SC 29824 (803) 637-3174
Utility Mark Out	811
SCDNR Spill Hotline	1-888-481-0125
National Response Center (NRC) for Oil/Chemical Spills	1-800-424-8802

APPENDIX B – Hospital Information and Driving Directions



APPENDIX C – Field Sign Off

Each field team member shall be provided the time and opportunity to review their site HASP. Each field team member shall sign this section after the site-specific training has been completed and before being permitted to work on site.

I have read, been provided the opportunity to ask questions, and understand this Site-Specific Health and Safety Plan. With my signature, I agree to comply with all its provisions.

Project: FPE EDGEFIELD – O&M, Inc.

Name (Print)	Signature		Date

APPENDIX D: EMPLOYEE SIGNOFF FORM

Health and Safety Plan

The O&M, Inc. project employees and O&M, Inc. subcontractors (and lower tier subcontractors) listed below have been provided with a copy of this HSP, have read and understood it, and agree to abide by its provisions (including drug testing and discipline protocols).

Project Name: ***FPE EDGEFIELD*** **Project Number:** 762

Revision 1 Dated: July 18, 2022

EMPLOYEE NAME (Please print)	**EMPLOYEE SIGNATURE**	**COMPANY**	**DATE**

ATTACHMENT III

Chemical Oxidation Addition Health and Safety Addendum

Addendum to the Health and Safety Plan for Sodium Persulfate Addition Former Federal Pacific Electrical Company Site Edgefield, South Carolina

Prepared by

O & M, Inc.
Knoxville, TN

April 2023

General Information

As described in the April 2023 O&M Inc. Operations Plan, the chemical oxidation addition for the Former Federal Pacific Electric Company Site (Site) will use sodium persulfate as a chemical oxidant, activated by sodium hydroxide, to destroy residual contaminates following the removal of soil from an excavation area. The chemical oxidant will be applied to the base of the excavations/surface of partially weathered rock.

Based on the Site conditions, size of the treatment area, contaminants present and success with implementation at other sites, sodium persulfate was chosen as the most cost effective and technically feasible remedial enhancement technique.

The excavation areas being targeted with the sodium persulfate addition are, Paint Bed Drying Area (PBDA), Drum Burial Area (DBA), and Degreasing Operational Area (DOA).

This document provides an Addendum to the existing Site Health and Safety Plan (HASP) (April 2023).

Client Contact:
Bennie Underwood – *de maximis, inc.* (865) 607-0560

Site Name and Location:
Former Federal Pacific Electrical Company Site
Edgefield, South Carolina

Senior Project Coordinator:
David Fuerst - O&M, Inc. (865) 691-6254
Cell: (865) 804-6314

Senior Geologist:
Fred McKay, PG – Cell: (727) 804-2238

Field Support/Site H&S Coordinator
Christopher Fuerst - O&M, Inc.
Cell: (865) 816-0986

Sodium Persulfate Technical Support:
John Valkenburg, PE–PeroxyChem (517) 669-5400

(See also Emergency Call List in the Site HASP, Section 1.3 Pg. 6)

Planned Site Activities

The addition event will consist of the following:

- There are three (3) areas for excavation:
  - Paint Bed Drying Area (PBDA)
  - Drum Burial Area (DBA)
  - Degreasing Operational Area (DOA)

- The estimated area at the bottom of each excavation is:
  - Paint Bed Drying Area (PBDA) - 4,125 ft2.
  - Drum Burial Area (DBA) - 1,650 ft2.
  - Degreasing Operational Area (DOA) – 3,200 ft2.

- Assume a depth of 0.25 feet of a sodium persulfate solution in each excavation. This will determine the approximate quantity of a 20% solution to be added to each location:
    - Paint Bed Drying Area (PBDA) –10,200 gallons.
    - Drum Burial Area (DBA) – 4,100 gallons.
    - Degreasing Operational Area (DOA) – 8,000 gallons.

- A 20% solution will require the following quantity of sodium persulfate:
    - Paint Bed Drying Area (PBDA) – 19,100 lbs.
    - Drum Burial Area (DBA) – 7,700 lbs.
    - Degreasing Operational Area (DOA) –15,100 lbs.

- The quantity of 30% sodium hydroxide to activate the sodium persulfate solution:
    - Paint Bed Drying Area (PBDA) – 3,000 gallons.
    - Drum Burial Area (DBA) – 1,200 gallons.
    - Degreasing Operational Area (DOA) – 2,100 gallons.

Chemical Oxidation Addition Equipment

The chemical oxidation addition equipment is a mobile based system that can be configured as required for varying operational requirements. See Figure 3 – Process Flow Diagram.

The addition equipment consists of the following components:

- 1,500-gallon polyethylene cone bottom sodium persulfate mix tank with stand and a secondary containment.
- An air operated double diaphragm mixing pump.
- Air compressor.
- 263-gallon sodium hydroxide totes (provided by Univar) and a secondary containment.
- Water provided from an on-site fire hydrant.
- The 1,500-gallon polyethylene cone bottom tank and the sodium hydroxide tote are fitted with discharge valves.
- A length of reinforced chemical resistant hosing is attached to the cone bottom tank and tote discharge valve via a cam lock fitting. These two (2) hoses are then tied together with a T-fitting. The outlet of the T-fitting has an inline static mixer and a length of hose that extends to the bottom of the excavation.
- The sodium persulfate will be delivered in 2,204 lb. super sacks. The sodium hydroxide will be delivered in 263-gallon totes.
- A Process Flow Diagram is presented in Figure 1.

The sodium persulfate solution will be produced on a batch basis. Approximately 1,200 gallons of water will be pumped into the 1,500-gallon sodium persulfate mix tank. A 2,204 pound super sack of sodium persulfate will be fed into the mix tank and the solution recirculated through the double diaphragm addition pump and static inline mixer until all the sodium persulfate solids are dissolved.

After the sodium persulfate solution has been mixed, the valves at the bottom of sodium persulfate mix tank and tote will be opened and each solution will drain via gravity flow and be combined for addition into the excavation via a hose. This provides for an optimum activated solution being added into each excavation.

- Paint Bed Drying Area (PBDA) - 10,200 gallons – nine (9) addition batches.
- Drum Burial Area (DBA) - 4,100 gallons – four (4) addition batches.
- Degreasing Operational Area (DOA) - 8,000 gallons – six (6) addition batches.

Purpose of this Health and Safety Plan Addendum

This Addendum is intended to provide workers with an awareness of and means to safeguard against potential hazards specific to oxidant addition activities at this site.

Overall Hazard Summary: Moderate

Description of Site-Specific Hazards

This section will describe the chemical and physical hazards that a worker may be exposed to at this Site. Brief emergency procedures are included in this section.

Chemicals/Contaminant

- TCE.
- Sodium Persulfate
- Sodium Hydroxide

SDS sheets for the contaminants are in the existing Site HASP. The Sodium Persulfate and Sodium Hydroxide SDSs are presented in *Attachment 1*.

Pathways to worker exposure:

Ingestion, skin and/or eye contact, skin absorption, inhalation of fumes or dusts.

Health Effects and Medical Monitoring:

Irritation and chemical burns may result from skin and/or eye contact or skin absorption. Nausea and possibly severe illness may result from ingestion or inhalation.

Emergency Exposure Directions:

<u>Eye Exposure</u>
If personnel are splashed in the eye with sodium persulfate or sodium hydroxide, the following procedures should be followed:

1) Do not allow the victim to rub or keep eyes tightly shut.
2) Gently lift eyelids and flush with eyewash immediately and continuously flood with water until transported to Hospital.
3) Consult Ophthalmologist immediately.

Skin Exposure
If personnel are splashed on the skin with sodium persulfate or sodium hydroxide, the following procedures should be followed:

1) Quickly remove contaminated clothing.
2) Rinse with flooding amounts of water for at lease 15 minutes.
3) Wash exposed area with soap and water.
4) Watch for reddened or blistered skin, consult physician.

Use adequate quantities of water to neutralize if sodium persulfate or sodium hydroxide are spilled onto the ground.

Ingestion
If personnel ingest sodium persulfate or sodium hydroxide, the following procedures should be followed:

1) Rinse mouth with water.
2) Dilute by giving 2 glasses of water.
3) Do not induce vomiting.
4) Consult physician.

Inhalation
If personnel inhale sodium persulfate or sodium hydroxide, the following procedures should be followed:

1) Remove to fresh air.
2) If breathing difficulty or discomfort occurs or persists consult a physician.

Equipment

A forklift will be used to lift the supersacks of Sodium Persulfate. Please see the Powered Industrial Trucks SOP presented in the HASP for proper operation.

Personnel Responsibilities during Addition Activities

The health and safety responsibilities of key field and project personnel are presented below. All onsite personnel are expected to adhere to the HASP and this addendum.

Site Health and Safety Coordinator (SHSC)
The SHSC is the primary contact for health and safety during all field activities. The SHSC establishes work zones, evacuation routes and assembly areas, makes the day-to-day decision to modify levels of protection based on site conditions or monitoring data, has the authority to stop all work if conditions are judged to be hazardous to onsite personnel or the public, and reports and investigates accidents and near misses.

Project Manager
The Project Manager is responsible for the proper installation of all equipment and piping and for the operations.

Field Support

All O&M staff are responsible for compliance with the Site HASP and this addendum in its entirety. They are responsible for taking all reasonable precautions to prevent injury to themselves or fellow employees and for being alert to potentially hazardous situations. The field personnel are expected to perform only those tasks they believe can be done safely. They are expected to immediately report any accidents, near misses, or unsafe conditions to the SHSC.

Personal Protection

The prescribed methods and procedures used to protect personnel (site workers and the adjacent community) from exposure to hazardous materials or conditions posed by pilot test activities are presented below.

Preventing exposure to sodium persulfate or sodium hydroxide is the primary health and safety issue of this pilot test. Engineering controls will be the primary means of personal protection. The following summarizes the engineering controls that will be used.

- Access to the raw materials will be restricted.
- Access to the addition area will be restricted.

Personal protective equipment (PPE)

Based on the Task Hazard Analysis and the use of engineering controls, **Level D PPE** will be used for site activities during the pilot test. Protection Levels may be upgraded depending on site conditions as determined by the SHSC. **Level D PPE** consists of the following:

- Work shirt and full-length cotton pants or coveralls.
- American National Standards Institute (ANSI) standard steel-toed work boots.
- ANSI Standard hardhat during forklift operations.
- ANSI Standard safety chemical resistant goggles (not glasses) while making adjustments to piping/fittings.
- Bright orange/yellow vest or shirt for work within the chemical oxidation addition area.

Splash shields and appropriate gloves will be worn by the personnel involved with the sodium persulfate and sodium hydroxide initial mixing process and/or direct handling of the liquid mixtures.

Handling and Storage/Fire Fighting/Accidental Releases

Please refer to the SDS's presented in *Attachment 1*.

I have read and understand the requirements of this H&S Addendum:

Print Name	Signature	Date

Attachment 1

SDS
Klozur – Sodium Persulfate
Sodium Hydroxide

Attachment 2
O&M, Inc.

POWERED INDUSTRIAL TRUCKS

I. PURPOSE

To provide a procedure to ensure the safe operation of powered industrial trucks at *O&M, Inc.* work locations.

II. SCOPE

This procedure applies to forklifts, man-lifts, backhoes, front-end loaders, etc. used at O&M, Inc. work locations.

III. REFERENCES

A. 29 CFR 1910.178, Occupational Safety and Health Standards, Powered Industrial Trucks

IV. PROCEDURE

A. Operators

1. The operation of powered industrial trucks at *O&M, Inc.* shall be performed **ONLY** by trained and qualified operators.

2. Operators must use safety belts, if equipped, while operating any powered industrial truck.

3. Operator training for all equipment shall include:

   a. Classroom training on the knowledge required to correctly inspect and safely operate the vehicle.

   b. Practical skill demonstration that shows the operator is capable of performing required skills on the vehicle.

   c. Documentation to verify the above training and practical exercise has been completed.

4. Qualifications of drivers may be suspended or revoked as a result of violation(s) of operating procedures or unsafe actions while operating a vehicle.

B. Inspection

1. All vehicles shall be formally inspected prior to use. For vehicles used on a regular basis, this inspection shall be performed at the beginning of each shift.

a. If the vehicle is found to be in need of repair, defective, or in any way unsafe, it shall be taken out of service until it is restored to a safe condition.

2. Each Operator shall perform a brief inspection every time prior to starting a vehicle, checking brakes, hydraulic lines, tires, etc. for obvious unsafe conditions.

C. **Operation**

1. When an operator discovers any unsafe condition during vehicle operation, the operator shall immediately take the vehicle out of service and notify the maintenance department or the Supervisor to effect repairs.

2. Trucks shall not be driven up to anyone standing in front of a bench or other fixed object that could result in a worker being "caught between" a vehicle and a fixed, immovable object.

3. No person shall be allowed to stand or pass under the elevated portion of any truck, whether loaded or empty.

4. Unauthorized personnel shall not be permitted to ride on any truck. Other than the operator, the only time personnel may ride on a vehicle is when an approved personnel carrying device is used.

5. Arms and legs shall not be placed between the uprights of the mast or outside the running lines of the truck.

6. Fire aisles, access to stairways and emergency response equipment shall be kept clear at all times.

7. Operator shall slow down and sound horn at cross aisles, doorways, and other locations where vision is obstructed. Operator shall also sound horn when starting to back up.

8. If the load being carried obstructs forward view, the driver shall travel in reverse, with the load trailing.

9. The Operator shall look in the direction of travel at all times, <u>including when backing up,</u> and keep a clear view of the path of travel.

D. Parking

NOTE: A powered industrial truck is considered unattended when the operator is 25 feet or more away from the vehicle which remains in his view, or whenever the operator leaves the vehicle and it is not in his view.

1. When the operator gets off the vehicle, whether it is unattended or remains attended, brakes shall be set, and load engaging means shall be fully lowered.

2. When a vehicle is left unattended, brakes shall be set, power shut off, load engaging means fully lowered, and controls shall be neutralized.

ATTACHMENT IV

O & M Excavation JSA (discharge structure)

O&M, Inc.	JOB SAFETY ANAYSIS FPE Edgefield Excavations

Tasks	Hazards	Controls
Area Prepartion	Employee Protection Slips, trips, falls, uneven surfaces	• Physical inspection work areas prior to start of work • Follow good housekeeping practices: Create walkways • Assure materials and debris do not block traffic • Keep work areas clean and neat, free from rubbish and debris. • Watch where you walk. • Be cognizant of your own safe work practices as well as those of your co-workers. • Be careful on slopes or wet muddy areas. • Flagmen will be utilized as required for roadway traffic • Appropriate warning signs will be posted • BNL to be notified prior to road & sidewalk closing
General Site Security	Unautherized Access by Populous	•Guard against unauthorized access to excavation by erecting fencing around the work area.
Working Outdoors	Heat Stress, Sunburn, Dehydration	• Drink plenty of water, and electrolyte drinks as needed. • Wear light-colored, cotton clothing. • Slow down work rate and increase breaks in hot weather. • Use sunscreen.
General Material; Lifting/ Handling	Ergonomic Injury Impact Injury Back injury-muscle pulls, sprains and strains, lacerations	• Use proper lifting methods, including team lifting when necessary. (Less than 80 lbs • Use mechanical equipment whenever possible. • lift with legs, keep loads close to body, don't twist while picking up loads. • Wear cut-resistant work gloves whenever materials are being handled.
Use of hand and power tools- General	Eye injury; Laceration and Hnad Injuries	• Wear eye protection when using hand/power tools which cause flying debris. • Eye wash to be immediately available • Tools must be in good condition and used for their intended purpose; • Familiarize workers with tool operation. • De-energize power equipment prior to changing bits or blades. • Wear appropriate hand protection

Excavation

Tasks	Hazards	Controls
General Tool Safety	N/A	Choose the right tool for the task. Inspect tools and remove ones that fail inspection
Delivery of Material on Site	Hitting People Or Obstacles On Site With Truck.	• Drive The Proper Speed Limit (5 MPH) And Constantly Scan For Potential Accidents. • Truck driver informed and understands the requirements in this document. • Driver reads and "signs off" on document. • Have proper PPE available for drivers so they can exit the cab to remove/tie down loads.
	Unwanted Loss of or shifting load.	
	Backing vehicle striking worker	• Be sure all items are securely tied and out of harm's way. • Keep loads secure until ready to be removed from the truck. Chock or wedge to prevent rolling of round objects. No use of "cheater bars" on Load Binders allowed. • Effective back up alarm and/or flagger to direct truck while backing
	Truck/Trailer Unwanted Rolling	Set Parking Brakes and Chock Tires
	Truck getting stuck- Tow Cable/ Chains Breaking	Hazards of Trying to Pull Truck out from being mired
	Entering and Exiting Being Struck By	• Road signage warning traffic of hazard. • Flagmen are to be used when necessary.
Unloading Trucks	Strains & Struck By	• Utilize Proper Rigging And Equipment. • Slings and chains must be inspected prior to use, and be designed for the proper lifting capacity of the load. • Follow manufacturer's recommendation on all equipment. • Driver will stay clear of unloading and loading operations
	Slips, Nails In The Foot, Tripping	•All wood scraps, nails, banding must be cleaned up immediately

Excavation

Tasks	Hazards	Controls
Conccrete Saw Cutting and Drilling	Silica Dust Inhalation	• Use engineering controls and wetting of concrete as a containment method to prevent any dust • When sawing concrete, use saws that provide water to the blade. • Use adequate respiratory protection when source controls cannot prevent dust • Utilize proper personal protective equipment as determined by IH Support.
Excavation	Hitting buried utilities Property Damage Electrocution Crushing, flying, debris & noise	• Completed mark-outs of utilities and excavation permit prior to start of excavation work • Confirm location of all utilities within excavation area by hand digging • Verify mark-out was completed. • All soils shall be considered Class “C”. • Wear proper PPE. • Keep appropriate distance for task at hand. • Have competent person examine area before work. • Keep spoils pile at least three feet from edge of excavation. • Keep non-essential personnel away from work activities • All equipment will be inspected by appropriate personnel 48 hours prior to using on the job.
Grading	Well Collapse Engulfment	• Excavations deeper than 3 ft in depth require an excavation plan. The required excavation plan must be complied with at all times. • All excavation egress’s shall be inspected daily and maintained. • Excavate slopes to 1.5 to 1 ratios, (34 ½ Degrees), install trench box when inadequate space is available for sloping. • Watch for signs of collapse (tension cracks, ground settlement, water seepage etc) • Safe-off excavation area as required.

Excavation

Tasks	Hazards	Controls
Compacting	Wall Collapse, Noise, Engulfment	• Ensure the vibration does not collapse excavation. • Wear appropriate hearing protection if the noise levels require it, above 85 dBA • Have competent person inspect excavation before work starts every day and as often as necessary during the shift or after a rain storm. • Ensure backup alarm is working properly. • Safety vest are to be worn at all times.
Dust Control	Breathing & Eyes Irritant, Property Damage	• Use mechanical, hoses or sprinkler to moisten soil to keep dust under control. • Use proper respiratory protection as needed, as determined by IH Support.