

SITE-SPECIFIC PROJECT MANUAL
FORMER SHARON PIPE PLANT
200-201 CLARK STREET, SHARON, MERCER COUNTY, PA 16146
DEP PRIMARY FACILITY ID NO. 625900

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MERCER NODE DEVELOPMENT, LLC

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Figure 1 - Phasing Plan

Figure 2 - Proposed Boring Locations

ATTACHMENTS

Attachment A - Site Specific Health and Safety Plan Acknowledgement

Attachment B - 2015 Environmental Covenant

Attachment C - Safety Data Sheets for the Chemicals of Concern

Attachment D - Air Monitoring Specifications

Attachment E - Form U Parameters and Analytical Methods

Exhibit 1 - Areas of Concern

1.0 PROJECT NAME AND LOCATION

Mercer Node Development

200-201 Clark St

Sharon, Mercer County, Pennsylvania

Pennsylvania Department of Environmental Protection (PADEP) Site Identification number 264051, Land Recycling Cleanup Location Primary Facility No. 625900.

2.0 SAFETY AND HEALTH ADMINISTRATION

The Project Manager is ultimately responsible for ensuring that work on this project is performed in accordance with the safety and health provisions contained in the Site-specific Health and Safety Plan (HASP; Section 14). The designated Site Health and Safety Officer (SHSO) will monitor compliance with the HASP during field activities. All field team members engaged in project activities will be required to sign the "Site Specific Health and Safety Plan Acknowledgement" form (Attachment A). The SHSO will maintain a copy of this Project Manual on-site for the duration of the project activities.

Subcontractors engaged in project activity at this site will comply with applicable provisions of the Occupational Safety and Health Act of 1970, the safety and health requirements set forth in Occupational Safety and Health Administration regulation 29 CFR 1910.120, where applicable, and any applicable state, city, or local safety codes. Each subcontractor will be responsible for developing the safety procedures to be followed by subcontractor personnel during on-site activities and for supplying and using the equipment necessary for safety precautions for its employees engaged in this project.

To reduce the risk of accidents, subcontractors will maintain an orderly, safe work area. It will be the subcontractors' responsibility to provide any safety barricades or warning devices that Mercer Node considers necessary to prevent accidents or injuries to field personnel and the public.

3.0 SITE HISTORY AND DESCRIPTION

3.1 BACKGROUND

Civil & Environmental Consultants, Inc. (CEC) has prepared this Project Manual on behalf of Mercer Node Development, LLC (MND) for the property located at 200-201 Clark Street in the City of Sharon, Mercer County, Pennsylvania (the “Site”), as described in the Site’s Environmental Covenant (EC; Attachment B) as the Main (Parcel 1-S-15) and North Yard (Parcel 1-S-14) Parcels which together comprise approximately 17 acres, as more fully described in the Site deed. MND intends to discontinue operation of an existing cryptocurrency mining facility and to develop an 80-megawatt substation, a 30-megawatt substation, and associated buildings and related infrastructure for a data center on the Site. This Project Manual was prepared to prescribe the health and safety, hazard assessment and soil and groundwater management procedures to be followed at the Site during a subsurface investigation for proposed environmental and geotechnical engineering services.

3.2 DESCRIPTION OF THE SITE

The Site is approximately 0.5 miles long in the north-south direction by approximately 0.1 miles wide in the east-west direction. The central portion of the Site historically contained the former Wheatland Tube Co. – Sharon Pipe Plant and the Armco Sawhill Tubular Division and is located adjacent to the Westinghouse Electric Corporation (WEC) Sharon Plant Superfund Site to the East. According to the 2015 EC, previous investigations at the Site have identified concentrations of volatile organic compounds (VOCs), semi-volatile VOCs (SVOCs), polychlorinated biphenyls (PCBs) and metals in soil at concentrations that are greater than applicable PADEP Statewide Health Standards for soil, including direct contact Medium-Specific Concentrations (MSCs) and vapor intrusion screening criteria. Currently, the Site is primarily undeveloped, except for a Wastewater Treatment Plant building along the north side of Clark Street in the central portion of the Site and the current cryptocurrency units.

The Site previously hosted various industrial steel and pipe manufacturing businesses, including but not limited to Wheatland Tube Sharon Plant, Sawhill Tubular (a division of Cyclops Corporation), Armco Inc., A.K. Steel Corporation, and John Maneely Company (“JMC”).

The Site is subject to a City of Sharon ordinance that bans groundwater use for drinking, non-drinking, or industrial purposes. The ordinance was enacted on November 29, 2000, and can be found in Section 644.02 of Chapter 644 of the Codified Ordinances of the City of Sharon.

3.3 SITE HISTORY

Historical operations at the Site resulted in releases of VOCs, SVOCs, metals, acids, and light non-aqueous phase liquids (“LNAPL”) to soil and groundwater. Several environmental response actions have taken place at the Site. On February 22, 1993, Armco Inc. (“Armco”) entered into a Consent Order and Agreement (COA) with the PADEP that required Armco to investigate, characterize, and remediate identified contamination from multiple releases on the Site.

On April 4, 2002, JMC purchased the Site from Armco’s successor, A.K. Steel Corporation, and continued operating as the primary pipe manufacturing facility at the Site until May 2006 (although end-finishing and hydrotesting activities continued in a warehouse on the Site). JMC continued to operate a groundwater remediation system and the on-Site wastewater treatment plant. Sampling of groundwater monitoring wells on the Site by JMC indicated that the groundwater abatement system continued to recover contaminants of concern.

On January 19, 2007, JMC entered into a COA with the PADEP (“JMC COA”) to investigate and remediate identified contamination and other contaminants of concern relating to past operations at the Site pursuant to Pennsylvania’s Land Recycling and Environmental Remediation Standards Act (Act 2).

JMC submitted a Notice of Intent to Remediate on August 24, 2007, indicating JMC’s intent to attain and demonstrate compliance at the Site boundary with a combination of the Background

Standard, the Statewide Health Standard, and/or the Site-Specific Standard as set forth in Sections 302, 303, and 304 of Act 2.

JMC investigated and remediated environmental conditions at the Site under Act 2 and submitted a Final Report to the PADEP demonstrating attainment of site-specific cleanup standards, subject to activity and use limitations (“AULs”) and a post-remediation care plan necessary to maintain the Act 2 site-specific standards, as described in the EC.

Clark Street Properties recorded the EC with the Mercer County, Pennsylvania Recorder of Deeds office on January 17, 2015, which is recorded at Instrument No. 2015-00000810 and attached as Attachment B and incorporated herein.

4.0 ROLES AND RESPONSIBILITIES

Key personnel included in this Project Manual consist of the MND Project Manager, Infrastructure Manager, Construction Manager, and Site Superintendent, along with supporting field staff and qualified subcontractors. Their roles are outlined as follows.

Title	Name	Phone
Project Manager	Michael Byrne (Bitfarms)	+1 917 498 4573
Infrastructure Manager	Craig Hibbard (Bitfarms)	+1 720 277 1022
Construction Manager	Hardik Patel (Bitfarms)	+1 732 407 8236
Site Superintendent	Manny Tovar (T5)	+1 213 436 7091
Site Health and Safety Officer	Jeff Summers (CEC)	+1 559 917 9345

CEC's SHSO will serve as the Point of Contact for Site field personnel and qualified subcontractors. The SHSO will be the primary point of contact for site-specific health and safety concerns in the impacted work areas. The SHSO's responsibilities will include:

- Assisting with oversight and coordination of MND's subsurface investigation activities at the Site.
- Observe and document site conditions during subsurface investigation activities at the Site.
- Monitor for chemicals of concern, lower explosive limits, and oxygen levels in the work area and in ambient air.
- Observe and document the proper use of personal protective equipment (PPE).
- Observe, document, and assist with waste management procedures and proper techniques for waste handling and the staging of investigation-derived impacted materials, including but not limited to soil and groundwater.
- Maintain routine communication with MND key personnel.

5.0 SCOPE OF WORK

The scope of work to be performed at the Site in accordance with the Project Manual includes activities subject to, but not limited to, the requirements of the Occupational Safety and Health Administration (OSHA) under Title 29 of the Code of Federal Regulations (29 CFR) 1910.120, Hazardous Waste Operations and Emergency Response, and 1910.132 through 1910.140, Personal Protective Equipment. This Project Manual incorporates Site-specific health and safety standards, procedures, and practices, as well as soil and groundwater management requirements, which must be followed during activities involving subsurface disturbances. All individuals involved in on-site subsurface disturbance activities must read and acknowledge this Project Manual, be vetted for appropriate safety training, and sign the acknowledgment form (Attachment A) before being permitted to perform on-site subsurface disturbance activities. This Project Manual will be provided to contractors to help them develop their own HASP.

The proposed subsurface disturbance activities at the Site include the following:

- Disturbance of subsurface soils,
- Installation of subsurface test borings,
- Sampling and analysis of soil and groundwater that are potentially impacted by Site contaminants,
- Backfilling of test borings with cement/bentonite grout,
- Managing, characterizing, and disposing of Investigate-Derived Waste (IDW).

6.0 SITE HAZARD ASSESSMENT

A review of the historical assessments of the Site for hazards identified potential chemical, physical, and biological hazards. The identified hazards are summarized below.

6.1 CHEMICAL HAZARDS

Hazardous chemicals may be encountered during subsurface investigation activities. The chemicals of concern (COC) identified at the Site in soil and groundwater includes petroleum hydrocarbons, chlorinated solvents, VOCs, SVOCs, dioxins, metals, sulfate, nitrate, low pH, and PCBs. Exposure pathways for these COCs are identified below.

- Inhalation of contaminants or particulates in ambient air,
- Dermal contact with and absorption of COCs in soils and groundwater,
- Ingestion of soil and groundwater,
- Accidental inoculation of hazardous chemicals into the bloodstream from a contaminated tool or debris.

The National Institute for Occupational Safety and Health (NIOSH) and OSHA have established various standards for specific chemicals. Each standard must be evaluated when working with hazardous materials, including Permissible Exposure Limits (PEL), Threshold Limit Values (TLVs), Time Weighted Averages (TWA), Short Term Exposure Limits (STEL), and exposure levels considered Immediately Dangerous to Life and Health (IDLH) for airborne concentrations of potentially hazardous materials. For site safety, this Project Manual identifies four primary COC areas for work, as shown in Exhibit 1.

- Non-Impacted
- VOC Impacted
- LNAPL Impacted
- DNAPL Impacted

To reduce the potential for inhalation of elevated COC concentrations, air monitoring will be conducted during investigation activities to document that COC exposure concentrations remain within permissible limits. Additional details on the required air monitoring are presented in Section 8.0 below.

To reduce the potential for dermal contact with and absorption of COCs in soils and groundwater, PPE, such as nitrile gloves and chemical-resistant clothing, will be used by Site personnel during subsurface activities, as needed.

To prevent ingestion of COCs, the following practices will be followed within the work areas.

- No eating, drinking, smoking, use of gum or chewing tobacco, or any other practice in the work areas that has the potential to increase the probability of hand-to-mouth contact with contaminants will be allowed. The SHSO shall designate safe areas outside the work areas where these activities can take place.
- A designated decontamination zone will be located on site, outside the restricted work areas, for the decontamination, removal and disposal of PPE and washing of hands and face upon leaving the work zone. Additional information on decontamination requirements are presented in Section 10.0.
- Potable water will be available for cleaning and drinking.

Additional measures to mitigate chemical hazards are discussed in Section 14.

6.2 PHYSICAL HAZARDS

Possible physical hazards that may be encountered at the Site during the investigation activities include, but are not limited to, the following:

- Stressors to the body related to improper lifting techniques and non-ergonomic movements.
- Repetitive strain from performing repetitive motions.

- Hazards associated with temperature, both heat and cold stress.
- Slips, trips, and falls from physical terrain conditions at the Site or poor housekeeping practices.
- Being struck by moving parts or construction equipment.

The SHSO is responsible for identifying, assessing, and abating physical hazards at the Site; however, all individuals are responsible for maintaining safe working conditions. Potential physical hazard abatements may include, but are not limited to, the following.

- Secure open borings with acceptable safety barriers and barricades to provide worker safety,
- Utilize traffic cones and other barricades in work areas to prevent unauthorized personnel from entering work areas,
- Store all flammables outside of work areas,
- Use non-flame-producing or spark-producing machinery or equipment within exclusion zones,
- Maintain an appropriate number of fire extinguishers on site,
- Implement lockout/tagout procedures for equipment and sources of energy,
- Assess the appropriate PPE level within the work zone based on field conditions.
- While investigative activities are being completed on site, there must always be a minimum of two staff to prevent lone worker scenarios.

Additional measures to mitigate physical hazards are discussed in Section 14.

6.3 BIOLOGICAL HAZARDS

Anticipated biological hazards include, but are not limited to, insects (bees, wasps, ticks, spiders, and mosquitoes) and plants such as poison ivy and poison sumac. On-site personnel with known allergies to insect bites must notify the SHSO at the start of the day about any needed precautions.

Site personnel will be instructed to avoid contact with all domestic and wild animals that have the potential to harm them. They can carry bacteria that can cause severe infections in humans, necessitating rabies and/or tetanus vaccines. In addition, Site personnel are to report unanticipated domestic and wild animal encounters to proper authorities (e.g., site security, local animal control) and are to stop work and contact the SHSO if working conditions are unsafe.

Additional measures to mitigate biological hazards are discussed in Section 14.

7.0 PERSONAL TRAINING AND MEDICAL SURVEILLANCE

All personnel engaged in subsurface investigation activities that involve disturbing subsurface soils, or groundwater must comply with OSHA regulation 29 CFR 1910.120 before arriving on site. All personnel must have completed the initial 40-hour hazardous waste operating (HAZWOPER) training, be current with the required 8-hour yearly refresher training and provide certification documentation.

7.1 SITE ORIENTATION

On-site personnel must read and acknowledge this Project Manual before engaging in subsurface investigation activities that disturb subsurface soils or groundwater. All personnel involved in subsurface investigation activities must attend a site safety briefing that reviews the details of the site-specific health and safety plan and soil and groundwater management plan, which outlines specific safety rules and requirements.

7.2 MEDICAL SURVEILLANCE

All personnel engaged in subsurface investigation activities involving the handling of potentially contaminated materials must comply with OSHA regulation 29 CFR 1910.120 and participate in the medical surveillance program. The three impacted areas where subsurface investigation activities will be conducted on the site require a minimum of Level D PPE. Active air monitoring will be performed during disturbance of subsurface materials and may indicate the need for higher-level PPE, depending on the chemical concentrations encountered. For Level C PPE, all personnel shall also have the additional medical clearances required for the use of respiratory protection.

8.0 AIR MONITORING

Air monitoring will be conducted using multiple photoionization detectors (PIDs) with a 10.6 eV and an 11.05 eV lamp, capable of measuring concentrations in parts per million (ppm) and parts per billion (ppb) in the breathing zone, and a lower explosive limit (LEL) meter will be used at the ground surface of the borehole. Chemical-specific Dräger tubes or equivalent will be available for chemicals with low PELs to evaluate chemical-specific concentrations. The results will be documented in the daily field notes. The summary below presents the PELs for the known COCs in soil and groundwater for each of the four established areas.

Non-Impacted Zone

Action levels for ambient air in the breathing zone and at the ground surface at a borehole for work in this zone are sustained readings of 10 ppm above background for 15 minutes or longer, measured as total VOCs on the PID, and an LEL below 10 percent at the ground surface.

VOC Impacted Zone

Action levels for ambient air in the breathing zone and at the ground surface at a borehole for work in this zone are sustained readings of 1 ppm above background for 5 minutes or longer, measured as total VOCs on the PID, and an LEL value below 10 percent at the ground surface. The 1 ppm for VOCs is based on the PEL for vinyl chloride, a potential COC in the VOC-impacted zone with the most stringent PEL.

Chemical	Permissible Exposure Limit (PPM)	Hazard
Benzene	1	Flammable, Inhalation, Absorption, Contact, Ingestion
Toluene	200	Flammable, Inhalation, Absorption, Contact, Ingestion
Ethylbenzene	100	Flammable, Inhalation, Contact, Ingestion
Total Xylenes	100	Flammable, Inhalation, Absorption, Contact, Ingestion
Tetrachloroethylene	25	Inhalation, Absorption, Contact, Ingestion

Chemical	Permissible Exposure Limit (PPM)	Hazard
Trichloroethylene	10	Inhalation, Absorption, Contact, Ingestion
Vinyl Chloride	1	Flammable, Inhalation, Contact, Ingestion
1,2 dichloroethane	200	Flammable, Inhalation, Contact, Ingestion

LNAPL Impacted Zone

Action levels for ambient air in the breathing zone and at the ground surface at a borehole for work in this zone are sustained readings of 0.2 ppm above background for 5 minutes or longer, measured as total VOCs on the PID, and an LEL value below 10 percent at the ground surface. The 0.2 ppm is based on the PEL for benzo(a)pyrene, a potential COC in the LNAPL-impacted zone with the most stringent PEL.

Chemical	Permissible Exposure Limit (PPM)	Hazard
Benzene	1	Flammable, Inhalation, Absorption, Contact, Ingestion
Toluene	200	Flammable, Inhalation, Absorption, Contact, Ingestion
Ethylbenzene	100	Flammable, Inhalation, Contact, Ingestion
Total Xylenes	100	Flammable, Inhalation, Absorption, Contact, Ingestion
Benzo(a)pyrene	0.2	Inhalation, Absorption, Contact, Ingestion
Naphthalene	15	Flammable, Inhalation, Absorption, Contact, Ingestion

DNAPL Impacted Zone

Action levels for ambient air in the breathing zone and at the ground surface at a borehole for work in this zone are sustained readings of 0.1 ppm above background for 5 minutes or longer, measured as total VOCs on the PID, and an LEL below 10 percent at the ground surface. The 0.1 ppm action level is based on the PEL for PCBs, a potential COC in the DNAPL-impacted zone with the most stringent PEL.

Chemical	Permissible Exposure Limit (PPM)	Hazard
Tetrachloroethylene	25	Inhalation, Absorption, Contact, Ingestion
Trichloroethylene	10	Inhalation, Absorption, Contact, Ingestion
Vinyl Chloride	1	Flammable, Inhalation, Contact, Ingestion
1,2 dichloroethane	200	Flammable, Inhalation, Contact, Ingestion

Attachment C contains Safety Data Sheets for the identified Chemicals of Concern.

If PID action levels are detected above the levels identified above at sustained readings of 5 minutes or longer, work will stop, and site personnel will retreat upwind. After 10 minutes, the breathing zone will be rechecked using a PID. If concentrations have decreased to levels below the action levels, work can proceed, and air monitoring will continue as discussed above. If sustained measurements above the action levels are detected, additional monitoring may be performed using vapor- or particulate-specific air-sampling methods, such as Drager tubes. Testing will be used to evaluate the average recurrence of concentrations in the work zone over a specified period.

If air monitoring indicates that chemical-specific concentrations of the above constituents, on which the action levels are based, in the various zones (i.e., constituents with the most stringent PELs) exceed the PEL, field personnel will don respirators. If air monitoring indicates that chemical-specific concentrations of the above constituents on which the action levels are based are less than the PEL, work can proceed, but the breathing zone will continue to be monitored as follows:

If continuous air monitoring indicates a concentration at or above 90% of the PEL, then continuous monitoring with a PID and chemical-specific testing every 15 minutes should be conducted to ensure compliance with PELs. If PID readings increase, chemical-specific testing should be performed more frequently. If PID readings fall below action levels, chemical-specific testing can be discontinued.

If continuous air monitoring is below 90% of the PEL but still above 75% of the PEL, air monitoring will be conducted using a PID and chemical-specific testing every 30 minutes to ensure PELs are maintained. If PID readings increase, the frequency of chemical-specific testing will be increased. If PID readings drop below the action thresholds, chemical-specific testing can be discontinued.

If continuous air monitoring is below 75% of the PEL, then continuous monitoring with a PID will be conducted. Chemical-specific monitoring will take place if PID readings exceed background levels. The Site-specific Air Monitoring Specifications are presented in the table in Attachment D.

8.1 AIR MONITORING EQUIPMENT CALIBRATION

Air monitoring equipment and instruments must be calibrated in accordance with the manufacturer's instructions and under the conditions for which the equipment is intended. They must be calibrated before and after use. All calibrations of monitoring equipment and instruments, including the standards used, must be documented in the calibration log and recorded in the daily field notes.

9.0 PERSONAL PROTECTIVE EQUIPMENT

The Site has a minimum PPE standard of Level D. If LNAPL or DNAPL is encountered, or if air monitoring detects COCs above the Site-specific Air Monitoring Specifications presented in Attachment D, the required PPE level will be upgraded. If air monitoring detects COCs above the action levels, the standard operating procedure is to stop work, retreat upwind and continue air monitoring until ambient air levels are below acceptable levels. If the concentration decreases to an acceptable level, work can resume at Level D PPE. If ambient air levels remain elevated during the stop-work period and do not decrease to an acceptable level, PPE must be upgraded to Level C.

The level of PPE required within the designated work areas will be determined and evaluated on a day-to-day basis by the SHSO. No worker will be permitted to wear a respirator without proper fit-test documentation and the ability to demonstrate a positive seal test in the field. No worker will be permitted to wear a respirator when facial hair interferes with the respiratory seal. All workers must be qualitatively fit-tested with their personal respirator before they are permitted to wear a respirator to enter the designated work zone.

Level D Required PPE

- Hard Hat,
- Safety Boots,
- Safety Vest,
- Safety Glasses,
- Hearing protection (when necessary),
- Work Gloves (leather for regular work, chemical-resistant when handling potentially contaminated material), and
- Long-sleeved shirt.

Level D Modified Required PPE – If DNAPL or LNAPL is encountered

- Level D, and
- Disposable coveralls.

Level C Required PPE

- Level D,
- Full-face air purifying respirator equipped with either organic vapor, acid gas, and or HEPA cartridges, or a combination of cartridges that correspond to the specific hazards associated with the work zone COCs,
- Chemical-resistant one-piece coverall with hood,
- Chemical-resistant disposal bootie covers, and
- Outer chemical-resistant gloves over nitrile gloves.

The SHSO and the Construction Manager are responsible for providing respirators for on-site personnel. The SHSO will provide guidance on selecting appropriate canisters for the specific work zone to verify that proper cartridges are selected for the COCs in the impacted areas.

10.0 PPE AND FIELD EQUIPMENT DECONTAMINATION PROCEDURES

Before exiting one of the three designated impacted work areas, workers will perform decontamination procedures. The decontamination process is designed to remove potential contaminants from PPE and equipment and prevent their spread to other areas of the Site and beyond. Procedures must be followed so that the COCs are removed from personnel and equipment before leaving the Work Zone and Site. The following procedures must be followed at the Site for proper decontamination.

- All non-disposable tools, air monitoring equipment, and samples will be placed at designated station bins and placed in a designated cleaning area.
- If applicable, disposable tape and protective booties are to be removed first and placed in designated bins clearly identified for used PPE only.
- Outer gloves should be removed second and discarded. Inner gloves must remain on while removing protective suits.
- Non-disposable PPE, such as hard hats, safety glasses, and respirators, will be removed and placed in designated wash areas. Washed equipment will be stored in the designated areas.
- Disposable PPE (Tyvek, gloves, etc.) is to be removed and placed in designated bins clearly identified for used PPE only.
- Protective coveralls are removed and placed in the designated areas.
- Inner gloves are removed and discarded after all other PPE has been removed.
- After PPE is removed, personnel should thoroughly wash their hands, forearms, face, and neck.

Contaminated clothing should be disposed of or cleaned in accordance with decontamination procedures. Personnel must follow the guidelines listed above for decontamination procedures.

10.1 SAMPLING EQUIPMENT

The following procedures are to be used for decontaminating equipment that encounters the sample media.

- Initial wash for gross removal of dirt and soil material.
- Clean with tap water and detergent (Liquinox) using a scrub brush to remove particulate matter and surface films.
- Rinse with tap water.
- Final rinse with deionized water and place on clean, unused plastic sheeting to air dry.

When working in an area known to contain PCB contamination, an additional step is required: a solvent (e.g., hexane) wash and rinse must be performed before the final rinse with deionized water.

10.2 DOWNHOLE EQUIPMENT

Cleaning and decontamination of all downhole equipment should occur at designated areas on site. The decontamination area should meet the specifications listed below.

- A temporary pad should be constructed with impermeable material that is disposable and placed in an area that is free of contamination. The pad should be designed to avoid leaks and constructed on a level surface. Racks should be constructed to hold equipment during cleaning to prevent puncturing the liner.
- Potable water should be used for drilling and cleaning purposes. All downhole equipment should be cleaned with soap and detergent, power-washed, steam-cleaned, or similar.
- Decontamination water should be removed daily and containerized for disposal.

11.0 PLANNED ACTIVITIES

Planned activities that are covered under this Project Manual include the following:

11.1 SITE RECONNAISSANCE AND PREPLANNING

The MND Construction Manager will coordinate and manage the subsurface investigation boring locations, which will be staked a minimum of three (3) business days before the first day of drilling and field-located using a handheld global positioning system unit. The drilling subcontractor will notify the Pennsylvania One Call utility location system (PA811). PA811 will only mark on-site public utilities participating in the program. PA811 will not mark public utilities that do not participate in the program, nor private utilities. The site owner will hire a contracted private utility locator to mark onsite utilities not located by PA811.

11.2 TEST DRILLING

A qualified drilling company will be subcontracted to complete test borings at the Site to characterize the subsurface geotechnical conditions. Test borings will be advanced to 50 feet below the existing ground surface (bgs) and may extend to refusal on bedrock; if necessary, bedrock coring may be required to obtain the required subsurface information. Soil samples will be obtained with a split-spoon sampler in accordance with the Standard Penetration Test (ASTM D1586). During test drilling and sampling, a field scientist will use a PID to obtain soil headspace readings for volatile organic compounds. Field activities will be performed following the PPE, air monitoring, and decontamination procedures discussed in the previous sections.

Upon completion, test borings will be backfilled using cement/bentonite grout or bentonite chips to the surface grade. Investigation-derived waste (IDW), including soil cuttings and other solid waste materials produced during the investigation, will be containerized and covered to prevent rain infiltration and dust migration, and staged on-site for proper testing and disposal by the site owner. Free liquids generated from subsurface investigative activities and water generated from decontamination activities will be containerized in Department of Transportation (DOT) approved containers and staged for proper testing and disposal by the Site owner.

11.3 TEST DRILLING MONITORING

CEC will provide full-time monitoring of the drilling operations. CEC's SHSO will monitor ambient, breathing zone, and drilling-zone air conditions, observe materials encountered, document field conditions, and, as necessary, make real-time modifications to the drilling program based on environmental monitoring results.

11.4 GEOTECHNICAL LABORATORY TESTING

CEC will subcontract with a geotechnical laboratory to test select soil and rock samples obtained from the subsurface geotechnical exploration. CEC anticipates the laboratory testing program may consist of the testing and quantities identified in the table below. The actual type and amount of laboratory testing will be determined based on the results of the subsurface investigation. The subcontracted geotechnical laboratory has an internal health and safety program to protect its staff and will be notified before receiving media samples containing the COCs.

Laboratory Testing Program Quantities	Units	Quantity
Soil Mechanical Sieve Testing (ASTM D6913)	EA	6
Soil Atterberg Limits Testing (ASTM D4318)	EA	6
Moisture Content Test (ASTM D2216)	EA	6
Consolidation (ASTM D2435-B)	EA	1
pH of Soil (ASTM D4972)	EA	2
Soil Sulfate (ASTM D516)	EA	2
Soil Sulfide (AWWA 4500)	EA	2
Soil Chlorides (ASTM D512)	EA	2
Redox Potential (ASTM G200)	EA	2
Soil Resistivity (ASTM G187)	EA	2

11.5 ENVIRONMENTAL LABORATORY TESTING

CEC will subcontract with an environmental laboratory to test select soil and groundwater samples obtained from the subsurface investigation. The actual amount of laboratory testing will be determined based on field observations during the subsurface investigation. Selected soil and groundwater samples will be analyzed for the impact zone-specific COCs identified in each of the three impacted areas, including VOCs, SVOCs, metals, and/or PCBs. The subcontracted

environmental laboratory has an internal health and safety program to protect its staff, and will be notified before receiving media samples, and will be aware of the COC in the media.

11.6 MANAGING INVESTIGATIVE-DERIVED WASTE

Soil cuttings generated during test drilling activities shall be containerized and characterized to identify an appropriate disposal method. Disposal sites in Ohio and Pennsylvania may be used to dispose of generated waste. PCB remediation waste, if encountered, will be disposed of at a facility capable of accepting it. Contaminated media from the Westinghouse Electric Corp (Sharon Plant) Superfund Site must be disposed of at an appropriate off-Site facility in accordance with the Off-Site Rule (OSR) pursuant to Section 121(d)(3) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This section of the statute is interpreted in the OSR, published in the National Contingency Plan (NCP), at 40 CFR 300.440.

Ohio: For disposal facilities in Ohio, the potential disposal facility will be contacted to determine the sampling and analysis required by their Waste Acceptance Plan.

Pennsylvania: For disposal at facilities in Pennsylvania, the PADEP requires that at least one sample be collected and analyzed for every 250 cubic yards of disposed material. Soil sampling will be performed as described below.

For every 250 cubic yards of soil to be exported off-site to a Pennsylvania facility, collect a minimum of four discrete grab samples from containerized soils that will be used to create one composite sample.

Before compositing, field-screen the grab samples to identify the sample most likely to have the highest concentrations of VOCs based on PID readings, odors, and other factors. PCB soil sampling will be biased toward staining or areas with known impacts.

For VOC analysis, select the grab sample most likely to contain the highest VOC concentrations and fill the approved VOC sample containers first, in accordance with SW-846, Method 5035.

For all other laboratory analyses, combine the grab samples into a single composite sample and fill the remaining sample jars with the composite. Perform the analysis on the composite sample in accordance with SW-846.

The composite and grab soil samples will be submitted to a Pennsylvania-accredited laboratory, using industry-accepted chain-of-custody procedures, for analysis of the constituents required by PADEP Form U (Attachment E) to verify that the disposal facility can accept the material for disposal.

Following receipt of the soil analytical data, either the Ohio facility's Waste Acceptance Profile or Pennsylvania's Form U – Request to Process or Dispose of Residual Waste and a Residual/Special Handling Waste Generator Profile will be completed and submitted to the selected disposal facility for approval.

Regardless of the selected disposal state, upon acceptance, the Site owner will arrange transportation to and disposal at the approved disposal facility. Waste manifests will be prepared for each load of material to be exported off-site.

11.7 SCHEDULING AND ADDITIONAL CONSIDERATIONS

The standard turnaround time for laboratory analyses of soil samples is a minimum of 10 business days. Preparation of Pennsylvania's Form U – Request to Process or Dispose of Residual Waste and a Residual/Special Handling Waste Generator Profile can be completed in one day. Upon submittal of these documents, PADEP has up to three weeks to review and approve the material for landfill disposal, though shorter review times are possible. Therefore, proper planning and scheduling of soil characterization and off-site disposal is recommended to minimize the potential for delays to the subsurface investigation schedule. Excavated materials that require removal from the Site within a shorter timeframe, based on other considerations, may be approved for disposal at an out-of-state landfill in a shorter period. In this event, the out-of-state landfill will be contacted to determine the specific sampling and analysis requirements.

12.0 SOIL AND GROUNDWATER MANAGEMENT PLAN

The following sections outline procedures for properly handling disturbed soil and groundwater at the Site.

12.1 PRELIMINARY EVALUATION AND SOIL AND GROUNDWATER SCREENING

The potential for soil and groundwater contamination has been assessed by reviewing existing drawings and soil data to evaluate the presence of known or suspected contamination (e.g., GP01-042 area, former drum storage area, former drum crusher area, waste storage areas, and/or areas requiring engineering controls (See Section 12.2). Historical groundwater levels and soil and groundwater investigative data have been reviewed in relation to the anticipated test-boring depths and areas to identify locations where contaminated media may be encountered. Based on these evaluations, it is anticipated that impacted soils and groundwater will be encountered; therefore, measures to manage and contain impacted soils and groundwater will be in place (e.g., use of roll-offs with watertight gaskets, 55-gallon DOT drums suitable for the waste characteristics, constructed secondary containment pads with berms to contain free liquids). It is anticipated that investigative test borings may encounter both DNAPL- and LNAPL-impacted areas.

During subsurface disturbance activities, materials will be screened using a PID or similar to detect contamination. A representative with experience in assessing environmental conditions must be on-site to conduct soil screening whenever subsurface intrusive activities are conducted.

The preliminary evaluation and soil screening process shall be implemented to identify, segregate, and properly manage uncontaminated soils and soils impacted by Site COCs.

12.2 SOIL SUBJECT TO ENGINEERING CONTROLS

Soil near boring GP01-042, shown in Exhibit C-2 (Attachment B), are subject to specific AULs/engineering controls as described in Section 5 of the EC. Specifically, the EC states the following:

- Each part or portion of any building, structure, or paved surface in the vicinity of the Waste Storage Area (GP01-042) that serves to eliminate pathways of exposure to potential contamination, as shown on Exhibit C-2 in Attachment B, shall be maintained to prevent complete pathways of exposure to soil and/or groundwater contamination, and
- There shall be no demolition, removal, replacement, or reconstruction of, or other modification to, any part or portion of any building, structure, or paved surface in the vicinity of GP01-042 that serves to eliminate pathways of exposure to potential contamination, as shown on Exhibit C-2 in Attachment B, unless PADEP is notified in writing.

Proposed test borings will be advanced in the designated limits of disturbance (LOD) areas where additional subsurface investigation is needed. The subsurface investigation LOD areas are shown in Figure 1. Figure 2 identifies the proposed test boring locations within the LODs. The area around boring GP01-042, which lies outside the defined LODs and includes parts of historical buildings, structures, or paved surfaces, is excluded to prevent exposure to underlying soils, as shown in Attachment B, Exhibit C-2. Currently, there are no plans to disturb or redevelop this part of the site that is outside the defined LOD areas. Therefore, no additional measures are necessary at this time to maintain existing engineering controls, aside from routine inspections and repairs as needed.

12.3 MATERIAL SEGREGATION, STAGING, AND MANAGEMENT

If encountered, material classified as unsuitable based on the criteria listed in Section 12.4 shall be segregated, staged, and evaluated separately from other materials to be exported off-site. Soils not deemed to be unsuitable, but those that are excavated from areas with known or suspected contamination, shall also be segregated and assessed to determine how they should be managed

for off-site disposal. Unsuitable material and soils with known/suspected contamination shall be stored in covered roll-off boxes. Soils with no history or evidence of contamination can be stored in piles with appropriate erosion and sedimentation (E&S) controls.

Soils of good quality, containing no evidence of contamination, and excavated from portions of the Site where historical releases of regulated substances are not known or suspected to have occurred, may be placed, graded, or used onsite as needed. Non-hazardous materials that meet clean or unrestricted use requirements may be reused on-site, provided they are covered by uncontaminated soil or infrastructure (e.g., buildings, paved areas) to prevent direct contact with contaminated materials and mitigate vapor intrusion concerns.

12.4 IDENTIFICATION OF UNSUITABLE MATERIALS

Soil and other excavated materials will be permitted to be reused onsite or remain in place to the extent practicable, unless they are characteristically hazardous, reuse is likely to interfere with the implementation of Site development, or soils in excess of what can be reused onsite are generated during excavation. Materials that are likely to interfere with project implementation, and are therefore considered to be “unsuitable,” include:

- Sludge.
- Flowable product.
- Soils saturated with separate phase liquids (e.g., tar, oil, fuel, grease).
- Soils containing flowable product and/or separate phase liquids.
- Soils with obvious staining, chemical or petroleum odors.
- Soils with elevated levels of organic vapors.
- Geotechnically unsuitable materials; and
- Non-hazardous construction and demolition (C&D) debris (e.g., rebar, railroad ties, wood, steel structural members).

Based on existing data, unsuitable soils with high levels of contamination may be present on-site. If potentially unsuitable materials, as described above, are discovered, an MND representative will

be notified, and the unsuitable materials will be segregated and managed separately from suitable materials intended for on-site reuse.

12.5 DUST SUPPRESSION

Dust generation during subsurface investigations will be controlled using water spray or other appropriate techniques. When temperatures fall below freezing, alternative methods, such as synthetic fluids, should be considered to mitigate safety concerns associated with ice formation in the immediate work zone.

13.0 FIRST AID AND MEDICAL

Emergency information, including the address and direction of the nearest hospital, is included in Section 14 of this Project Manual. The site is located within the 911 emergency district. All on-site personnel can direct emergency personnel to the site. Emergency contacts are included in Section 14.

A dedicated site first-aid kit will be maintained by the SHSO to provide prompt medical attention for first-aid injuries and to comply with 29 CFR 1910.151(c) Medical Services and First Aid. The first aid kit will be equipped to handle minor cuts and lacerations. In addition, MND will have personnel certified in first aid, CPR, and AED to assist with medical emergencies until trained EMTs arrive. Potential emergencies most associated with this scope of work include equipment-related incidents, exposure to inclement weather, and unstable terrain.

All injuries, regardless of severity, will be documented and reported within 24 hours. If the injury is minor and does not require off-site treatment, and minor first aid can be administered on-site, the SHSO, with assistance from telehealth care services, will determine the next steps for the individual who received minor first aid on a case-by-case basis.

14.0 SITE-SPECIFIC HEALTH AND SAFETY PLAN

The Site-specific Health and Safety Plan is provided on the following pages.



**CIVIL & ENVIRONMENTAL
CONSULTANTS, INC.**

SITE-SPECIFIC HEALTH AND SAFETY PLAN

This document is the property of Civil & Environmental Consultants, Inc. and is considered Business Confidential. The contents of this document are for the use of Civil & Environmental Consultants, Inc. employees only and shall not be divulged or used by any other person or entity without explicit written consent of Civil & Environmental Consultants, Inc.

This plan has been prepared for:

Project No: Project 353-024

Date Prepared: March 2026

Name: Sharon Data Center

Client: Mercer Node Development, LLC

PREFACE

The Site-specific Health and Safety Plan provides general physical hazard assessments for tasks commonly performed by CEC employees and our subcontractors. Tasks involving activities with the reasonably anticipated potential for exposure to hazardous materials or hazardous wastes, whether known or suspected, additionally must comply with WSM400.4 Environmental Health & Safety Program. The Site-specific Health and Safety Plan incorporates the requirements of the CEC Environmental Health & Safety Program through the requirements contained in General Safe Operating Practice WSM 100.1 Field Operations.

WSM Summary Page

WSM #	WSM Name
WSM100.4	Domestic and Wild Animals
WSM100.9	Geographic Hazards
WSM100.10	Hazardous Materials
WSM100.11	Hostile and Irrate Person Encounters
WSM100.12	Hot Weather Safety
WSM100.14	Inclement Weather Conditions
WSM100.17	Personal Protective Equipment For Field Operations
WSM100.18	Tick Safety
WSM100.19	Sun Exposure
WSM100.20	Safer Driving
WSM100.21	Wet Weather Safety
WSM100.22	Use of Mobile Electronics While Driving
WSM100.34	Stop Work Authority and Process
WSM100.44	Insect Stings and Bites
WSM100.45	Poisonous Plants
WSM100.46	Venomous Snakes
WSM200.2	Construction Sites
WSM200.5	Geologic Field Mapping
WSM200.14	Waste Materials Handling and Storage
WSM200.17	Earth Moving Activities
WSM200.19	Hand Removal of Vegetation
WSM200.21	Observing Drilling Operations
WSM200.22	Solid Waste Landfill Operations
WSM200.25	Plan for the Day
WSM200.31	Hoisting Equipment
WSM200.36	Working Near Overhead High-Voltage Lines
WSM200.38	Rail Line Safety
WSM200.41	Construction Site Testing Safety
WSM300.3	Field Vehicles
WSM300.6	Hand Tools (Power and Manual)
WSM300.7	Posthole Diggers Gas Powered Augers
WSM400.1	Hazard Communication Program
WSM400.7	Noise Exposure and Hearing Conservation Program

Project Hazard Assessment Form and Safety Plan

Client: <u>Backbone Sharon LLC</u>	Project No: <u>353-024 Project</u>
Location: <u>201 Clark Street, Sharon PA</u>	Start Date: <u>3/18/2026</u>

- This Project Hazard Assessment (PHA) is required for all projects with field operations.
- The Project Safety Plan (PSP) is to include the safe operating procedures prepared to assist in mitigating the identified project hazards
- This completed form must be filed in the Project Management/Safety folder.

1. Scope of Service:

The proposed subsurface disturbance activities at the Site include the following:

- Installation of subsurface test borings.
- Sampling and analysis of soil and groundwater that are potentially impacted by site contaminants.
- Backfilling of test borings with cement/bentonite grout.
- Managing, characterizing, and disposing of Investigate-Derived Waste (IDW).

This PSP was prepared for the use of CEC personnel while performing the following tasks:

1. **Air Monitoring.**
2. **Disturbance of subsurface soils.**
3. **Installation of subsurface test borings.**
4. **Sampling and analysis of soil and groundwater that are potentially impacted by site contaminants**
5. **Backfilling of test borings with cement/bentonite grout.**
6. **Managing, characterizing, and disposing of Investigate-Derived Waste (IDW).**

All work plans/scopes referenced in this PSP will be available for CEC personnel on site. The CEC field staff may also call the Project Manager.

It is the purpose of this PSP to proactively aid CEC employees in:

- Identifying and understanding the risks/hazards they are likely to encounter at the site.
- Mitigating those risks/hazards.

2. General

Does a Prime Contractor (Constructor) or Client Safety Program apply? ☐ Yes ☒ No

If yes, all project team members working in the field are required to receive client safety training. Append copy of client documentation to this form.

3. Approvals

Prepared by: <u>Jeff Summers</u>		<u>03/18/2026</u>
Print Name	Signature	Date
Approved by: <u>Robert Eaton</u>		<u>03/26/2026</u>
Print Name	Signature	Date

4. Hazard Identification, Evaluation, and Control

Hazard (or Potential Hazard) Description:	HAZARD PRESENT/ EXPECTED?	Appropriate Control Measure(s):	PPE/Safety Equipment Beyond CEC Standard Required:
ENVIRONMENTAL HAZARDS			Section N/A? ☐
Noise	☒ Yes ☐ No	WSM400.7 Noise Exposure and Hearing Conservation	Foam ear plugs with a min. 29 NRR
Animal/Vegetation Environmental Encounters	☒ Yes ☐ No	WSM100.4 Domestic and Wild Animal Safety WSM100.18 Tick Safety WSM100.44 Insect Stings and Bites WSM100.45 Poisonous Plants WSM100.46 Venomous Snakes WSM200.19 Hand Removal of Vegetation	Gloves: Leather/Canvas/ Nitrile as appropriate Tick Test Kit/Tick Key Tick Repellent/Duct Tape/ Technu
Uneven ground, foot-level debris, potential injury to foot, walking obstructions, level, or tripping hazards	☒ Yes ☐ No	WSM100.9 Geographic Hazards	Proper ANSI footwear to be worn at all times: Steel toed boots with steel shank or hiking boot as appropriate
Over-head construction / operation/ Head-level obstructions	☒ Yes ☐ No	WSM200.31 Hoisting Equipment WSM200.36 Working Near Overhead High-Voltage Lines	ANSI approved Type I, Class E Hard Hat
Working in Open Excavations	☐ Yes ☒ No		Appropriate fall protection/prevention system.
High voltages / live overhead power lines or equipment	☒ Yes ☐ No	WSM200.36 Working Near Overhead High-Voltage Lines	ANSI approved Type I, Class E Hard Hat Non-conductive ladder
Work in boats or by/on a body of water (excludes walking along streams with no hazard of falling in)	☐ Yes ☒ No		Personal Flotation Device
Extreme Weather Temperatures / Conditions: • Heat • Cold • Inclement weather conditions • Sun	☒ Yes ☐ No	WSM100.12 Hot Weather Safety WSM100.14 Inclement Weather Safety WSM100.19 Sun Exposure WSM100.21 Wet Weather Safety	Appropriate clothing.
Working Alone	☐ Yes ☒ No		Appropriate for project hazards SPOT Satellite GPS or Cell Phone/Booster as appropriate
Work on Construction Sites (excludes work/ walking around the perimeter of Construction Sites	☒ Yes ☐ No	WSM200.2 Construction Sites WSM200.41 Construction Site Testing Safety	Appropriate for project hazards

Hazard (or Potential Hazard) Description:	HAZARD PRESENT/ EXPECTED?	Appropriate Control Measure(s):	PPE/Safety Equipment Beyond CEC Standard Required:
Work in Confined Spaces	☐ Yes ☒ No		To be Identified during Confined Space assessment.
Working in Man-Holes, Vaults, Sewers, Etc.	☐ Yes ☒ No		Gloves: Leather/Canvas/Nitrile as appropriate Footwear: Steel toed boots with steel shank
PEOPLE HAZARDS			Section N/A? ☐
Hostile or Irrate People	☒ Yes ☐ No	WSM100.11 Hostile & Irrate People Safety Practices	N/A
Working near or around construction traffic	☒ Yes ☐ No	WSM200.17 Earth Moving Activities	Traffic Safety Vest Safety Lights if appropriate
Working near or around Traffic	☐ Yes ☒ No		Class 2 or 3 High Visibility Traffic Safety Vests as appropriate. Control signage and devices as required. Safety Lights if appropriate
EQUIPMENT HAZARDS			Section N/A? ☐
Work / inspection on raised platforms / sky jacks	☐ Yes ☒ No		Fall Arrest Harness, Fall Protection System.
Ladders or climbing	☐ Yes ☒ No		Fall Arrest System
Operation of Construction Equipment	☒ Yes ☐ No	WSM200.17 Earth Moving Activities	Appropriate for project hazards
Electrical Equipment	☐ Yes ☒ No		Gloves: Electrical protective Hard Hat: Class E Clothing: Arc Flash Clothing
Vehicle Operation	☒ Yes ☐ No	WSM100.20 Safer Driving WSM100.22 Use of Mobile Electronics While Driving WSM300.3 Field Vehicles	Seat Belt Helmet as required Gloves, glasses, and training as required by WSM300.12
Hand and Portable Power Tools	☒ Yes ☐ No	WSM300.6 Hand Tools (Power and Manual) WSM300.7 Posthole Diggers Gas Powered Augers	Gloves: Leather/Canvas/ Nitrile as appropriate and/or recommended by tool manufacturer.
Cutting Tools	☐ Yes ☒ No		Gloves: Cut Resistant.
Drilling Equipment	☒ Yes ☐ No	WSM200.21 Observing Drilling Operations	Appropriate for project hazards
Nuclear Densometer Usage	☐ Yes ☒ No	WSM200.41 Construction Site Testing Safety	
Unusual circumstances / active processes: welding, cutting, etc.	☐ Yes ☒ No		Appropriate for project hazards
Unmanned Aerial System	☐ Yes ☒ No		Appropriate for project hazards
CHEMICAL HAZARDS			Section N/A? ☐
(Attach copy of appropriate Safety Data Sheets to this document if applicable)			

Hazard (or Potential Hazard) Description:	HAZARD PRESENT/ EXPECTED?	Appropriate Control Measure(s):	PPE/Safety Equipment Beyond CEC Standard Required:
Benzene	☒ Yes ☐ No	WSM100.10 Hazardous Materials WSM400.1 Hazard Communication Program	Gloves: Nitrile Respirator: Full face with Organic Vapor Cartridges*, Clothing: Chemical-resistant coveralls Boots: Chemically-resistant boots Eyes: Goggles and faceshield (if respirator is not required) * Dependent on concentration
Hydrogen Sulfide (H ₂ S)	☐ Yes ☒ No	WSM100.10 Hazardous Materials WSM400.1 Hazard Communication Program	Gloves: Butyl rubber, chlorinated polyethylene, neoprene nitrile, or polyvinyl rubber Respirator: Up to 100 ppm: Powered air purifying respirator with acid gas cartridges; or gas mask with acid gas cartridges. >100 ppm: SCBA Clothing: Chemical-resistant coveralls Boots: Chemically-resistant Personal or area monitor (as appropriate) set to alarm at 10ppm. (Include monitoring equipment in Section 7)
Lead	☐ Yes ☒ No	WSM100.10 Hazardous Materials WSM400.1 Hazard Communication Program	Gloves: Nitrile Respirator: Air purifying respirator or powered air purifying respirator with high efficiency particulate filter * Clothing: Washable or disposable coveralls Boots: Rubber boot covers * Dependent on concentration
Radiation	☐ Yes ☒ No		Gloves: Nitrile Respirator: Air purifying respirator or powered air purifying respirator with high efficiency particulate filter * Clothing: Washable or disposable coveralls Boots: Rubber boot covers * Dependent on concentration
Compressed Gasses	☒ Yes ☐ No		Appropriate for Specific Chemical. Refer to SDS.
Waste Materials	☒ Yes ☐ No	WSM200.14 Waste Materials Handling & Storage WSM200.22 Solid Waste Landfill Operations	Appropriate for Specific Chemical. Refer to SDS.
Airborne dust / debris	☒ Yes ☐ No	WSM400.1 Hazard Communication Program WSM100.10 Hazardous Materials	Half or full face respirator with particulate filters

Hazard (or Potential Hazard) Description:	HAZARD PRESENT/ EXPECTED?	Appropriate Control Measure(s):	PPE/Safety Equipment Beyond CEC Standard Required:
Explosion hazards (ex: combustible / explosive gases / dusts / stored substances)	☐ Yes ☒ No	WSM400.1 Hazard Communication Program WSM100.10 Hazardous Materials WSM400.1 Hazard Communication Program	Appropriate for other project hazards
Other chemical Hazard – Specify:	☒ Yes ☐ No	WSM100.10 Hazardous Materials WSM400.1 Hazard Communication Program	Appropriate for Specific Chemical. Refer to SDS, see below
Other chemical Hazard – Specify:	☐ Yes ☒ No	WSM100.10 Hazardous Materials WSM400.1 Hazard Communication Program	
Asbestos	☐ Yes ☒ No		Gloves: Nitrile Respirator: Air purifying respirator or powered air purifying respirator with high efficiency particulate filter Clothing: Washable or disposable coveralls Boots: Rubber boot covers
Pesticides and Herbicides	☐ Yes ☒ No		Clothing: Long sleeve shirt, pants, and socks. Spray drift suit (when boom spraying and exposure is likely) Gloves: Appropriate chemical resistant gloves Boots: Rubber boot covers Respirator (when required by the pesticide/herbicide SDS)
OTHER HAZARDS			Section N/A? ☐
Geologic Field Hazards	☒ Yes ☐ No	WSM200.5 Geologic Field Mapping	Appropriate for project hazards
Lifting	☐ Yes ☒ No		Appropriate for project hazards
Survey Work	☐ Yes ☒ No		Appropriate for project hazards
Working Near Rail Lines	☒ Yes ☐ No	WSM200.38 Rail Line Safety	Appropriate for project hazards

5. List of Project Specific Hazards and Required Controls

☐ NA

To be completed as required by the Project Manager and field staff to address additional hazards not listed in the above Table. Complete JHA form in accordance with WSM100.23.

Hazard (or Potential Hazard) Description	HAZARD PRESENT/ EXPECTED?	Appropriate Control Measure(s)	PPE Required
petroleum hydrocarbons	☒ Yes ☐ No	Air Monitoring and PPE	Level D
chlorinated solvents	☒ Yes ☐ No	Air Monitoring and PPE	Level D

Hazard (or Potential Hazard) Description	HAZARD PRESENT/ EXPECTED?	Appropriate Control Measure(s)	PPE Required
volatile organic compounds (VOCs)	☒ Yes ☐ No	Air Monitoring, testing, PPE	Level D
semi-volatile organic compounds (SVOCs)	☒ Yes ☐ No	Air Monitoring, testing, PPE	Level D
dioxins	☒ Yes ☐ No	PPE	Level D
metals	☒ Yes ☐ No	PPE	Level D
sulfate	☒ Yes ☐ No	PPE	Level D
nitrate	☒ Yes ☐ No	PPE	Level D
low pH	☒ Yes ☐ No	PPE	Level D
Polychlorinated Biphenyls (PCBs)	☒ Yes ☐ No	PPE	Level D

6. Personal Protective Equipment

Based on the above tables identify the required Personal Protective Equipment Below

PPE	Type	PPE	TYPE
☒ Hard Hat	☒ Standard ☐ ANSI Class E	☒ Hearing Protection	NRR Rating: N/A
☒ Work Boots	☒ Steel Toe ☐ Metatarsal Guard ☐ Hiking	☒ Respiratory Protection	☐ Half-Face ☒ Full-Face Cartridge: organic vapor, acid gas, and or HEPA cartridges, or a combination of cartridges that correspond to the specific hazards associated with the impact zone COCs
☒ Eye/Face Protection	☒ Safety Glasses ☐ Goggles ☐ Face Shield	☒ Clothing/Apparel	☐ Flame Retardant ☒ Chemical Tyvek
☒ High Visibility Vest	☒ Class 1: near traffic traveling < 25 mph, and other times when visibility is required ☐ Class 2: On/near roads, 25-50 mph ☐ Class 3: High Risk/roads, 50+ mph	☐ Fall Protection	Type:
☒ Gloves	Type: Task appropriate.	☐ Other:	Type:

7. Air Monitoring Specifications ☐ NA

Refer to Attachment E - Air Monitoring Specifications for PEL/TLV/Action Levels

<u>Instrument ID</u>	<u>Contaminant</u>	<u>Results (units)</u>	<u>PEL/TLV/ Action Level</u>	<u>Time</u>	<u>Calibration Date</u>

8. Does the project require site control/decontamination? If so, describe below.

Before exiting one of the three designated impacted work areas, workers will perform decontamination procedures. The decontamination process is designed to remove possible contaminants encountered in the work area and prevent their spread into other areas of the site and beyond. Procedures must be followed so that the COCs are removed from personnel and equipment before leaving the Work Zone and Site. The following procedures must be followed at the site for proper decontamination.

- All non-disposable tools, air monitoring equipment, and samples will be placed at designated station bins and placed in a designated cleaning area.
- Disposable tape and protective booties are to be removed first and placed in designated bins clearly identified for used PPE only.
- Outer gloves should be removed second and discarded. Inner gloves must remain on while removing protective suits.
- Non-disposable PPE, such as hard hats, safety glasses, and respirators, will be removed and placed in designated wash areas. Washed equipment will be stored in the designated areas.
- Disposable PPE (Tyvek) is to be removed and placed in designated bins clearly identified for used PPE only
- Protective coveralls are removed and placed in the designated areas
- Inner gloves are removed and discarded after all other PPE has been removed
- After PPE is removed, personnel should proceed to the sanitation station and thoroughly wash hands, forearms, face, and neck, followed by the use of antibacterial cleanser.

Contaminated clothing should be disposed of or cleaned in accordance with decontamination procedures. Personnel must follow the guidelines listed above for decontamination procedures.

8.1 SAMPLING EQUIPMENT

The following procedures are to be used for decontaminating equipment that comes into contact with the sample media.

- Initial wash for gross removal of dirt and soil material.
- Clean with tap water and detergent (Liquinox) using a scrub brush to remove particulate matter and surface films.
- Rinse with tap water.
- Final rinse with deionized water and place on clean, unused plastic sheeting to air dry.

When working in an area known to contain PCB contamination, an additional step is required: a solvent (e.g., hexane) wash and rinse must be performed before the final rinse with deionized water.

8.2 DOWNHOLE EQUIPMENT

Cleaning and decontamination of all downhole equipment should occur at designated areas on site. The decontamination area should meet the specifications listed below.

- A temporary pad should be constructed with an impermeable material that is disposable and in an area that is free of subsurface contamination. Designed to avoid leaks and constructed on a level paved surface. Racks should be constructed to hold equipment during cleaning to prevent puncturing the liner.
- Potable water should be brought to the site for drilling and cleaning purposes in a precleaned tank. All downhole equipment should be cleaned with detergent, steam-cleaned, and finally rinsed with

deionized water.

- Decontamination water should be removed daily and containerized for disposal.

9. Emergency Information

Emergency Numbers

- Note: 911 is not always the appropriate number – please verify. May need to include a site specific emergency contact number identified by the client.
- For all symptoms of work-related injury/illness, contact WorkCare: 888-449-7787
- The hospital closest to the project location can be found at the address below. Employee GPS and Mapping applications will be used to provide the quickest driving directions in the event of an employee injury, and when emergency services are unavailable or inappropriate.

Site Emergency No.	NA	Fire Department	911
Ambulance	911	Police	911
Hospital	Sharon Regional Medical Center 740 E State St, Sharon, PA 16146 (724) 983-3911	Environment Dept.	PADEP - Northwest Region (814) 332-6945
Poison Control	800-222-1222	INFOTrac	800-535-5053
One Call	(888) 449-7787	Private Utility Locator	NA

It is the responsibility of the Project Manager to prepare and communicate the requirements of the PSP to all field staff. Include client-required protocols, where required, as an attachment to this plan.

Project Personnel Numbers:

Title	Name	Company	Phone Number
Project Manager	Jeff Summers	Civil & Environmental Consultants	(559) 917-9345
Project Site Safety	Jeff Summers	Civil & Environmental Consultants	(559) 917-9345
Client or Owner	Craig Hibbard	Mercer Node Development, LLC	(720) 277-1022
Other:			

First Aid facilities are located:	CEC Truck
First Aiders on site are:	CEC Trained
Fire extinguishers are located:	CEC Truck
Emergency/Fire alarms are located:	CEC Truck
Safety Data Sheets are located:	CEC Truck

Spill response equipment is:

CEC Truck

The nearest phone is:

Cell Only

Record Site-Specific Information Below (Evacuation Signal, Muster Points, Etc.)

Environmental Incidents

For incidents involving spills, releases or other negative impacts to air, water, land, animals etc.:

- (1) If possible, and safe to do so, stop the spill or release and prevent further damage.
- (2) Take notes and photographs if possible. An investigation may be required.
- (3) Complete and submit an Accident Incident Report (AIR) immediately using the OTHER category.

Other Incidents

For incidents involving serious injury, a fatality, or major property damage:

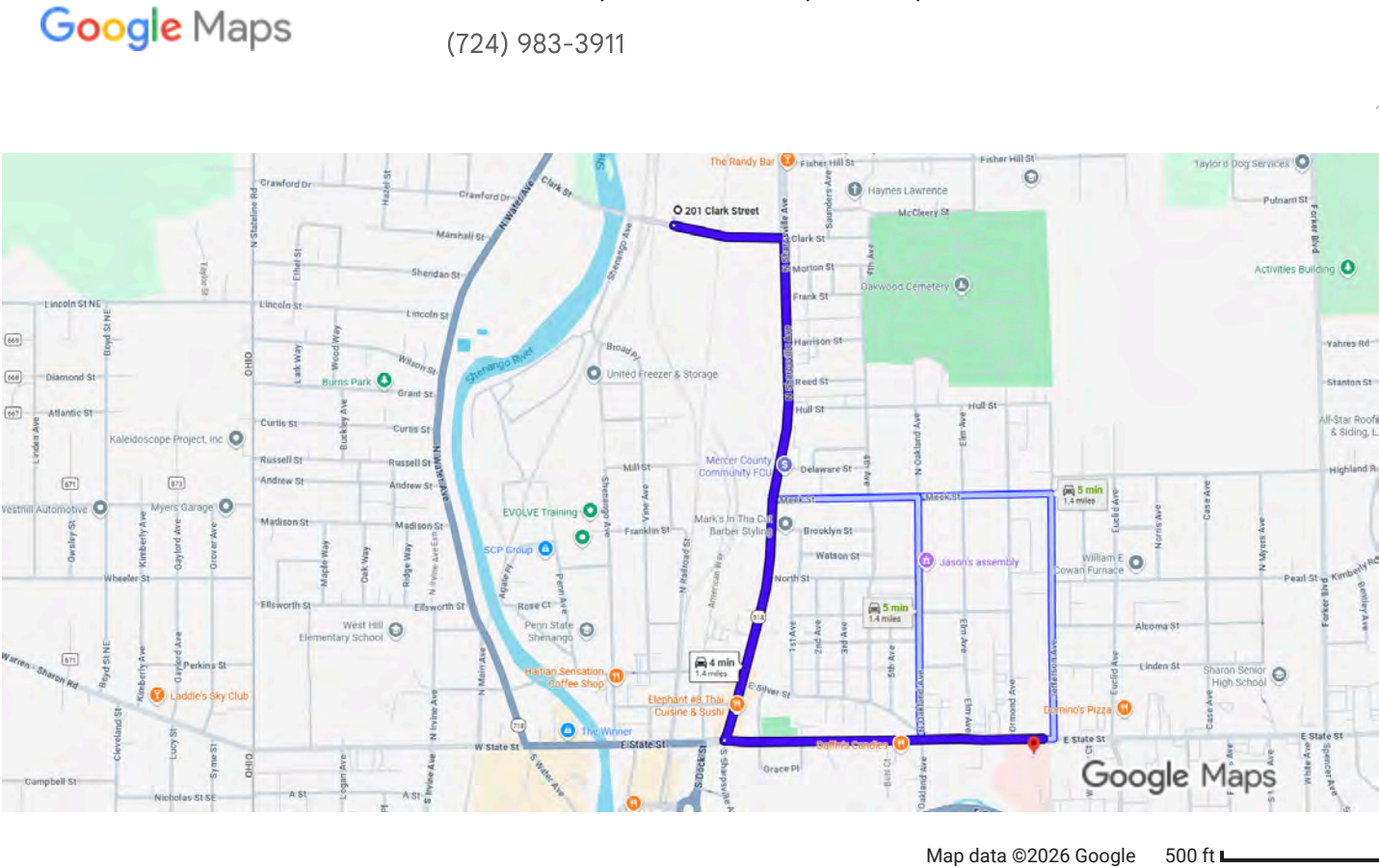
- (1) Notify local Office Leader and Corporate Safety Director immediately. Discuss with proper authorities only.
- (2) Don't disturb the scene except to tend to the injured and prevent further damage.
- (3) Take notes and photographs if possible. An Incident Report is to be prepared and submitted immediately.

**** DO NOT CALL REGULATORY AUTHORITIES DIRECTLY****

201 Clark St, Sharon, PA 16146 to Sharon Reg'l Medical Ctr, 740 E State St, Sharon, PA 16146

Drive 1.4 miles, 4 min

(724) 983-3911



201 Clark St
Sharon, PA 16146

- ↑

1. Head toward N Sharpshville Ave

0.2 mi
- ↘

2. Turn right at the 1st cross street onto N Sharpshville Ave

0.8 mi
- ↶

3. Turn left onto E State St

📍

 Destination will be on the right

0.5 mi

Sharon Reg'l Medical Ctr
740 E State St, Sharon, PA 16146

10. Have The CEC Workers Involved In The Project Been Advised What To Do In The Following Situations:

	Yes	N/A
Discovery of contaminants or contaminated materials?	☒	☐
Contact with hazardous materials or wastes?	☒	☐
Releases to the environment (air, land or water)?	☒	☐
Responding to requests for on-site advice regarding environmental matters?	☒	☐

11. Are There Any Special Environmental, Health Or Safety Concerns Or Equipment Required?

☒ Yes ☐ No

If Yes, note concerns or equipment here:

All personnel must have completed the initial 40-hour hazardous waste operating (HAZWOPER) training, be current with the required 8-hour yearly refresher training, and provide certification documentation. All personnel engaged in subsurface investigation activities that involve handling potentially contaminated materials must comply with OSHA regulation 29 CFR 1910.120 and participate in the medical surveillance program.

12. Do Workers Require Any Medical Monitoring/Surveillance?

If Yes, note the protocols that are required and date completed below.

☒ Yes ☐ No

<u>Protocol</u>	<u>Date Completed</u>
Asbestos	☒ NA
Respirator	NA
HAZMAT	NA
Heavy Metals	NA
Pesticides	☒ NA

13. Do Workers Require Any Special Training?

If Yes, note the training that is required and date completed below.

☒ Yes ☐ No

<u>Name</u>	<u>Training</u>	<u>Date Completed</u>
HAZWOPER		
Medical surveillance program		
Fit-Tested		

14. Do Workers Require A Site Orientation?

If Yes, provide the names of the employees and date the orientation was completed.

☒ Yes ☐ No

If Client, Prime Contractor Or Constructor Provides Orientation And/Or Training, Attach A Copy Of The Training Record To The Project File.

15. Employee Review

All employees required to perform work on this project shall review this Project Hazard Assessment and sign below acknowledging that they have been advised of the hazards and the controls and PPE required.

Field conditions affecting hazards may differ from those summarized in this Project Hazard Assessment and must be re-evaluated and any new hazards identified, mitigated, and documented on a daily basis using the Plan for the Day form.

Employees in the field who identify additional hazards not listed above shall notify the project manager of the hazard and confirm the controls that will be used prior to proceeding.

All CEC employees have the authority and obligation to stop and correct perceived unsafe acts, behaviors and conditions related to the direct project activities and services provided by CEC employees and our subcontractors.

Reviewed by:

Print Name

Signature

Date

Print Name

Signature

Date

Print Name

Signature

Date

Print Name

Signature

Date

Print Name

Signature

Date

PLAN FOR THE DAY SAFETY DISCUSSION



Civil & Environmental
Consultants, Inc.

Date: _____ Location(s): _____

Project Name(s): _____

Project No(s): _____

CEC Work Type: ☐ Observation ☐ General Field Work ☐ Surveying ☐ Design-Build

Plan for the Day Participants: _____

1. WHAT ARE THE SITE CONDITIONS LIKE TODAY?

2. WHAT IS THE WEATHER EXPECTED TO BE LIKE TODAY?

3. WHAT IS BELOW MY FEET AND ABOVE MY HEAD TODAY?

4. WHAT EQUIPMENT OR TOOLS AM I USING TODAY?

5. WHAT PPE DO I NEED TODAY?

**Minimum PPE required for all field activities is safety glasses, long pants, and hazard appropriate footwear*

☐ Safety Glasses ☐ Hard Hat ☐ Hi-Vis Vest ☐ Steel-toed boots ☐ Hiking Boots ☐ FR Clothing

☐ Long Sleeves ☐ Leather Gloves ☐ Rubber Gloves ☐ Goggles ☐ Face Shield ☐ Fall Harness ☐ Respirator

Additional PPE: _____

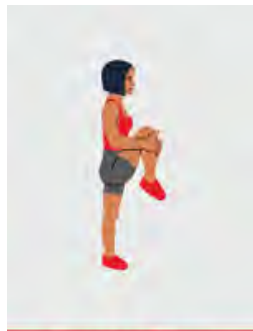
Are there any new or unexpected hazards not identified in the Project Safety Plan? ☐ Yes (list below) ☐ No

Are there any subcontractor activities that may impact work? ☐ Yes (list below) ☐ No

☐ Pre-Work Stretch & Flex Completed (see reverse side)



Toe Touch



Knee to Chest



Arm Circles



Shoulder Stretch



Quadriceps Stretch

HOW WAS YOUR DAY?

1. Did any injuries/incidents occur?

☐ Yes (list below)

☐ No

2. Did any near misses occur?

☐ Yes (list below)

☐ No

3. Did you implement a stop work action?

☐ Yes (list below)

☐ No

4. Are there any lessons learned/good catches to share?

☐ Yes (list below)

☐ No

5. Are there any changes to work procedures needed?

☐ Yes (list below)

☐ No

Questions 1 through 4: If any “yes” boxes are checked, CEC’s Incident Reporting Procedures shall be followed to make certain the appropriate notification requirements are being met.

Question 5: Project Manager must be notified immediately.

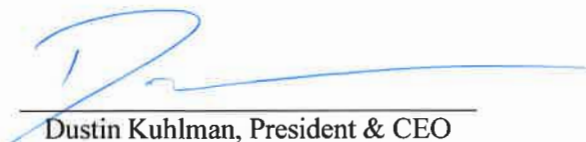


CIVIL & ENVIRONMENTAL CONSULTANTS, INC.

Safety Philosophy

Civil & Environmental Consultants, Inc. (CEC) is committed to conducting its business in a manner that sustains and protects the safety and health of its employees. CEC strives for continuous improvement in the effectiveness of its safety and health programs. We affirm that:

- Working safely is a key corporate value and a condition of employment.
- All workplace hazards can be safeguarded against by using proactive measures and actions.
- Occupational safety and health are part of every employee's total job performance.
- Each CEC employee is responsible and is held accountable for establishing safe workplace conditions to prevent injuries and occupational illnesses.
- Training employees to work safely is essential and is the responsibility of CEC Managers and Supervisors.
- Creating and maintaining a safe workplace, combined with the prevention of personal injuries and accidents, is good business.
- An effective Safety Program is part of CEC's vision and mission.



Dustin Kuhlman, President & CEO
Civil & Environmental Consultants, Inc.

CEC Workplace Safety Program

INTRODUCTION TO WORKPLACE SAFETY PROGRAM AND SAFE OPERATING PRACTICES

These Safe Operating Practices have been peer reviewed by CEC employees and are provided to assist managers, supervisors and employees in carrying out work activities and operations in a safe manner. They are “living documents” and will be revised to reflect continuous improvement in safe work practices. Potential hazards have been identified for typical activities and work sites, and Safe Operating Practices have been written for use in avoiding identified hazards.

The Safe Operating Practices have been divided into sections:

- General Safe Operating Practices, Workplace Safety Manual (WSM)100;
- Field Operations, WSM200;
- Equipment/Tool Safe Operating Practices, WSM300; and
- Specific Safety Programs, WSM400.

These Safe Operating Practices should not be utilized as substitutes for employee job training. Rather, they shall serve as a review for performing daily job tasks in a safe manner. These reviews will be conducted during safety meetings and at other times

All Safe Operating Practices are intended to comply with federal, state and local laws. In case of conflict, Federal, State and local laws shall be strictly adhered to.

Employees are responsible for working in a safe manner. They must comply with all applicable Safe Operating Practices contained herein, in addition to any other safety laws, rules, policies, or procedures.

Employees must wear the required personal protective equipment specified for each operation and as designated by their supervisor.

Project Managers and Task Leaders shall review appropriate Safe Operating Practices before beginning new activities individually and with their direct reports. They should also review Safe Operating Practices for routine operations on a monthly basis.

Project Managers and Task Leaders are responsible for providing each employee with the appropriate personal protective equipment, and training to perform their assigned tasks.

Project Managers and Task Leaders are responsible for ensuring that their employees observe and follow all applicable Safe Operating Practices, rules, policies, and laws necessary for their safety and may take disciplinary action consistent with company policy as needed to obtain compliance.

Employees have the right and are encouraged to report all safety and health issues to their management or the Corporate Safety Officer.

GENERAL SAFE OPERATING PRACTICES

FIELD OPERATIONS

WSM100.1

1.0 PURPOSE

Field operations expose CEC employees to a variety of hazards and changing conditions. This General Safe Operating Practice has been prepared to assist project managers and employees performing project field operations with project hazard identification and development of project safety plans

2.0 SCOPE

All projects involving field operations require a Project Hazard Assessment (PHA) before initiating the activities. Project Safety Plans (PSP) are prepared subsequent to and include the PHA. PHAs identify potential hazards based on the expected scope of work, and PSPs include and establish safe operating practices to help mitigate those hazards. The complexity of the PSP will be related to the number and significance of the project hazards.

3.0 RESPONSIBILITIES

3.1 Project Managers:

1. Ensuring the completion of the PHA.
2. Ensure that employees and subcontractors who will participate in the project field work review the PHA and/or Project Safety Plan (PSP).

3.2 Project Operations Employees:

1. Review the PHA and/or PSP prior to going onto any project site.
2. Review and update PHA and PSP as necessary: when the scope of field operations changes, new personnel are assigned, site conditions change, a near miss occurs, or work stoppage occurs.
3. Review and sign the Tailgate Safety Form or Daily Field Report as required.

3.3 Office Safety Coordinators and CEC Corporate Safety Director:

1. Assist employees in the interpretation, methods of compliance and preparation of PHA and PSP.

4.0 PROJECT HAZARD ASSESSMENT PROCESS

- 4.1 Use the PHA form (Attachment A) to identify and assess potential project hazards. The completed PHA, combined with appropriate safe operating practices, make up the PSP, and is used as a means to communicate results of the hazard assessment and identification of potential project hazards to project employees and subcontractors. The project scope of services serves as the basis for identifying project activities to be performed. Additional information such as project/client safety requirements and PHAs/PSPs prepared for similar projects should be reviewed, if available, to assist in completing the PHA. The key considerations and analysis for a PHA includes the following:

1. Task Description: Utilizing the project scope of service for the project, define the tasks or activities comprising the work. Consider and include defining the required physical movements (e.g. walking, observing, sampling, etc.) equipment, objects (e.g. trucks, monitoring wells, streams, etc.), tools (e.g. knife, ladder, hand auger, etc.) or materials (e.g. mist nets, chemicals, cylinder gas, etc.) to be used, and the work conditions under which the task will be performed (e.g. inside, outside, hot, cold, limited illumination, elevated surfaces, excavations, other contractors working in the same locale, etc.).
 2. Hazard Identification: Based on the task description, identify the potential hazards. Consider whether the field operations present environmental, people, equipment, chemical or other hazards that may be expected to be present. These types of hazards may include, temperature conditions, work around traffic and other people on a project site, vehicles and portable equipment, chemicals and oils and other hazards such as lifting. When evaluating and considering the project tasks the following items should be considered: sources of motion, sources of high temperatures that could result in burns, eye injury or ignition of protective equipment, chemical storage and exposures, sources of harmful dust/vapors, sources of light radiation, sources of falling objects or potential for falls from different elevations, sources of sharp objects which might pierce the feet or cut the hands, sources of rolling or pinching objects, layout of workplace and location of co-workers; and electrical or other stored energy hazards. Additionally, review injury/accident data to help identify potential hazards that have contributed to incidents and injuries.
 3. Hazard Evaluation: The objective of the hazard evaluation is to identify the potential hazards in the work environment that are anticipated/expected to be present and enable implementation of hazard control strategies. Consider the possibility of exposure to several hazards.
 4. Hazard Control Guidelines: It is the policy of CEC that PPE alone should not be relied on to provide protection against hazards, but should be used in conjunction with engineering controls and safe work practices to avoid or mitigate hazards. The general sequence for implementing hazard control is:
 - a. Avoidance - Avoid putting employees in the hazardous situation if possible;
 - b. Engineering Control - Control the hazard by physically guarding the employee from the hazard; and
 - c. Personal Protective Equipment - It is necessary to consider certain general guidelines for assessing the foot, head, eye and face, and hand hazards that exist while performing any operation and to match hazard control strategies to the particular situation. It is the responsibility of each employee to exercise common sense and apply appropriate expertise to accomplish these tasks.
- 4.2** *A Project Hazard Assessment Form and Safety Plan (Attachment A) must be completed for every project with a field work component.*
1. Complete the information in Section 1 and Section 2 on the first page of the PHA form, sign and date the form (Section 3).
 2. While considering the scope of the project activities defined in Section 1 of the PHA, review the list of typical hazards and answer yes or no, with respect to the potential for this hazard to be present for the scope of services to be provided (Section 4).
 3. These two steps complete the hazard assessment process. The control measures (Safe Operating Procedures, WSMs, etc.) and noted PPE for the associated hazards that have been

- identified as expected to be present (i.e. answering Yes) must then become part of the assembled PSP.
4. Applicable Workplace Safety Manual SOPs are to be attached to the PHA Form and become part of the PSP.
 - a. Where no current WSM SOP exists, or you identify a hazard that is not listed on the PHA, a Job Hazard Assessment (JHA) must be completed in accordance with WSM100.23.
 - b. The Office Safety Coordinator will review the JHA. If additional guidance is required, the Corporate Safety Director will assist.
 5. All employees performing field operations on the project must review the PHA/PSP to become familiar with the safe operating practices to mitigate the risk from the identified hazards. They must sign indicating that they are aware of the hazards and risks, and will follow all required controls.

When crews report to the project location, previously unidentified or unanticipated hazards may be present. Additionally, on projects covering multiple days, hazards due to changes in conditions such as weather conditions, work by client, new equipment or personnel on site may occur that impact the field operations of CEC employees. To ensure that new hazards and required controls are adequately identified, appropriate information shall be added to the [Tailgate Safety Meeting Form \(WSM200.25\)](#), or Daily Field Report Form, as appropriate.

GENERAL SAFE OPERATING PRACTICES DOMESTIC AND WILD ANIMALS

[WSM100.4](#)

Field employees are at risk from exposure to various types of animals, their nests, waste products and their carcasses. Rodents and other animals can harbor disease causing agents that are very harmful to humans. Care should be taken to avoid all wild animals and domestic animals that have the potential to harm you.

To avoid accident or injuries associated with rodents and other animals observe the following guidelines:

1. Be aware of your surroundings and note any wild or suspicious acting animals in your work area. If necessary, seek safe shelter from these animals.
2. Avoid reaching or stepping into or over hidden areas that may contain such animals.
3. When working with soil, be aware of signs that indicate above or below ground animal nests and take appropriate action to prevent contamination by dust or injury from bites.
4. If working around animal carcasses, spray them with a disinfectant (Lysol) prior to removal and wear rubber gloves to remove animal carcasses. Dispose of dead animals in compliance with applicable city or county health guidelines. Wash exposed skin with an antibacterial or disinfectant soap (e.g., Dial or Dermascrub) after removal and disposal of the animal.
5. If an animal bite occurs, clean the wound with soap and water, and follow appropriate first aid procedures. Immediately report the incident to your supervisor.
6. Transport any bite victim to the CEC preferred provider located in your area. (If possible, safely capture or kill the animal so it can be tested for any known disease causing agents.)
7. If exposure to airborne particles and dust from a nest does occur, immediately report the incident to your supervisor. (If possible, and without further exposure to you, mark the site without disturbing it so trained personnel can collect samples to determine if any disease causing agents are present.)
8. Avoid direct contact with bird, bat and other animal droppings. Areas where birds and bats roost should be avoided or appropriate respiratory protection shall be used when working in such an area.
9. Avoid direct contact with animal blood. Wear rubber gloves if contact with animal blood cannot be prevented. Dispose of rubber gloves properly. Wash hands thoroughly with an antibacterial soap after disposal of rubber gloves and before eating, drinking or smoking.
10. When working near farm animals, note their positions, numbers and demeanor.

GENERAL SAFE OPERATING PRACTICES GEOGRAPHIC HAZARDS

[WSM100.9](#)

Hazard Review

Uneven Terrain
Swamp Lands/Wetlands
Woodlands

Poisonous Snakes/Insects & Ticks/Plants
Falling Rocks
Animals

1. Wear appropriate personal protective equipment (PPE) consistent with the hazards identified in the Project Safety Plan. The minimum PPE that will be worn on all CEC field projects is safety glasses, long pants, and hazard-appropriate footwear. Refer to WSM100.17 for additional detail.
2. Be alert for tripping hazards (i.e., loose rocks, logs, vines, brush, hidden objects, fence wires, holes and uneven ground) and slipping hazards (i.e., wet or muddy ground, stream substrates, steep slopes, ice and snow). Use three points of contact when possible and as necessary. Make sure footwear is appropriate for the terrain. Wear shoe cleats when appropriate.
3. Rappelling activities, if necessary, must be coordinated with CEC's Corporate Safety Director (CSD), David Parise. The CSD will identify required training and equipment.
 - a. Supervisors shall verify with the Fall Protection SME that employees who use rappelling equipment have the necessary training.
 - b. Safety lines and equipment shall be inspected prior to rappelling.
4. For climbing on slopes and mountainous terrain, ensure all climbing equipment has sufficient weight ratings for personnel and equipment being used during the climb.
5. Be aware of poisonous plants, insects, snakes, animals, and animal waste products and carcasses. Wear long sleeve shirts, gloves and high-top boots when hazards cannot be avoided. If there is a potential for snakes, snake chaps shall be worn. Refer to WSM100.18 Tick Safety, WSM100.44 Insect Stings & Bites, WSM100.45 Poisonous Plants, and WSM100.46 Poisonous Snakes.
6. Use caution and protect your eyes and skin when walking through brush and branches, especially when vegetation with thorns is present.
7. Be aware of deep mud, sinkholes and quicksand areas in swamps, marshes and coastal plain areas.
8. Use caution when crossing any creek or swale.
9. Be aware of active deer, small game, and hunters during the hunting season. The use of hi-visibility vests or blaze orange clothing is required when working in wooded areas.

WSM100.9 (continued)

10. Be cautious of dead trees and limbs in wooded areas, particularly during windy conditions when overhanging dead wood could be dislodged and/or fall.
 - a. Be aware of large equipment, like excavators or drill rigs, in wooded areas. They can hit these snags, or “widow makers”, knocking them loose so they crash down. If working with heavy equipment in wooded terrain or on a WINDY day in the woods to be even more cautious. Always stop every few 100 feet and look up and around for broken tree tops, snags and dead trees.
11. Review safety procedures relative to area and surroundings.

Related SOPs

WSM100.18 Tick Safety, WSM100.44 Insect Stings & Bites, WSM100.45 Poisonous Plants, WSM100.46 Poisonous Snakes, WSM200.10 Wetlands Assessment Activities, WSM200.13 Excavating, Trenching and Shoring, WSM200.35 Working In or Around Water Equipment SOPs –WSM300

GENERAL SAFE OPERATING PRACTICES HAZARDOUS MATERIALS (JOBSITE)

[WSM100.10](#)

Supervisors

1. Ensure that labels on hazardous materials are legible when the material is received and that they are maintained in a legible condition. Containers should be stored with warning labels visible.
2. Maintain the collection of Material Safety Data Sheets in a good condition and ensure employee access when requested.
3. Provide initial and refresher training on the CEC Hazard Communication Standard and the CEC Hazard Communication Program. Maintain records of employees' training.
4. Ensure employees are provided with and instructed on the use of any personal protective equipment that may be necessary for working with the hazardous materials.
5. Provide proper devices and containers for transfer of hazardous material.
6. Ensure proper labeling on storage buildings that contain hazardous chemicals.

Employees

1. Acquire the necessary training before working with any hazardous material.
2. Review chemical labels for procedures to follow, personal or environmental hazards and safety information.
3. Acquire and wear necessary personal protective equipment before working with any hazardous material.
4. Use approved containers for transporting hazardous material.
5. Arrange for disposal of hazardous materials consistent with applicable Federal, State and local protocols.
6. CEC employees are not permitted to sign hazardous waste manifests.

GENERAL SAFE OPERATING PRACTICES

HOSTILE OR IRATE PERSON ENCOUNTERS

[WSM100.11](#)

Hazard Review

Physical Violence and Injury
Concealed Weapons
Verbal Abuse
Thrown Objects
Environmental Conditions

Office Environment

1. Remain calm. Use calm voice to respond to the individual.
2. Where possible, keep your desk, workstation, or chair between you and the individual.
3. Use any strategy you may have learned in a *Violence in the Workplace* or similar training course to attempt to diffuse the situation.
4. Avoid an argument or physical confrontation with the individual(s).
5. Contact the nearest supervisor or coworker immediately and request assistance.
6. Request law enforcement assistance if the situation escalates into a potentially dangerous condition or if any apparent physical danger is present.
7. Back away from the situation, if possible, until assistance arrives.
8. Ensure that others in surrounding areas are immediately notified of the situation.
9. Maintain visual contact with hostile party from a safe distance.
10. Always remember to Retreat, Request help, and to Regroup when necessary.
11. Follow established security guidelines for your facility.

Field Situations

1. Prior to going on-site, review the SOP for the activity you will be conducting and note any SOPs regarding hostile or irate neighbors or nearby residents. Check available records to see if any prior activities or visits met with a hostile or aggravated reaction. Where a known potential exists, take someone with you.
2. If warranted, Request law enforcement assistance if the situation escalates into a dangerous condition or if any apparent physical danger is present. Request local law enforcement to accompany you.
3. Remain calm. Use a calm voice to respond to the individual.
4. Where possible, keep a non-threatening item between you and the individual.
5. Use any strategy you may have learned in a *Violence in the Workplace* or similar training course to attempt to diffuse the situation.
6. Avoid an argument or physical confrontation with the individual(s).
7. Contact your supervisor as soon as possible, and request guidance.
8. Back away from the situation and leave the scene if possible.
9. Ensure that others in surrounding areas are immediately notified of the situation.
10. Maintain visual contact with hostile party from a safe distance.
11. Always remember to Retreat, Request help, and to Regroup when necessary.

GENERAL SAFE OPERATING PRACTICES

HOT WEATHER SAFETY

[WSM100.12](#)

I. INTRODUCTION

Operations involving high air temperatures, radiant heat sources, high humidity, direct physical contact with hot objects, or strenuous physical activities have a high potential for inducing heat stress. Outdoor operations conducted in hot weather including hazardous waste site activities that require workers to wear PPE are likely to cause heat stress.

TRAINING

Each CEC employee shall be trained to understand methods of preventing heat-related illness, symptoms of heat disorders, how to mitigate heat-related effects, and how to provide emergency response to heat-related illnesses. CEC employees managing the work of others shall be trained as indicated above before assuming supervisor duties. Supervisor training will also include consideration of the individual employee causal factors affecting heat stress prior to the assignment of workers to tasks.

CAUSAL FACTORS

Age, weight, degree of physical fitness, degree of acclimatization, metabolism, use of alcohol or drugs, and a variety of medical conditions such as hypertension affect sensitivity to heat. It is difficult to predict just who will be affected and when, because individual susceptibility varies. Environmental factors include ambient air temperature, radiant heat, air movement, conduction, and relative humidity affect an individual's response to heat.

II. HEAT DISORDERS AND HEALTH EFFECTS

HEAT STROKE occurs when the body's system of temperature regulation fails and body temperature rises to critical levels. Heat stroke is a medical emergency. The primary signs and symptoms of heat stroke are confusion; irrational behavior; loss of consciousness; convulsions; a lack of sweating (usually); hot, dry skin; and an abnormally high body temperature. If body temperature is too high, it causes death.

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

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

WSM100.12 (Continued)

HEAT EXHAUSTION. The signs and symptoms of heat exhaustion are headache, nausea, vertigo, weakness, thirst, and giddiness. Fortunately, this condition responds readily to prompt treatment. Heat exhaustion should not be dismissed lightly since fainting associated with heat exhaustion can be dangerous if the victim is operating machinery or the victim may be injured when he or she faints.

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

HEAT CRAMPS are usually caused by performing hard physical labor in a hot environment. These cramps have been attributed to an electrolyte imbalance caused by sweating. Thirst cannot be relied on as a guide to the need for water; instead, water must be taken every 15 to 20 minutes in hot environments.

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

HEAT COLLAPSE ("Fainting"). In heat collapse, the brain does not receive enough oxygen because blood pools in the extremities. As a result, the exposed individual may lose consciousness. This reaction is similar to that of heat exhaustion and does not affect the body's heat balance. However, the onset of heat collapse is rapid and unpredictable. To prevent heat collapse, the worker should gradually become acclimatized to the hot environment.

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

HEAT FATIGUE. A factor that predisposes an individual to heat fatigue is lack of acclimatization. The signs and symptoms of heat fatigue include impaired performance of skilled sensorimotor, mental, or vigilance jobs. There is no treatment for heat fatigue except to remove the heat stress before a more serious heat-related condition develops.

III. ENVIRONMENTAL HEAT STRESS INDEX ASSESSMENT

The combined effects of ambient air temperature, relative humidity, direct sunlight, and effects of protective clothing can be evaluated using the Heat Stress Index (HSI). The Heat Stress Index is defined using the ambient air temperature and the relative humidity using adjustments for work in direct sunlight and use of protective clothing (see Table 1). The HSI classifies heat stress into five Danger Categories: None, Caution, Extreme Caution, Danger, and Extreme Danger as defined in the table on the following page.

TABLE 1

GENERAL HEAT STRESS INDEX

From the National Weather Service

General Heat Stress Index										
Danger Category		Apparent Temp. (°F) (Humiture)				Heat Syndrome				
IV. Extreme Danger		>130°				Heatstroke or sunstroke imminent				
III. Danger		105°-130°				Sunstroke, heat cramps, or heat exhaustion likely. Heatstroke possible with prolonged exposure and physical activity				
II. Extreme Caution		90°-105°				Sunstroke, heat cramps, or heat exhaustion possible with prolonged exposure and physical activity.				
I. Caution		80°-90°				Fatigue possible with prolonged exposure and physical activity				
*Note: Degree of heat stress may vary with age, health, and body characteristics										
Relative Humidity										
		10%	20%	30%	40%	50%	60%	70%	80%	90%
Temp °F	104	98	104	110	120	>130	>130	>130	>130	>130
	102	97	101	108	117	125	>130	>130	>130	>130
	100	95	99	105	110	120	>130	>130	>130	>130
	98	93	97	101	106	110	125	>130	>130	>130
	96	91	95	98	104	108	120	128	>130	>130
	94	89	93	95	100	105	111	122	128	>130
	92	87	90	92	96	100	106	115	122	128
	90	85	88	90	92	96	100	106	114	122
	88	82	86	87	89	93	95	100	106	115
	86	80	84	85	87	90	92	96	100	109
	84	78	81	83	85	86	89	91	95	99
	82	77	79	80	81	84	86	89	91	95
	80	75	77	78	79	81	83	85	86	89
	78	72	75	77	78	79	80	81	83	85
	76	70	72	75	76	77	77	77	78	79
74	68	70	73	74	75	75	75	76	77	

Example: The temperature stands at 94°F and the RH is now 62%. The heat stress temperature is over 111°F, in the **Danger** area

IV. CONTROL METHODS

ACCLIMATIZATION. The human body can adapt to heat exposure to some extent. This physiological adaptation is called acclimatization. After a period of acclimatization, the same activity will produce fewer cardiovascular demands. The worker will sweat more efficiently (causing better evaporative cooling), and thus will more easily be able to maintain normal body temperatures.

NIOSH (1986) recommends that for workers who have previous experience in jobs with heat stress, the regimen should be 50% exposure on day one, 60% on day two, 80% on day three, and 100% on day four. For new workers who will be similarly exposed, the regimen should be 20% on day one, with a 20% increase in exposure each additional day.

FLUID REPLACEMENT. Cool (50°-60°F) water or any cool liquid (except alcoholic and caffeinated beverages) should be made available to workers to encourage them to drink small amounts frequently, e.g., one cup every 20 minutes. Ample supplies of liquids should be available and placed close to the work area.

ENGINEERING CONTROLS

Radiant Barriers block direct sunlight to produce shade or block direct or reflected heat coming from hot surfaces. Surfaces that exceed 35°C (95°F) are sources of infrared radiation that can add to the worker's heat load.

Air Conditioned Recovery Areas provide locales with cooler temperatures to facilitate heat balance recovery during work break periods. These can be adjacent air conditioned structures, trailers, or vehicles (if the vehicle can be safely operated to maintain cool cab temperature).

Increasing Air Flow can reduce heat stress as long as the air temperature is less than the worker's skin temperature. Changes in air speed can help workers stay cooler by increasing both the convective heat exchange (the exchange between the skin surface and the surrounding air) and the rate of evaporation. Because this method does not actually cool the air, any increases in air speed must impact the worker directly to be effective.

If the ambient temperature is higher than 95°F and relative humidity is high, the hot air passing over the skin can actually make the worker hotter. Increases in air speed have no effect on the body temperature of workers wearing vapor-barrier clothing.

AUXILIARY BODY COOLING

Commercially available **ice vests**, though heavy, may accommodate as many as 72 ice packets, which are usually filled with water. The cooling offered by ice packets lasts only 2 to 4 hours at moderate to heavy heat loads, and frequent replacement is necessary. However, ice vests do not encumber the worker and thus permit maximum mobility. Cooling with ice is also relatively inexpensive.

WSM100.12 (Continued)

Wetted clothing is another simple and inexpensive personal cooling technique. This approach to auxiliary cooling is effective under conditions of high temperature and low humidity, where evaporation from the wetted garment is not restricted.

WORK PRACTICES

Workgroup Self-Monitoring involves members of the work group visually observing each other for signs of heat stress and reacting to the visual clues to control heat stress.

Work / Rest Break Protocol involves adjusting the duration of work relative to the duration of recovery or rest periods to control heat stress. The Work / Break Protocol is implemented using heart rate, heart recovery rate, and/or body temperature monitoring.

Shift Work Protocol involves varying the time of work to avoid heat stress. This includes working in early morning, cool part of the day, or night work.

WORKER MONITORING

Every worker who works in the Extreme Caution Danger Category is to be personally monitored. These conditions include wearing semi-permeable or impermeable clothing (such as Tyvek PPE or rain suits) when the temperature exceeds 21°C (69.8°F) or when working at extreme physical loads.

Personal monitoring can be done by checking the heart rate, recovery heart rate, body temperature, or extent of body water loss.

Heart Rate Monitoring. To check the heart rate, count the radial pulse for 30 seconds at the beginning of the rest period. If the heart rate exceeds 110 beats per minute, shorten the next work period by one third and maintain the same rest period.

Heart Recovery Rate Monitoring. The recovery heart rate can be checked by comparing the pulse rate taken at 30 seconds (P_1) with the pulse rate taken at 2.5 minutes (P_3) after the rest break starts. The two pulse rates can be interpreted using Table 1.

TABLE 1 HEART RATE RECOVERY CRITERIA		
Heart rate recovery pattern	P_3	Difference between P_1 and P_3
Satisfactory recovery	<90	--
High recovery (Conditions may require further study)	90	10
No recovery (May indicate too much stress)	90	<10

Body temperature can be checked with a dedicated digital oral or electronic ear thermometer after work but before the employee drinks water. If the temperature obtained exceeds 37.6°C (99.6°F), shorten the next work cycle by one third.

Body water loss is recommended for assessing cumulative dehydration effects of heat stress. Performing body water loss measurements under short-term (1-2 days) heat stress conditions is optional. Body water loss can be measured by weighing the worker on a scale at the beginning

WSM100.12 (Continued)

and end of each work day. The worker's weight loss should not exceed 1.5% of total body weight in a work day. If a weight loss exceeding this amount is observed, increase fluid intake.

V. HEAT STRESS PROGRAM

The following is a recommended basic strategy for management of employee heat stress based on the Heat Stress Index (HSI):

DANGER CATEGORY	CUMULATIVE STRATEGY
NONE	Workgroup Visual Self-Monitoring
CAUTION	Fluid Replacement Protocol Radiant Barriers (provide shade)
EXTREME CAUTION	Heart Rate Monitoring Heart Rate Recovery Monitoring Work /Break Protocol
DANGER	Body Temperature Monitoring Worker Self-Pace Provide Air-Conditioned Recovery Area Shift Work Protocol Body Water Loss Monitoring
EXTREME DANGER	Work permitted only with a written heat stress mitigation plan.

GENERAL SAFE OPERATING PRACTICES INCLEMENT WEATHER CONDITIONS

[WSM100.14](#)

Hazard Review

Slips and Falls
Falling Objects
Slick Road Conditions
Downed Trees

Downed or Low Hanging Power Lines

Exposure to Temperature Extremes
Low Hanging Tree Limbs
Freezing Rain
Flooding Conditions and Flooded Roadways
Other Vehicles and Pedestrians

1. When possible, reschedule all non-essential work activities to non-inclement weather times.
2. Always wear appropriate footwear for slippery conditions and try to avoid icy areas whenever possible.
3. Always use caution or avoid walking under trees, power lines and any type of overhead structure that has ice buildup.
4. Never cross or go near downed power lines even if you believe the power is off to the lines.
5. Avoid walking or driving under or near low hanging power lines.
6. All power lines shall be treated as if they are live (energized).
7. Always wear appropriate clothing to ensure warmth, preferably in multiple layers.
8. Avoid driving on excessively snowy and icy roads, if at all possible.
9. If driving is necessary, reduce speed to help retain control of the vehicle.
10. Four wheel drive vehicles should be used if they are available.
11. Always keep emergency safety supplies in your vehicle such as blankets, flares, sand or litter for traction, and some form of communication device in case you become stranded.
12. Always use caution when entering intersections to ensure other approaching vehicles are able to stop.
13. Always pay close attention to the location of pedestrians to avoid hitting them if they should fall in front of you or should your vehicle slide into them.
14. When driving or walking, avoid crossing roads and roadways with standing or moving water from sudden rainfall or flooding. Even small amounts of flowing water can move a large vehicle sideways or sweep a person off their feet. The depth of water or current may be much greater than anticipated; do not drive through standing or flowing water.
15. If lightning is suspected or observed, all activities must be stop and equipment must be evaluated for its potential to attract lightning. Personnel should wait indoors or in vehicles for the storm or lightning to end. If lightning strikes on or near the Site, personnel are to seek immediate shelter in the nearest accessible permanent building or vehicle available. If shelter is unavailable, the response should be to disband from one another and lay low to the ground by dropping to your knees and bending forward with your hands wrapped around your knees, away from any poles or trees.
16. If a tornado warning is issued, seek shelter immediately. A provisional tornado shelter should be identified before the start of work. If sturdy permanent buildings are accessible, go there immediately, moving toward interior hallways or small rooms on the lowest floor.
17. If a tornado warning is issued and you are in a vehicle, go to the nearest building. If there are no buildings nearby, go to the nearest ditch, ravine, or culvert, with your hands shielding your head.

WSM100.14 (continued)

18. If a tornado is sighted or a warning issued while you are in open country, lie flat in a ditch or depression. Hold onto something on the ground, such as a bush or wooden fence post, if possible. Once a tornado has passed the site, site personnel are to assemble at the guard building to determine if anyone is missing or injured. Administer first aid and seek medical attention as needed.

1.0 PURPOSE

CEC employees work on a variety of sites, with many different specific hazards. To ensure that employees are protected while working in these environments, a project hazard assessment must be performed for each project to identify hazards that are present, or are likely to be present. Based on this assessment, Personal Protective Equipment (PPE) will be identified in the Project Safety Plan (PSP) that is designed to protect against the specific hazard identified. PPE will be selected so that it fits each employee that must wear it. The PSP will be used to communicate to employees the required PPE. PPE used by CEC employees will conform to applicable regulatory requirements.

2.0 SCOPE

This procedure is to be followed by all CEC employees while performing their work tasks after a hazard assessment has been carried out to determine the required PPE. This procedure will be reviewed on an annual basis to ensure it is meeting the appropriate standards and legislation as they are revised.

When assessing project hazards, Project Managers must consider PPE an employee's last line of defense. Other avenues should be pursued first (where reasonably practicable) to mitigate the employee's exposure to a site's identified hazards. These avenues include: Elimination of the hazard; substitution of safer materials or processes; engineering controls; and, administrative controls. Only after these other avenues are considered should PPE requirements be assessed. The minimum PPE that will be worn on all CEC field projects is safety glasses, long pants, and hazard-appropriate footwear.

All PPE will be provided, used, and maintained in a hygienic and reliable condition to protect employees from workplace hazards.

CEC will provide all required PPE for the performance of work at no cost to the employee. Use of employee-owned PPE is not permitted. Damaged PPE shall not be used and must be replaced.

3.0 RESPONSIBILITIES

3.1 Employees

- Be aware of and comply with requirements outlined herein.
- Obtain the prescribed safety equipment through their Project Managers or other approved sources.
- Select and use appropriate PPE, together with the tools and equipment required to conduct the work safely.
- When handling chemicals such as acids, caustics, hydrocarbons or any other harmful substances, use appropriate PPE or other means to provide adequate protection against these hazards.
- Following manufacturer instructions, inspect PPE for cleanliness and defects prior to each use. Worn or deteriorated PPE must be immediately reported to a supervisor and either repaired or replaced immediately. Any maintenance or repair on PPE must be done in accordance with the training and instruction provided. PPE that is no longer fit for use must be disposed of responsibly.
- Know the proper use and limitations of the assigned PPE.
- Use the required PPE in accordance with the training provided.
- Inform other individuals when safety devices are not being (properly) used.

- Do not wear PPE outside of the work area where it is required if doing so could create a hazard to the employee.
- Any protective clothing or other safety device that is worn next to the skin must be cleaned and disinfected prior to use by another employee.

3.2 Project Managers:

- Evaluate the chemical, biological, environmental, mechanical, radiation and/or noise hazards associated with every field project to determine what PPE is required. This evaluation shall be documented using the Project Hazard Analysis Form.
- Use only employees trained as required in this procedure so that employees will be able to select, use and properly maintain their PPE.
- Provide the required protective equipment to employees.
- Require employees to use the PPE that is required for their tasks.
- Maintain and use applicable equipment in accordance with this procedure.

3.3 Corporate Safety Director

- Create and maintain this procedure
- Assist with interpretation and methods of compliance with this standard
- Perform periodic formal and informal project site audits that verify whether or not requirements within this procedure are being met

4.0 CONTROLS

4.1 Hazard Assessment

The CEC Project Manager, or his designee, will perform the site hazard assessment using the form and guidance in WSM100.1 to determine potential hazards, and to identify the required PPE for employees assigned to perform operations in the identified location. Where applicable, the site owner/operator shall be consulted by the Project Manager to obtain the minimum requirements for PPE to be worn by CEC employees.

The completed and signed Project Hazard Assessment from WSM100.1 shall be considered the written certification (as required by OSHA 29 CFR 1910.132(d)(2)) that identifies the workplace evaluated; the person certifying that the evaluation has been performed; the date(s) of the hazard assessment; and, which identifies the document as a certification of hazard assessment. The hazard assessment phase is carried out using the Project Hazard Assessment (PHA). The PHA shall be completed for all projects involving field work prior to beginning field work.

Personal protective equipment will:

- Be selected and used in accordance with recognized standards, and provide effective protection,
- Not in itself create a hazard to the wearer,
- Be compatible, so that one item of personal protective equipment does not make another item ineffective, and
- Be maintained in good working order and in a sanitary condition.

4.2 Selection

4.2.1 Head Protection – Hard Hats

A hard hat can protect you from cuts, scrapes, and bruises. It can protect you from falling objects, which can cause severe damage to the head and spine. It can prevent electric shock and limit your exposure to UV radiation from the sun.

Every employee working on or visiting a project site with identified head-strike hazards shall possess a hard hat approved by the American National Standards Institute (ANSI Z89.1) or an approved equivalent.

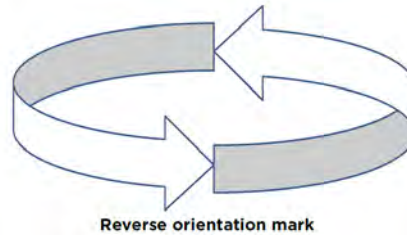
- Type I hard hats are designed to reduce the force of impact resulting only from a blow to the top of the head.
- Type II hard hats are designed to provide protection against both side impact and blows to the top of the head.
- Class E (electrical) hard hats are designed to reduce the danger of contact with conductors at higher voltage levels and are proof tested at 20,000 volts, and are required for construction and utility projects.
- Class G (general) hard hats are designed to reduce the danger of contact with low-voltage conductors and are proof tested at 2,200 volts.
- Class C (conductive) hard hats provide no protection against contact with electrical hazards

Approved hard hats must be worn when working under any of the following conditions:

- At all construction, excavation, or road building sites;
- When working as a flag person;
- When working with or near any mobile equipment such as backhoes, bulldozers, drills or cranes;
- In heavily treed areas with the potential of overhead limbs falling;
- In all posted, designated areas;
- In all other areas where a potential hazard to the head exists from falling, flying or thrown objects, or from other harmful contacts;
- Employees riding on All-Terrain Vehicles must wear DOT or Snell-approved helmets with chin and face protection.
- High visibility caps shall be worn when flagging traffic. Where hard hats are required, flaggers shall use special High visibility covers over the hard hat.
- When specifically directed by a client.

Additional guidance for hardhats:

- Never wear a baseball cap under your hard hat.
- Never paint a hard hat.
- Never make holes in a hard hat.
- Never store your hard hat in the rear window of your car—intense sunlight can make it age more quickly.
- Never spray your hard hat with insect repellent—it can damage the material.
- A hard hat should normally be worn facing forward. It may be worn backwards only if it has a reverse orientation mark (see below).



Hard hats and suspension must be inspected before each use by the user, be kept in good clean condition and if found defective, be replaced immediately. Employees are not permitted to wear head protection that has been damaged, structurally modified, subjected to severe impact, painted or cleaned with solvents.

Even with careful use, a hard hat has a limited lifespan. Frequent use and exposure to chemicals, or UV radiation can cause damage that will reduce its ability to protect the wearer from impact. Manufacturer's recommended replacement schedules vary and personal usage pattern may warrant more frequent replacement. At a minimum, hard hat replacement should not exceed 5 years past the date of manufacture for employees required to wear a hardhat as part of their daily work. For reference, the date of manufacture is typically stamped on the underside of the brim.

If hard hats are not required as part of the work, employees must ensure that appropriate head protection is worn to protect the employee from environmental hazards such as heat stroke or frost bite.

4.2.2 Hearing Protection

CEC employees will be required to wear appropriate hearing protection while working in areas with noise exposures at or above 90 dBA_{Lex}, or an 8-hour time-weighted average (TWA) of 90 dBA, and above 115 dBA for impulse noises.

Please refer to WSM400.7 Noise Exposure and Hearing Conservation Program for additional details on the use of hearing protection devices.

4.2.3 Eye and Face Protection

Every CEC employee must, as a minimum, wear safety glasses fitted with permanent side shields during all field work.

The appropriate eye protection must be worn when the potential for eye injury exists.

1. Eye and/or face protection must conform with or exceed ANSI Z87.1 Practice for Occupational/Educational Eye and Face Protection.
2. Clean eye and face protection regularly, and replace when it becomes pitted or scratched.
3. Tinted or shaded glasses shall not be worn at night, indoors or in poor light conditions.
4. Approved eye and/or face protection (including glasses, goggles and/or face shield) shall be worn while:
 - Working in any CEC laboratory;
 - Performing work which might cause foreign particles, dusts, chemicals or vapors to enter the eyes;
 - Working on any construction site;

- Whenever working near vegetation above waist level, grinding, drilling, or sawing.
 - When operating or near power tools or machines (e.g., weed eaters, power or concrete saws, rock drills, chippers, jackhammers) which may throw particles.
 - Exposed to the arc flash from welding operations;
 - Working in bright sunlight or exposed to other extremely bright light services; and
 - Anytime specifically directed by a client.
5. Safety goggles shall be worn when:
- Jump starting a battery to prevent possible acid burns.
 - Their use is more appropriate than that of safety glasses (as determined by the supervisor).
 - There is a need to protect the eye from dust, sawdust, and mist (e.g., during sandblasting or when using a chain saw) which can enter or blow into an employee's eye even though he or she is wearing safety glasses.
 - There is a danger of a foreign object entering through the side of safety glasses.
6. Secondary eye protection in the form of a full-face shield shall be worn at all times when handling corrosive materials (acids, caustics, etc.), or when job tasks present the potential for chemical facial-splash (e.g. performing contaminated ground water sampling, tank cleaning, and examination of drill cuttings, using hazardous cleaning compounds, or high-pressure sprayers, or performing tasks associated with buffing or grinding). NOTE: Face shields by themselves do not provide eye protection, and must be worn with safety glasses, or where chemicals or high pressure are present, goggles.
- Emergency eyewash equipment must be available when the eyes or body may be exposed to corrosive materials.
7. Employees that require corrective lenses and who regularly wear safety glasses shall be provided, in accordance with Section 4.3, prescription safety glasses that meet the regulatory requirements for impact resistance, and shall have permanently-attached side shields that conform to ANSI Z87.1. Eye examinations are at the expense of the employee.
8. Prescription safety glasses must meet the following guidelines to be acceptable as approved safety eye wear:
- Frames and plastic lenses must meet or exceed the standards established by ANSI Z87.1.
 - The eyewear must be equipped with clear plastic top/side protection shields. CEC requires permanently attached side-shields that meet the requirements of ANSI Z87-1.
 - The glasses must be marked as required to indicate that they meet ANSI Z87.1 standards.
 - Lost or misplaced prescription safety glasses must be replaced at the employee's expense.
 - Employees that require corrective lenses and who only on occasion need eye protection can wear safety glasses specifically designed to be worn over prescription glasses.
9. Employees who intend to wear contact lenses must inform other project personnel, and first aid attendants if applicable, so that proper first aid may be promptly administered if necessary. No worker shall wear contact lenses where:
- Gases, vapors, or other materials are present which, when absorbed by contact lenses, may harm the eye;
 - Dusts or other materials are present which may harm the eyes or cause distraction which may expose the worker to other injury; or
 - Prohibited by the client due to the work environment.

4.2.4 Hand Protection

CEC shall select, provide, and require its employees to use appropriate hand protection when hands may be exposed to biological, chemical, extreme temperature or environmental hazards, or to physical hazards that may lead to cuts, lacerations, abrasions, punctures, or burns. Typical operations where work gloves should be worn include:

1. Tree cutting operations
2. Fence repair
3. Sign installation/repair
4. Tree trimming activities
5. Welding and grinding
6. Using shovels, picks, etc.
7. Handling lumber
8. Loading or unloading transport trucks and vans
9. Sharpening tools
10. Lifting heavy objects

One type of glove will not work in all situations. Glove selection will be based on the tasks to be performed, the perceived hazards, the gloves' performance requirements, the working conditions, and the duration of use. Additionally, glove selection will take into account manufacturers' guidelines, host-facility hand protection requirements, and/or the CEC Project Manager's evaluation.

Disposable gloves are designed for one-time-use, while re-usable gloves may be decontaminated by neutralizing/cleaning methods suggested by the glove manufacturer. Note that gloves that afford protection from electrical hazards have inspection and certification requirements that must be followed.

Where possible, gloves should be inspected before or during use by inflating them with air to check for pin-holes, cracks, or excessive wear. Defects will prohibit their use and replacements must be obtained before work can begin. If reusable gloves become worn and no longer provide protection they must be discarded and new ones obtained.

Gloves should not be worn when operating mechanized devices unless there is a possibility of frostbite. If this is the case, the gloves should allow for proper manipulation of the apparatus and be easily removable.

If an employee is working with a chain saw, only one glove should be worn, with that being on the hand holding the upper handle of the saw.

4.2.5 High Visibility Clothing

Employees in work zones where vehicles are traveling in excess of 20 mph shall wear high visibility apparel.

Various job sites require the employee to wear a reflective safety vest. Certain clients specify the type of reflective clothing/vest that must be used. They must be kept in good clean condition and replaced immediately if found to be defective or faded. If the vest is to be worn over fire retardant clothing, the vest, striping and thread must also be fire retardant.

Approved reflective safety vests shall be worn under the following conditions:

1. On all excavation or drilling sites;
2. On all construction or road building sites where there is vehicular activity;
3. On or near roads or highways, including work done by flag persons;
4. Work in remote or forested locations;
5. On client properties requiring them; and,
6. During hours of darkness.

7. High visibility shirts must be supplemented with reflective vests for nighttime operations.
8. During hunting season when working in or around fields and woods.

4.2.6 Body Attire

Shirts shall be worn in all instances at all work sites. Short-sleeved shirts are acceptable if a long-sleeved shirt results in an unacceptable risk of heat exposure. The wearing of short-sleeved shirts must be evaluated versus the risk of burns or skin exposure, with justification and approval documented on the assessment form utilized. Tank tops and sleeveless shirts are not permitted on any work sites.

Long sleeve shirts shall be worn when:

- Welding or cutting.
- Potentially exposed to poison oak, ivy or sumac.
- Exposed to hot materials.
- Working on projects that involve a risk of cuts or laceration to exposed skin.
- Required by Client safety protocols.

When long sleeve shirts are required, they shall be rolled all the way down and buttoned, where applicable.

On all HAZWOPER sites, 100% cotton long sleeve shirts are required.

Shorts or cut-off pants shall not be worn at any work site.

If there is a risk of exposure to molten metal, infectious substances or dangerous tools, employees must wear appropriate protective attire (e.g. protective apron, hood or arm/leg pads).

Loose clothing, long hair, dangling accessories, jewelry or other similar items that are likely to be a hazard shall not be worn around machinery or electrical equipment unless they are tied, covered or otherwise secured so they prevent the hazard.

In all cases, body attire must comply with or exceed client/owner site requirements.

4.2.7 Fire Retardant Clothing

Employees must wear properly fitted fire retardant clothing as an outer layer if a hazard assessment determines that the work may subject the employee to the threat of flash fires, molten metal, welding, gouging, or burning.

In the absence of a hazard assessment performed by the Client, the following steps must be used initially, and when on-site activities by others change to evaluate whether the wearing of FR clothing is required:

1. Will CEC on-site services be performed concurrent with gas drilling, well servicing or production-related services identified in the 3/19/10 OSHA Enforcement Policy?
 - No – FR not required.
 - Yes – Proceed to item 2.
2. Can CEC services be scheduled to avoid concurrent work performance with gas drilling, well servicing or production-related services identified in the 3/19/10 OSHA Enforcement Policy?
 - Yes – Reschedule to preclude need for FR clothing.
 - No – Wearing of FR clothing is required by CEC employees.

Fire retardant clothing must meet the requirements of NFPA 2112 (Standard on Flame-Resistant Garments for Protection of Industrial Personnel against Flash Fire) for fire resistance and should only be laundered according to manufacturers' guidelines. Failure to adhere to these guidelines may diminish the protection of the garment.

It is strongly recommended that 100% natural fiber clothing (cotton, wool) should be worn underneath fire retardant clothing. The use of fusible synthetic materials (e.g., polyester/nylon blends) is strongly discouraged. Where clients require all cotton undergarments, synthetic materials will not be used. An incidental amount of elastic used on non-melting fabric underwear or socks is permitted. Polyester blends will melt to the skin if an employee is subjected to a flash fire.

If warm temperatures are expected while wearing fire retardant coveralls, a minimum layer of clothing worn under the coveralls should be a short-sleeved T-shirt and shorts. The more clothing worn under the coveralls, the higher the level of protection in the case of a flash fire.

Any disposable coveralls, rain wear, or chemical gear used as an outer layer must be of flame resistant material with regular FRC clothing worn as the primary layer.

4.2.8 Skin Protection

Every precaution must be taken to protect the skin through the proper use of clothing, shields, or cream (e.g. sun block or barrier cream) when there is a hazard of injury or disease to or through the skin. It is important to ensure that PPE such as safety glasses and hard hats are not worn when applying sun screen or insect repellent as these compounds can permanently damage the PPE.

Evaluations to determine appropriate skin protection must include a review of potential hazards from biological hazards, such as poison ivy and/or insects (i.e. ticks, black flies, wasps etc.). In cases of extreme exposure to insects (i.e. heavily forested areas), the use of insect netting around the face and neck should be evaluated, including the size of mesh used.

See section 4.2.6 on Body Attire for additional information.

4.2.9 Leg Protection

Leg protective devices (e.g. ballistic pants and chaps) shall be worn by employees using chain saws or other potentially hazardous equipment, and where risk of snake bite or other hazard of leg injury exists.

Refer to WSM300.9 Chain Saws and All Purpose Cut-Off Saws.

4.2.10 Foot Protection

In all areas outside of the office environment, it is mandatory that an appropriate work boot or work shoe for the hazards identified be worn, and in no case will athletic, open-toed, cowboy boot, or light cloth shoes be acceptable. Chemical and oil resistance is required where such hazards are present.

Boots shall have a minimum of six inches of ankle support and shall be tied up to the top of the boot to ensure the ankle is properly protected from slips and trips. All boots must have good tread and should be replaced if cracked, torn or the toe caps are exposed.

- Hazardous materials boots or chemical protective boots shall be worn when:

1. Required by the MSDS or SDS.
 2. Required by a health & safety plan.
 3. Mixing and applying pesticides.
- Waterproof shoe-boots without protective toecaps (e.g. knee boots, hip or chest waders) shall be worn in projects involving stream, wetland, and ecological operations without construction.
 - Where there is potential hazard of impact to the toes or metatarsal area, or a risk of injury to the soles of the feet, employees must wear footwear with safety toes and puncture resistance designed to comply with the latest ASTM F2412, ASTM F2413, and ANSI Z41 standards. As a minimum, employees must wear safety footwear under any of the following conditions:
 1. In all excavations;
 2. In all pipe laying work;
 3. At all construction sites or road works;
 4. When loading or unloading heavy material or equipment; and
 5. Where required by clients.
 - Where employees are exposed to rough environmental terrain, and where there is no risk for impact/injury to toes or soles of feet, and no other client requirements exist, employees may wear sturdy hiking boots to protect their feet/ankles.

Refer to the Safety Shoe Reimbursement Policy on Cyber C's Safety Page for steps required to receive safety shoe benefits.

4.2.11 Fall Protection

Fall protection shall be worn during any activities where the fall height is four feet or greater. (NOTE: Client-specific requirements may dictate lower fall heights and only permit the use of retractable lanyards). Fall protection must also be worn near a floor opening over a dangerous condition such as moving machinery or hazardous substances below regardless of fall height.

Fall protection systems will conform with applicable regulatory and/or client requirements, whichever is the more stringent, while also following ANSI Z359 "Fall Protection Standard". Refer to WSM200.30 Flat Roof Fall Protection and WSM400.8 Fall Protection Program.

4.2.12 Buoyancy Devices

When exposed to a risk of drowning, such as when working over or near water, each employee shall be supplied with and shall wear a United States Coast Guard (USCG)-approved personal flotation device having sufficient buoyancy to keep the worker's head above water. The device shall not require manual manipulation to produce the buoyancy effect.

4.2.13 Respiratory Protection

Some work tasks require the use of a NIOSH-approved respirator to mitigate respiratory hazards. Examples include entering into work areas designated as "benzene-regulated", considered "hazardous" by the nature of other components (e.g. solids, liquids, or mixtures) identified on specific job sites, or those above OELs/PELs/TLVs as outlined in legislation or the ACGIH. Respirators are often used to protect

employees when engineering controls are not feasible or when engineering controls are being installed. The Project Manager will identify this requirement on the PHA form for each project.

Air purifying respirators (APRs) will be provided when the contaminant is known, and when an oxygen-deficient atmosphere is not a possibility. The choice between half-face and full-face APRs will be determined by the hazard assessment or client requirements. Use of this equipment requires additional training as specified in WSM400.13 Respiratory Protection Program.

Where not reasonably practicable to prevent or eliminate an oxygen deficient atmosphere or a harmful concentration of air contaminants, or where the exposure to the hazard results from temporary or emergency conditions only, supplied air respirators (SARs), such as SCBA or Air-Line/Egress (ALE) shall be provided. Use of this equipment requires additional training as specified in WSM400.13 Respiratory Protection Program.

Employees requiring respiratory protection must be medically fit and be fit-tested by a competent person according to the provisions of WSM400.13 Respiratory Protection Program.

4.3 Provision and Reimbursement

CEC will provide/reimburse employees for PPE as outlined in the following table.

PPE	Reimbursement Amount	Frequency	Comments
Hard Hats	Company Supplied	Every five calendar years or per expiration date	Provided by company on initial hiring. Replaced upon hard hat expiration date (usually every 5 years). Hard hats provided to contract/term employees remain company property and are to be returned at end of contract/term
Safety Footwear	\$200	Every 2 years	Company will reimburse for lace-up work boot, minimum of six inches tall, Safety Toe that meets US/ANSI Z41.1 standard, puncture-resistant (PR) soles and metatarsal guards (as required).
Non-Prescription Safety Glasses, Goggles, and Face Shields	Company Supplied	As needed based on wear	Provided by company on initial hiring. Safety glasses provided to contract/term employees remain company property and are to be returned at end of contract/term
Prescription Safety Glasses	Single Vision Lenses: \$81 Bifocal Lenses: \$101 Trifocal Lenses: \$131 Progressive Lenses: \$140	Every 2 calendar years or when prescription changes	Covered items include basic frames, polycarbonate safety lenses, permanent side-shields, and an anti-fog/anti-scratch coating. Fees for upgraded

PPE	Reimbursement Amount	Frequency	Comments
			frames are the responsibility of the employee.
Safety Vest	Company Supplied	As needed based on wear	Provided by company on initial hiring. Assumption is light-weight tear-away vests. Vests provided to contract/term employees remain company property and are to be returned at end of contract/term
Hearing Protection	Company Supplied	As needed based on wear	Company supplies disposable earplugs. Employee will be supplied with a set of earmuffs if required
Leg Protection	Company Supplied	As needed based on wear	Office inventory, checked in and out as required by project work.
Gloves – Chemical Resistant, Leather, etc.	Company Supplied	As needed based on wear	Specific glove material determined during hazard assessment – specific to protect against identified chemical hazards
FR Clothing	Company Supplied	As needed based on wear	Specific materials as determined by hazard assessment, including Flame Resistant (FR).
Specialty Rain Gear	Company Supplied	As needed based on wear	Office inventory, checked in and out as required by project work. Contact Office Leader, Office Safety Coordinator, or Safety Director for guidance.
Specialty Cold Weather Gear	Company Supplied	As needed based on wear	Office inventory, checked in and out as required by project work. Contact Office Leader, Office Safety Coordinator, or Safety Director for guidance.
Buoyancy Devices	Company Supplied	As needed based on wear	Office inventory, checked in and out as required by project work.
Respirators	Company Supplied	As needed based on wear	Provided by company when requirement for use determined, along with appropriate filters/ cartridges.
Fall Protection	Company Supplied	As needed based on wear	Office inventory, checked in and out as required by project work.

5.0 TRAINING

Each employee who is required to wear PPE must be properly trained on:

1. When PPE is necessary
2. What PPE is necessary
3. How to properly don, doff, adjust and wear PPE

4. The limitations of PPE
5. The proper care, maintenance, useful life and disposal of the PPE

Each employee shall demonstrate an understanding of the training, and the ability to use PPE properly before being allowed to perform work requiring the use of PPE.

When there is reason to believe that any employee who has already been trained does not have the understanding and skill required by this SWP, he or she shall be retrained. Circumstances where retraining is required include, but are not limited to, situations where:

- Changes in the workplace render previous training obsolete; or
- Changes in the types of PPE to be used render previous training obsolete; or
- Inadequacies in an employee's knowledge or use of assigned PPE indicate that the employee has not retained the requisite understanding or skill.

Verification that each employee has received and understood the required training is required. This verification shall be through a written certification that contains the name of each employee trained, the date(s) of training, and that identifies the subject of the certification.

CEC Health & Safety Plan Addendum - Covid-19

March 18, 2020

Revised March 31, 2020

Civil & Environmental Consultants, Inc. (CEC): Field Visit Protocol for CEC Field Personnel and Visitors in addition to Employer Health & Safety Plan Requirements:

1. Identify, obtain review and follow any client established guidelines for site and or facility access and notifications.
2. Identify team members who will be performing the field visit. Inquire if they have experienced any illness which may be related to Covid 19. If any illness experienced related to Covid 19, follow client reporting guidelines.
3. If you are feeling ill or are exhibiting symptoms (fever, cough, and/or shortness of breath), you will not be permitted to accompany the CEC team members on any field work.
4. Secure appropriate personal protective equipment for the project including hand sanitizers, disinfectant wipes, gloves, etc. Consider packing a lunch and water, there may be limited food outlets in the area where you are working.
5. No ride sharing. Ride in the vehicle you came in. Only CEC team members are permitted to be in CEC vehicles. **(CEC employees working as members of a field team may choose to travel in separate vehicles)** Take appropriate measures to disinfect contact surfaces of any vehicles before beginning your drive.
6. Maintain a safe “social distance – 6 feet”, between field event participants at all times in and between CEC field team members and others who may be on site. Only essential personnel should be participating in the field events.
7. Practice good hygiene at all times. Frequently use the hand sanitizers after contact with surfaces, sharing tools/equipment, and before and after eating.

1.0 PURPOSE

Ticks pose a significant hazard because of the possibility of transmission of Rocky Mountain Spotted Fever, Lyme Disease, other viral or bacterial pathogens, and antigens. This procedure provides guidance to protect employees from health impacts associated with exposures to ticks.

2.0 SCOPE

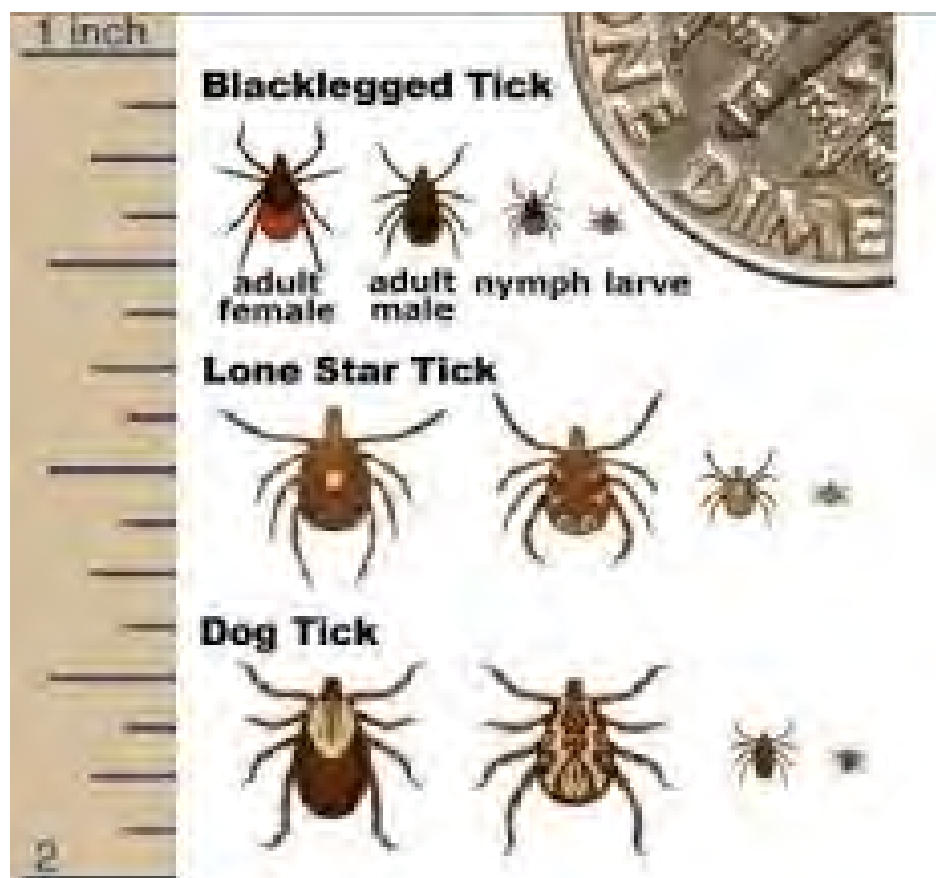
This procedure applies to all CEC field operations where the potential for exposure to ticks exists, or where there is a higher potential for exposure.

3.0 HAZARDS

Ticks can attach to any part of the human body, but are often found in hard-to-see areas such as the groin, armpits, and scalp. In most cases, the tick must be attached for 36-48 hours or more before the disease bacterium can be transmitted (CDC).

3.1 Tick Identification Aid

Three of the ticks most commonly encountered in the U.S. are the American Dog (wood) tick, the deer (blacklegged) tick, and the Lone Star tick. The picture below provides some information on the coloration and relative size of these ticks.



4.0 CONTROLS

The best way to limit these potential health issues is to prevent the tick from biting and becoming attached. Pre-bite removal is the best approach. To limit and control exposure to tick attachment, employees should follow these guidelines:

1. Wear appropriate light colored pants and shirts (preferably long-sleeved) when working in potential tick habitat. Light colors make it easier to spot ticks.
2. In order to prevent tick from climbing inside clothing, tape pants legs closed around ankles. Velcro wraps can also be used.
3. Reduce Potential for tick exposure:
 - a. Avoid wooded and bushy areas with high grass and leaf litter
 - b. Walk in the center of trails
 - c. Perform tick checks at least every 2 hours
4. Use a tick repellent. (Available commercially)
 - a. Use repellents that contain 20% or more DEET (N, N-diethyl-m-toluamide) on the exposed skin for protection that lasts up to several hours. Always follow product instructions. Apply this product avoiding the eyes and mouth. Repellents can be obtained from CEC's safety equipment provider, or locally in camping and/or sporting goods stores. Office Safety Coordinators should maintain a supply of repellents, and employees should keep a supply in their safety equipment bags and field vehicles.
 - b. Treat clothing and gear, such as boots, pants, and socks, with permethrin. Permethrin remains protective through several washings, but breaks down in sunlight or water. Permethrin applied to clothing must be allowed to dry before wearing, and should be reapplied at least every week.
 - i. Pre-treated clothing is available and remains protective for up to 70 washings. Pre-treated clothing can be obtained at outdoor stores or through outdoor catalog stores.
 - c. Other repellents registered by the Environmental Protection Agency (EPA) may be found at <http://cfpub.epa.gov/opprpref/insect/>.
5. Find and Remove Ticks from Your Body
 - a. Do a check of clothing and skin in the field at least every 2 to 3 hours, paying particular attention to the hair and neck area and other areas of potential exposure. These other areas of potential exposure include locations where skin is exposed or clothing is not tightly secured to the body. Specific locations to check include under the arms, in and around the ears, inside the belly button, back of the knees, between the legs, around the waist, and your back.
 - b. Prior to leaving a field operation site where tick risk is likely, employees should conduct another tick check. Include any equipment that will be loaded into a CEC vehicle to ensure no ticks are being transferred to the vehicle.
 - c. Bathe or shower as soon as possible after coming indoors (preferably within two hours) to wash off and more easily find ticks. Conduct a full-body tick check using a hand-held or full-length mirror to view all parts of your body upon return from tick-infested areas. Check for ticks under the arms, in and around the ears, inside the belly button, behind the knees, between the legs, around the waist, and especially in the hair.

- d. Examine gear. Ticks can ride into the home on clothing then attach to a person later, so carefully examine coats, and daypacks. Tumble clothes in a dryer on high heat for an hour to kill remaining ticks.
 6. Use a tick removal tool, such as the Tick Key provided to all employees (see picture), to carefully remove attached ticks. If no tool is available, utilize tweezers to grab the tick by the head and use gentle uniform tension to remove the tick. Ensure that you remove the tick's embedded head from the skin. Do not use petroleum-based liquids, heat, or squeeze the abdomen of the tick during removal. Clean the area of the tick bite, and apply over-the-counter antibiotic ointment.
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7. The removed tick should be retained and stored in a zip lock bag. The bag containing the tick should be returned to the employee's office, or hotel if working out of town. Follow the steps outlined at <https://www.ticknology.org/order-test> to create an order and send the tick in for testing – utilize the priority testing option. The results of the testing should be communicated to the applicable Office Safety Coordinator.
 8. Removal of an attached tick is considered First Aid and requires that an Incident Report be filed in accordance with WSM100.25. The incident report should be updated to include results of the tick test.
 9. Monitor the area around the tick bite. If a rash meeting any of the following conditions occur, contact WorkCare at 888-449-7787 immediately:
 - a. Round or oval, enlarges in size over days/weeks, and does not fade in a few days
 - b. Usually greater than 2" inches in diameter, often 6-8"
 - c. Usually uniformly red
 - d. Sometimes but not often, a "bull's eye" rash with a red ring surrounding a clear area and red center
 - e. Minimally tender, minimally itchy (much less itchy than poison ivy), and sometimes warm
 - f. Often confused with spider bites
 10. If a fever, aches, and abrupt and severe fatigue occur, contact WorkCare immediately. A runny nose and prominent cough are NOT symptoms of Lyme disease.

GENERAL SAFE OPERATING PRACTICES

SUN EXPOSURE

[WSM100.19](#)

Information for both on and off the job.

1. Sunburn can occur during any time of the year. To avoid sunburn, wear hats with wide brims, long sleeve shirts, and use sunscreen with a Sun Protective Factor (SPF) rating of 15 or higher on exposure skin. Premature aging of the skin also occurs with prolonged sun exposure.
2. Excessive sun exposure can result in sunburn. Sunburn can be aggravated by additional sun exposure. When sunburned, avoid additional sun exposure if possible or take additional sun protective measures.
3. By far, the most common cause of skin cancer is overexposure to the sun. Ninety percent of all skin cancers occur on parts of the body that are not usually covered by clothing.
4. People who sunburn easily and those with fair skin and red or blond hair are more prone to develop skin cancer. The amount of time spent in the sun also affects a person's risk of skin cancer.
5. To prevent skin cancer:
 - a. Cover up with a wide brimmed hat and a bandanna for your neck. Wear long-sleeved shirts and pants which the sun cannot penetrate.
 - b. Use sunscreens to help prevent skin cancer as well as premature aging of your skin. Use a Sun Protective Factor (SPF) rating of 15 or higher. Women may receive added protection by using tinted opaque cosmetic foundation along with a sunscreen. Apply sunscreen at least an hour before going into the sun and again after swimming or perspiring a lot. Do not use indoor sun lamps, tanning salons/parlors, or tanning pills.
 - c. You can still get burned on a cloudy day. Try to stay out of the direct sun at midday, because sun rays are their strongest between 10 a.m. and 3 p.m. Beware of high altitudes - where there is less atmosphere to filter out the ultraviolet rays. Skiers should remember that snow reflects the sun's rays, too.
6. Know your skin. Whatever your skin type, do a monthly self-examination of your skin to note any moles, blemishes or birthmarks. Check them once a month and if you notice any changes in size, shape or color, or if a sore does not heal, see your physician without delay.

1.0 OVERVIEW

Driving is among the most hazardous tasks performed by employees; therefore, it is imperative to follow safe driving practices. Employees driving on company business are expected to be properly licensed, maintain a favorable driving record, not operate vehicles while impaired in any way, obey applicable traffic laws, and follow the established safe operating practices. Safe operating practices for driving on company business utilizing personal vehicle, rental vehicle or company vehicle are outlined in this WSM.

2.0 SCOPE

The expectation is that everyone driving on company business will return safely and without accident or incident, operate the vehicle in a manner that obeys traffic laws and return the vehicle without physical damage. Following are the minimum qualifications and expectations for driving on company business.

2.1 Driver Qualifications

- 2.1.1 Drivers shall be properly licensed and insured (including the required state minimum coverage) for the vehicle that they are operating. Notify CEC immediately if your license is suspended for any reason.
- 2.1.2 You must have and keep a favorable driving record and be willing to permit a periodic review of your driving record (MVR).
- 2.1.3 Employees shall not operate vehicles while impaired in any way. Impairment shall include, but is not limited to, alcohol use, drug use, or injury.
- 2.1.4 Only employees who have been pre-approved by passing the background and MVR check and have successfully completed the required driver training may operate a company vehicle.
- 2.1.5 Employees operating company-owned vehicles must complete any company prescribed driver training program. First-time drivers of CEC vehicles and those who drive infrequently (<1/six months) must complete online driver safety training and an initial checkout by the person in your office designated to perform driver evaluations prior to operating a CEC vehicle.

2.2 CEC's Expectations

- 2.2.1 Vehicles shall be operated in a safe manner and in compliance with the applicable state vehicle code. All drivers must complete the pre-operation vehicle checklist prior to the initial operation of their vehicle and complete a review of this WSM.
- 2.2.2 You must be mentally and physically able to drive safely.
- 2.2.3 You and all passengers must wear seatbelts and all other available active restraints.
- 2.2.4 You must be always courteous, respecting the rights of other drivers and pedestrians. Driving issues reported to CEC management by the public will be investigated and may result in disciplinary action.
- 2.2.5 You may operate your company vehicle on company business and possibly to and from work.
- 2.2.6 Personal use of the company vehicle is to be limited and must be authorized by your office lead prior to use. Transporting non-CEC employees in a company vehicle is limited to project and client related activities.
- 2.2.7 The vehicle must be in safe mechanical condition and your operation of the vehicle must not damage it. The vehicle is not to be modified unless approved by the Office Lead.

- 2.2.8 The interior of the vehicle is not to have loose or unsecured items (e.g., papers, laptops, first aid kit, foodstuffs, equipment, materials, etc.). Make sure that the interior of the vehicle is presentable for passengers such as clients. Maintain the interior of the vehicle in a clean condition.
- 2.2.9 Cellular communication use shall follow WSM100.22 in the Workplace Safety Manual.
- 2.2.10 If your company vehicle is involved in an accident, you must notify CEC immediately and follow the procedures established and required by our insurance carrier.
- 2.2.11 Any moving violations or other traffic violations that you receive while operating a CEC vehicle must be promptly reported to your office lead. You are responsible for all moving violations or parking and toll citations received while you have the vehicle.

While driving on company business, CEC expects employees to comply with local traffic regulations, while also being conscious of general safe driving practice. The following actions are viewed as serious breaches of conduct:

- Being under the influence of drugs or alcohol while driving
- Driving while disqualified or not correctly licensed or insured
- Driving without proper care and control of the vehicle
- Not being courteous to others while driving
- Driving without regard for state and local traffic regulations
- Driving while distracted
- Failing to stop after an accident

Violations of this policy will be subject to disciplinary procedures, up to and including dismissal.

3.0 RESPONSIBILITIES

3.1 Employees

An employee who drives as part of his/her CEC business will:

- a. Hold a current driving license valid for the class of vehicle being operated.
- b. Immediately notify his/her office leader if the license is suspended, cancelled, or has limitations placed upon it, or if he/she has personal limitations (e.g., difficulty driving at night or driving on icy roads, driving standard transmission vehicles, the use of medications that cause drowsiness, etc.).
- c. Complete the required driver safety training and prescribed pre-qualifications requirements established as part of this safe operating procedures. First time drivers of a CEC vehicle or drivers who infrequently drive a CEC vehicle must complete a pre-operation driver checkout by your office designated person.
- d. For Commercial Motor Vehicles (CMV's), use Attachment A – Vehicle Pre/Post-Use Checklist to perform and document a pre-use vehicle inspection prior to leaving the office, which includes taking time to become familiar with the vehicle (including its safety features), as well as a post-use inspection when the vehicle is returned to the office.
- e. Complete the CEC Circle of Safety. Walk around the vehicle prior to moving from parked location, checking the tires, windows, and body of the vehicle. Report any discrepancies.
 - i. Check the area surrounding the vehicle to determine if there are obstructions or anything else that could possibly be a safety hazard to the vehicle. Assess the cleanliness of the vehicle exterior and process the vehicle through a commercial car wash to remove dirt and road debris. All CEC vehicles are to be clean such that there is no dirt or debris that would obscure the lettering, license plate, windows, etc.

- ii. Check the inside of the vehicle, driver side, passenger side, rear seat and truck bed to ensure that there are no loose or unsecured items (e.g., papers, laptops, first aid kit, foodstuffs, equipment, materials, etc.) Remove or secure the loose or unsecured items. Also assess the cleanliness of the interior of the vehicle. Make sure that the interior of the vehicle is presentable for passengers such as clients.
 - ii. Once the Circle of Safety is completed, document the conditions.
- f. Report vehicle defects (rental cars) to the rental company before the start of the trip.
- g. Always wear a seat belt in vehicles so equipped and ensure all passengers wear seat belts. Ensure the number of passengers never exceeds the number of available seat belts.
- h. Transport passengers only in the vehicle cab.
- i. Be directly responsible for the safe operation of the vehicle, while observing all relevant regulations (e.g., obeying posted speed limits). This includes verification that loads are secured and within the vehicle manufacturer's specification and legal limits for the vehicle.
- j. Where a personal vehicle is used for company business, all elements of this WSM are applicable and are to be followed.
- k. Assess driving hazards and anticipate "what if scenarios". Be alert and attentive.
- l. The vehicle is to be secured when not behind the wheel. Securing the vehicle includes placing the vehicle in "Park", turning off the engine and keeping the key(s) on our person. Additional items to consider securing the vehicle, should include move from potential construction equipment pathways, use emergency brake and/or chock wheels, roll up windows, lock doors, secure and store valuables such that they are not visible, etc.
- m. Always park in such a way so your first move when leaving is forward. This can be accomplished through backing into a parking spot or pulling through to the leading parking spot. Avoid parking spots and other areas where first move forward actions cannot be completed.
- n. Verify that a First Aid Kit and blank Vehicle Incident Reports (Attachment B) are available in the vehicle's glove box.
- o. Immediately report any incident (including those that do not result in damage or injury) to the office leader and your project manager or supervisor. Complete the Vehicle Incident Report within 24 hours.
- p. Report motor vehicle accidents as required to the local police. Include a copy of any police report and information about other drivers/vehicle involved as part of the Vehicle Incident Report.
- q. If driving a CEC vehicle or vehicle/trailer combination with a GVWR of greater than 10,001 pounds, (identified by DOT number on the door of the vehicle), employees must follow the DOT Guidelines for Operating a Commercial Motor Vehicle (Attachment C). Coordinate with Office Leader, Corporate Human Resources, and Corporate Safety Director to ensure that requirements for DOT qualification are met before driving this type of vehicle.

3.2 Office Leaders

Office Leaders will:

- a. Assign an experienced individual (preferably someone who has experience driving and or drives a truck as their personal vehicle) to coordinate the new driver vehicle operation checkout, and to assure that vehicles are properly serviced and maintained. The purpose of the new vehicle operation checkout is help ensure that individuals who will be driving a CEC vehicle, e.g., truck, are capable and comfortable in the operation of this type of vehicle. This checkout process should include an overview of company pre-operation/driving vehicle inspections, cleanliness of the vehicle, availability of first aid kit, use of company provided fuel card, mileage recording for project activities and safe operation.
- b. Prohibit untrained drivers from operating CEC vehicles.

- c. Receive Vehicle Incident Reports and assure that employees involved in vehicle incidents have received needed medical attention, properly reported vehicle incident, and have completed the AIR.
- d. Know the DOT criteria for drivers who will operate a CEC vehicle, or vehicle trailer combination with a GVWR or greater than 10,001 pounds and verify that any employee assigned to operate such a vehicle or vehicle/trailer combination meets the DOT qualifications. See Attachment C for guidance.
- e. Communicate the information about the vehicle incident to Corporate Safety Director and Accounting. Accounting will notify CEC insurance carrier concerning the incident.
- f. Conduct incident investigation in coordination with Corporate Safety Director.

4.0 HAZARDS

Driving hazards include:

- a. Distractions within or around the vehicle. These distractions can include a vehicle that has a dirty exterior, loose items inside the passenger compartments of the vehicle and equipment and materials inside or located in the bed of the vehicle that are not secured.
- b. Environmental and road conditions (e.g., rain, fog, ice, snow, etc.)
- c. Alcohol and/or drug consumption
- d. Other drivers in the area
- e. Pedestrians, wildlife, bicyclists, motorcycles, tractor trailers
- f. Vehicle condition, tires, lights, windows, etc.
- g. Lack of driving skill
- h. Size / type of vehicle
- i. Use of electronics, mobile phone
- j. Construction zones
- k. Speed

5.0 CONTROLS

5.1 Vehicle Condition

- 5.1.1 Check vehicle regularly and prior to each use. Checks should include:
 - a. Tire inflation
 - b. Cleanliness of windows
 - c. Mirror adjustment
 - d. Function of horn, lights, and brakes (including emergency brake)
 - e. Fluid levels, including washer fluid, engine oil, brake fluid, transmission fluid, power steering fluid, fuel, etc.
 - f. Condition of windshield wipers and washer fluid
 - g. Closure of doors, trunk, and tailgate
 - h. General condition, exterior and interior and functionality of vehicle
 - i. Obstructions that may prevent the vehicle from forward or reverse movement.
- 5.1.2 Prior to each trip, complete the Vehicle Pre-Use Checklist (Attachment A).
- 5.1.3 All defects in company vehicles must be noted in the vehicle logbook and made known to the relevant supervisor who in turn will direct the repairs to be completed according to manufacturers' specifications.
- 5.1.4 Remove or secure loads, tools, material or equipment against movement or store in tool or gang boxes. Particular attention must be paid to transporting gasoline.

5.2 Environmental and Road Conditions

- 5.2.1 Drivers must adapt when conditions deteriorate due to bad weather, construction, or poor road conditions at project sites. Ensure the vehicle is in good condition and be aware of weather and road conditions.
- 5.2.2 The internet is a good tool to assess weather conditions along the route prior to departing. Tune in to regional radio stations to gain further awareness of accidents and road closures in that area.
- 5.2.3 Check or inquire with the project client contact or project manager for information about road conditions that may be encountered at project sites.
- 5.2.4 Check the condition of wipers and volume of washer fluid. For snowy conditions, verify that there is a brush with scraper, a shovel, and where necessary, a blanket and adequate survival gear.
- 5.2.5 Do not exceed posted speed limits. Typically driving in less-than-ideal conditions requires adjustment in speed.
- 5.2.6 Following distance should be increased in bad weather. Be patient and slow down.
- 5.2.7 If you can't see, don't drive.
- 5.2.8 Remember that puddles can hide dangerous potholes.
- 5.2.9 Use your headlights and beware of other drivers.
- 5.2.10 The surrounding landscape can affect your safety. Park your vehicle safely on firm ground, in gear where appropriate, and always use the emergency brake. When on a hill facing down, turn wheels to the curb/ditch; when facing uphill, turn wheels to the center line. Chock your wheels and use traffic cones where necessary. Where possible, position your vehicle such that you have a clear line of sight for oncoming vehicles, and allow space to safely exit and enter the vehicle for the driver and passenger and to access equipment that may be stored in the bed/rear of the vehicle.
- 5.2.11 If an employee is required to drive a vehicle to a hazardous location (place where fire or explosion hazards may exist due to flammable gases, vapors, combustible or flammable liquids, combustible dust, or ignitable fibers - as described by National Fire Protection Association - NFPA), the vehicle MUST be parked outside the hazardous location.

5.3 Distractions

- 5.3.1 Driving distractions can assume multiple forms – inappropriate use of electronic devices such as a cellular phone or any other electronic device to make a phone call, text a message, read email messages, manipulate music files or search for information; eating, drinking, putting on makeup, reading a newspaper, operating any other electronic device, or some other type of distracting activity where the driver's mind, eyes, and hands are engaged elsewhere than the road ahead and the steering wheel. Driving distractions also include items that are in the passenger compartment or other portions of the vehicle that are not secured.
- 5.3.2 All Cell Phone Usage
 - a. Employees must adhere to all federal, state, or local rules and regulations regarding the use of mobile electronic equipment while driving. Accordingly, employees must not use such equipment if such conduct is prohibited by law, regulation, or other ordinance. It is the employee's responsibility to determine whether such use is restricted or prohibited in a particular area.
 - b. While driving for business purposes, the CEC policy is that employees shall not use handheld cellular communications devices. If permitted by law, regulation, or other ordinance, employees may use hands-free devices. The use of hands-free devices shall not be used under moderate to heavy traffic conditions or during hazardous weather conditions requiring enhanced driver attention. At all times, it is the employee's responsibility to judge whether permitted cellular phone use would jeopardize safe vehicle operation and act accordingly.

- c. Employees are responsible for the distraction created by placing or taking calls while driving. To avoid distraction, incoming calls can be allowed to go to cellular voice mail for a return call later.
- d. The employee can also locate a lawfully designated area to pull over and park before making or taking a call, reading, or responding to a text message and or email.

5.3.3 Discipline

- a. Employees who are charged with traffic violations resulting from the use of cellular devices while driving will be solely responsible for all liabilities that result from such actions. Violations of this policy will be subject to disciplinary procedures, up to and including termination.

5.4 Speed and Vehicle Operation

- 5.4.1 CEC vehicles are equipped with GPS devices which enable vehicle tracking, driver monitoring, mobile form completion and vehicle management.
- 5.4.2 Vehicles which exceed posted speed limits or are driven in an erratic manner present hazards to the driver and others.
- 5.4.3 Drivers are expected to obey posted speed limits and operate in the normal flow of traffic.
- 5.4.4 To assist drivers in the safer operation of vehicles, the GPS devices are programmed to alert drivers when posted speed limits or pre-set speeds are exceeded. These alerts are audible sounds in the passenger compartment or alerts to their mobile devices about speed and other related driving issue.
- 5.4.5 Periodically, the office lead, or their designee will review the GPS logged data for excessive speed and other driving related issues, such as hard braking and cornering. These reports will be based on a defined driver performance scoring system and the reports will score and rank all drivers in the location. The locations may choose to award the drivers with the best scores.
- 5.4.6 Drivers who may routinely score poorly will be provided with driving tips delivered electronically.
- 5.4.7 Discipline
 - a. Employees who are charged with traffic violations by law enforcement, resulting from excessive speed while driving will be solely responsible for all liabilities that result from such actions. Violations of this policy will be subject to disciplinary procedures, up to and including termination.
 - b. Individuals who continue to score poorly on the driver rating system and specifically, those drivers who routinely exceed posted/pre-set speed limits, based on the review of monthly GPS logged data will be subject to requirements of the Safety Accountability Program (WSM 400.4) which may include loss of driving privilege or other discipline up to and including termination.

5.5 Vehicle Monitoring

The overall objectives of the vehicle monitoring devices include:

- a. Allows for real-time vehicle location in the event of an emergency, breakdown or need to change staff schedules to provide support to others.
- b. Assist drivers to operate vehicles safely through in cab alerts and driving performance feedback through phone application.
- c. Assist the Office Lead and Office Fleet Manager in managing vehicle maintenance requirements (e.g., oil change) and assist in improving driver safe practices through a review of driving performance data.

5.6 Drowsiness:

- 5.6.1 Plan ahead and take into consideration pre-trip work duties, the length of the trip and post-trip commitments.
- 5.6.2 When driving long distances, consider traveling the day before, or stay over an extra day.
- 5.6.3 Stay overnight if driving time and non-driving duties exceed 16 hours or 500 miles in one day. If for unavoidable reasons you must drive over these limits, approval must be obtained from your supervisor.
- 5.6.4 It is the responsibility of each employee to ensure that he/she comes to work rested and alert to carry out work duties safely.
- 5.6.5 When driving, take regular and adequate rest breaks.
 - a. At least 15 minutes for each 2 hours driven
 - b. Stop when tired
- 5.6.6 Share driving if travelling with other employees. Passengers need to remain alert and attentive and be support to the individual driving.
- 5.6.7 At no time should an employee put him/herself in a position where he/she feels unsafe, whether it is on location or driving to a location.
- 5.6.8 If an employee is requested by a client to drive to its location and he/she believes the road conditions are unsafe, the employee should discuss the matter with his/her supervisor.

5.7 Alcohol and Drug Use

CEC employees are prohibited from operating a motor vehicle while under the influence of alcohol or drugs.

5.8 Other Drivers, Pedestrians and Wildlife

- 5.8.1 The defensive driver assumes that pedestrians and other drivers may make mistakes and is on guard in the event an error is made.
- 5.8.2 The defensive driver will:
 - a. Anticipate that pedestrians or wildlife may do the unexpected.
 - b. Scan around the vehicle thoroughly when a pedestrian is present. Pedestrians may walk or stand in a vehicle's blind spots.
 - c. Adjust driving speed to safely avoid pedestrians or wildlife. It is difficult for pedestrians to correctly judge how fast a vehicle is approaching.
 - d. Yield the right-of-way to the pedestrian or the wildlife.
 - e. Be extra careful at night as pedestrians may assume a driver can see them since they can see the vehicle headlights so easily.
 - f. Be always vigilant for presence of wildlife; never assume they will act predictably.

5.9 Towing

- 5.9.1 Towing of anything shall be prohibited unless the vehicle is specifically designed and equipped for the task.
- 5.9.2 Prior to towing, the employee must be trained in proper use, setup, and driving procedures and will be subject to requirements of Trailer Use Safe Operating Practice (WSM 300.13).
- 5.9.3 Vehicles designed and equipped for towing shall only tow approved trailers.
- 5.9.4 Do not attempt to pull vehicles with any other vehicle than a tow-truck. Chains can snap, and vehicles not designed for towing can be damaged.

5.10 Transportation of Employees

- 5.10.1 Employees and materials or tools must not be transported in the same compartment of a vehicle except where approved seating is provided for the employees and the material or tools are secure against movement.
- 5.10.2 A vehicle driver or passenger must not ride with any part of the body outside the vehicle.
- 5.10.3 Employees must not board or leave any vehicle while it is in motion.
- 5.10.4 Except for cases of dire emergency, seriously injured or ill persons shall be transported for medical treatment by ambulance only.
- 5.10.5 Vehicles that are used for transporting employees must have within the enclosed portion of the vehicle:
 - a. Effective ventilation (independent of doors) to provide clean air
 - b. Adequate lighting and means of heating and cooling

6.0 DRIVER SAFETY TRAINING

- 6.0.1 New hires will complete the assigned Driver Safety Orientation Training modules within their first week of employment.
- 6.0.2 First-time drivers of CEC vehicles and those who drive infrequently (<1/six months) must complete the Driver Safety Orientation Training modules prior to operating a CEC vehicle.
- 6.0.3 Field employees (such as Ecological, Survey, Construction Technician, and Environmental Scientists), individuals “assigned” a vehicle, and others as designated by their Office Leader shall complete the Driver Safety Refresher Training modules annually.

ATTACHMENT A - VEHICLE PRE/POST-USE CHECKLIST

Employee Name: _____ Office: _____

Date: _____ Time: _____ Vehicle Color: _____

Vehicle Make/Model: _____ Vehicle License Plate Number: _____

Odometer Start: _____ Odometer Stop: _____ Total Mi Driven: _____

CEC Vehicle ☐

Rental ☐

Personal Vehicle ☐

Perimeter Walk-Around

Item is OK

Item is NOT OK

Check for signs of vandalism, negligence, damage, or unusual conditions				
Check all tires for excessive and unusual wear and proper inflation– include the spare tire if accessible. Make sure rims are in good shape.				
Check under vehicle for signs of leaking fluids				
Check wiper blades (Do they work? Do they need replacement?)				
Check all light systems – brake, head, back-up, running, turn signals, emergency flashers				
Check to make sure doors, truck/toolbox lids, tailgates all open and close properly				
(Make sure you have keys to any toolboxes that you may need to access)				

Check Gauges on Dashboard

Item is OK

Item is NOT OK

Fuel level				
Oil light				
Engine Coolant Temperature Gauge				
Service Indicator Lights				
Battery Charge Indicator				

Inside Vehicle

Item is OK

Item is NOT OK

Make sure seatbelts are present for all who will be riding in the vehicle				
Make sure horn, steering, and parking brake works				
Secure all items and cargo in the vehicle so that items will not become projectiles in the event of sudden stops or collisions				
Adjust the seat position, rearview and side mirrors				
Make sure emergency equipment is present and secured				
Adjust temperature controls, vents, radio, etc.				

If Pulling a Trailer

Item is OK

Item is NOT OK

Is trailer properly hitched to the vehicle (including safety chains)				
All lights are working properly				
Proper trailer for the load (check weight specifications) and load is balanced. If you anticipate the load is near the trailer weight limit, weigh the trailer at a weigh station				
Are tires in good condition and properly inflated?				

Notify the vehicle manager or Rental Company if you feel that any deficiencies are unsafe and DO NOT drive the vehicle

Signature: _____

ATTACHMENT B – VEHICLE INCIDENT REPORT FORM



VEHICLE INCIDENT REPORT

To be completed by the employee involved in the vehicle incident:

DATE OF REPORT:		CEC OFFICE:	
NAME OF EMPLOYEE COMPLETING REPORT:			
JOB TITLE:			
PROJECT NUMBER:		CLIENT NAME:	
Has the CEC Office Lead been notified of this incident?		☐ Yes	☐ No
Is there a Police Report for this incident?		☐ Yes	☐ No
INCIDENT INFORMATION			
DATE OF INCIDENT:		TIME OF INCIDENT:	
ADDRESS (City, State) WHERE ACCIDENT OCCURRED:		Seatbelts Used:	☐ Yes ☐ No
		On Cell Phone:	☐ Yes ☐ No
WEATHER CONDITIONS:		ROAD CONDITIONS:	
HOW DID THE INCIDENT OCCUR?			
IF AN INJURY OCCURRED, DESCRIBE ALL INJURIES IN DETAIL INCLUDING ANY PART OF THE BODY AFFECTED (ex. 2" laceration on back of left hand; dull pain in lower right ribs)			
DESCRIBE VEHICLE DAMAGE AND WHETHER VEHICLE CAN BE DRIVEN			
VEHICLE YEAR:		VEHICLE MAKE/MODEL:	VIN #:
VEHICLE TOWED?	☐ Yes ☐ No	WHERE TO:	
CITATION RECEIVED?	☐ Yes ☐ No	VIOLATION:	
Vehicle Owner?	☐ Employee ☐ CEC ☐ Rental	Rental Company:	
INVOLVED PARTIES			
NAME:		ADDRESS:	
CITY:		STATE:	ZIP:
HOME PHONE:		CELL PHONE:	
DATE OF BIRTH:		DRIVERS LICENSE # & STATE:	
VEHICLE YEAR:		VEHICLE MAKE/MODEL:	VIN #:
DESCRIBE VEHICLE DAMAGE AND WHETHER VEHICLE CAN BE DRIVEN			
WITNESS/PASSENGER INFORMATION			
NAME:		PHONE:	
NAME:		PHONE:	

ATTACHMENT C - DOT COMPLIANCE GUIDANCE

This section pertains to VEHICLES

The following requirements apply to all CEC vehicles and vehicle/trailer combinations where the GVWR exceeds 10,001 lbs. (Commercial Motor Vehicles - CMV).

- Each CMV vehicle shall have the CEC DOT number (2638111) applied to the front driver and passenger door, centered, approximately 4 inches from the bottom. DOT numbers are to be affixed to those vehicles which have a GVWR rating greater than 10,001 lbs. and those vehicles which will be used to pull a trailer, even if the GVWR is less than 10,001 lbs.
- All vehicle occupants must wear seatbelts
- Radar detectors are not permitted in any CMV.
- CMVs must have a fire extinguisher (rated 5 B:C or more) securely mounted and readily accessible within the vehicle.
- The following information must be maintained and available for each CMV:
 - o Identifying information, including company number, make, serial number, year, and tire size
 - o A schedule of inspections to be performed, including type and due date
 - o Inspection, repair, and maintenance records
 - o These records must be retained for one year at the location where the vehicle is garaged and maintained for six months after the vehicle leaves the carrier's control (e.g., sale, trade-in, scrap).
 - o 2nd, 3rd, and 4th bullets above are the manufacturer's maintenance schedule. Maintain the manual with the schedule in the glove box to show that: (1) scheduled services are conducted, and (2) we know when upcoming services are required.
- Written pre- and post- trip inspections must be conducted for all CMVs. This report must cover at least the following parts and accessories:
 - o Parking (hand) brake
 - o Steering mechanism
 - o Lighting devices and reflectors
 - o Tires
 - o Horn
 - o Windshield wipers
 - o Rearview mirrors
 - o Coupling devices
 - o Wheels and rims
 - o Emergency equipment
 - o The report must list any condition that the driver either found or had reported to him/her that would affect safety of operation or cause a breakdown. If no defect or deficiency is reported or found, the report should state this. The driver must sign the report in all cases. All deficiencies must be corrected or identified as not needing immediate correction before sending the vehicle out again. The original inspection reports and the certification of repairs for at least three months from the date of preparation.

Vehicles (except those greater than 10,000 pounds - F-350s and Sierra) marked with DOT numbers and not pulling trailers (so less than 10,001 lbs. in aggregate), are not classified as Commercial Motor Vehicles, and can be operated by any authorized employee.

This section pertains to CEC Employees that Drive CMVs

CEC DOT Drivers, who, for a single trip, drive a CMV more than 150 air miles from their point of origin (see attached maps), must maintain a drivers' hours-of-service logbook for just those trips. The logbook is not otherwise required. However, these drivers must provide documentation of hours worked for the previous 7 days.

CEC DOT Drivers have the following hours of service limitations:

- After 10 consecutive hours off duty, may drive 11 hours.
- After 10 consecutive hours off duty, aggregate of work and drive time cannot exceed 14 hours
 - o Example #1 – Employee may come in and work 3 hours, and then drive 11 hours. If the employee comes in and works 4 hours, they can only drive 10 hours; if they work 5 hours, they can only drive 9 hours; etc.
 - o Example #2 – Two employees are driving to a project site. Driver 1 drives no more than 11 hours, and Driver 2 can drive no more than an additional 3 hours. Or Driver 1 drives 7 hours and Driver 2 drives 7 hours. The combination of driving hours cannot exceed 14 hours.
 - o Example #3 – Three employees are driving to a project site. Driver 1 drives 5 hours, Driver 2 drives 5 hours, and Driver 3 can drive no more than 4 hours. The combination of driving hours cannot exceed 14 hours.
- **60/70-Hour Limit: May not drive after 60/70 hours on duty in 7/8 consecutive days. A driver may restart a 7/8 consecutive day period after taking 34 or more consecutive hours off duty.**

Vehicles (except those greater than 10,000 pounds - F-350s and Sierra) marked with DOT numbers and not pulling trailers (so less than 10,001 lbs. in aggregate), are not classified as Commercial Motor Vehicles, and can be operated by any authorized employee.

This section applies to Driver Records that are maintained by and programs that are coordinated by HR

Each DOT driver must have a Drivers' Qualification File containing the information listed below. HR is responsible for developing and maintaining these files and the information in them.

- Driver's Application for Employment
- Drivers Record from state agency cover previous 3 years
- Driver's Road Test Certificate
- Annual Inquiry to State Agencies for Driving Record
- Annual Review of Driving Record
 - o Documentation that drivers meet the minimum requirements for safe driving and have no disqualifying offenses:
 - o Loss of driving privileges
 - o DUI
 - o Transportation of controlled substances
 - o Leaving the scene of an accident
 - o Felony involving the use of a motor vehicle
- Annual Driver's Certification of Violations
 - o Drivers must furnish a list of all violations of motor vehicle traffic laws during the previous 12 months
- Medical Examiner's Certificate
- Inquiry to Employee's Previous Employers (3 years)

Each DOT driver must have a DOT physical, and be included in a DOT Drug/Alcohol Testing Program, which include:

- Pre-employment Testing
- Post-accident Testing
- Random testing
 - o 10% of annual drivers for alcohol
 - o 50% of annual drivers for controlled substances
- Reasonable Suspicion

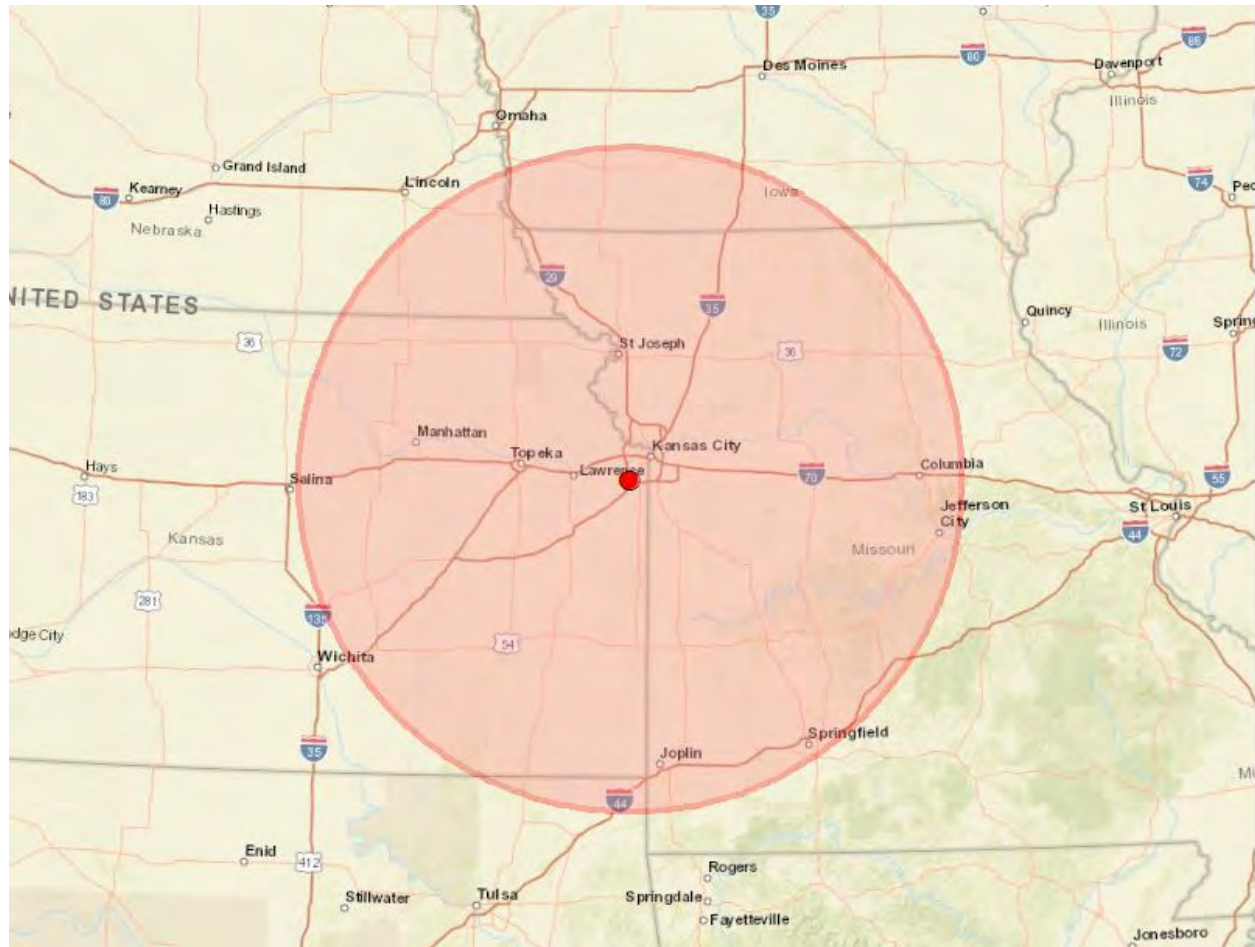
150 AIR MILES FROM OFFICE OF ORIGIN MAPS**ATHENS, PA**

A map of Texas with a large red circle centered on Austin, indicating the area of influence for the Texas Department of Transportation (TxDOT). The map shows major cities, highways, and geographical features. Key cities within the red circle include Austin, San Antonio, Waco, Killeen, and Bryan. Major highways shown include I-35, I-40, I-10, and I-290. The map also shows the Gulf of Mexico to the east and the border with Mexico to the south.

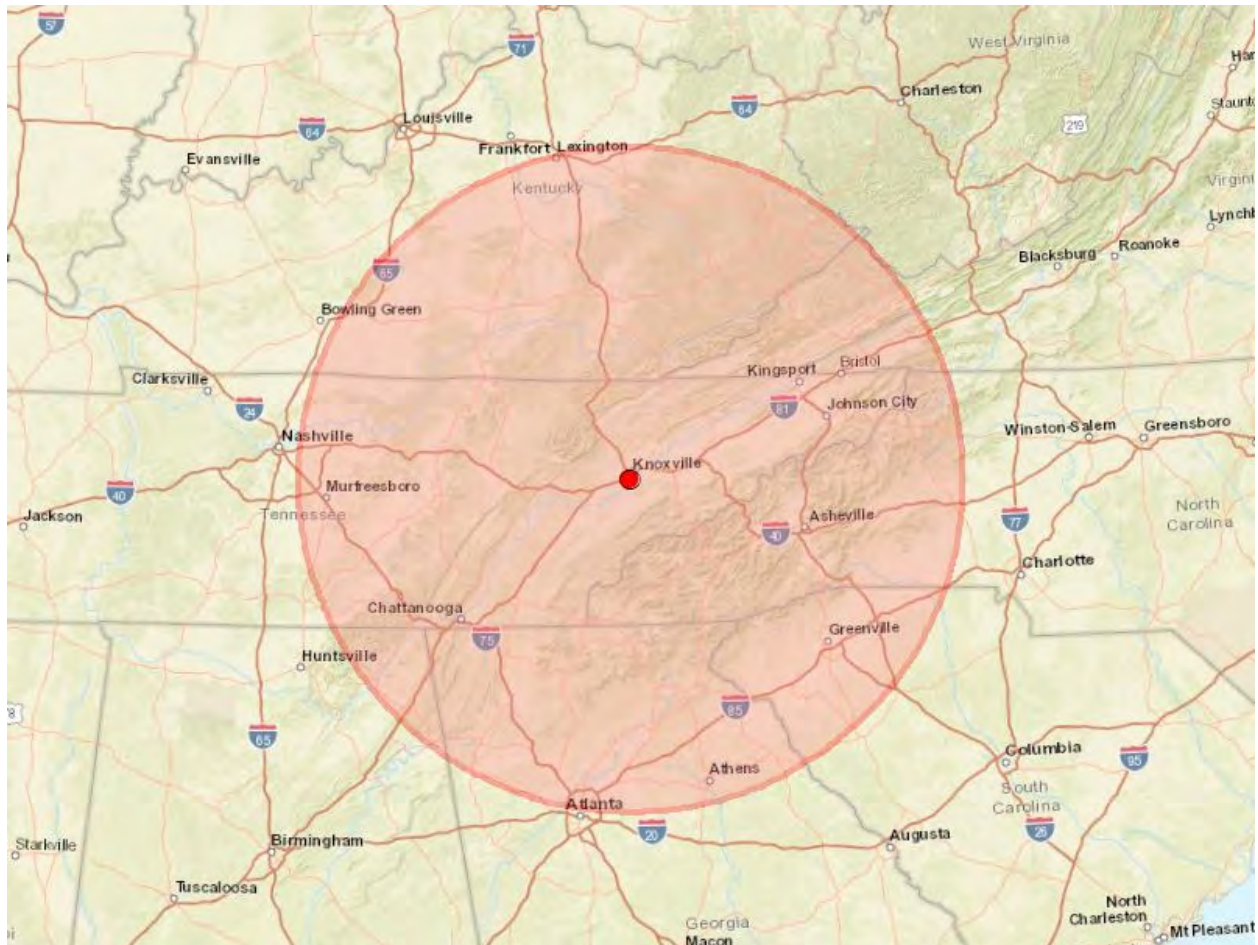
CHARLOTTE, NC



KANSAS CITY, KS



KNOXVILLE, TN

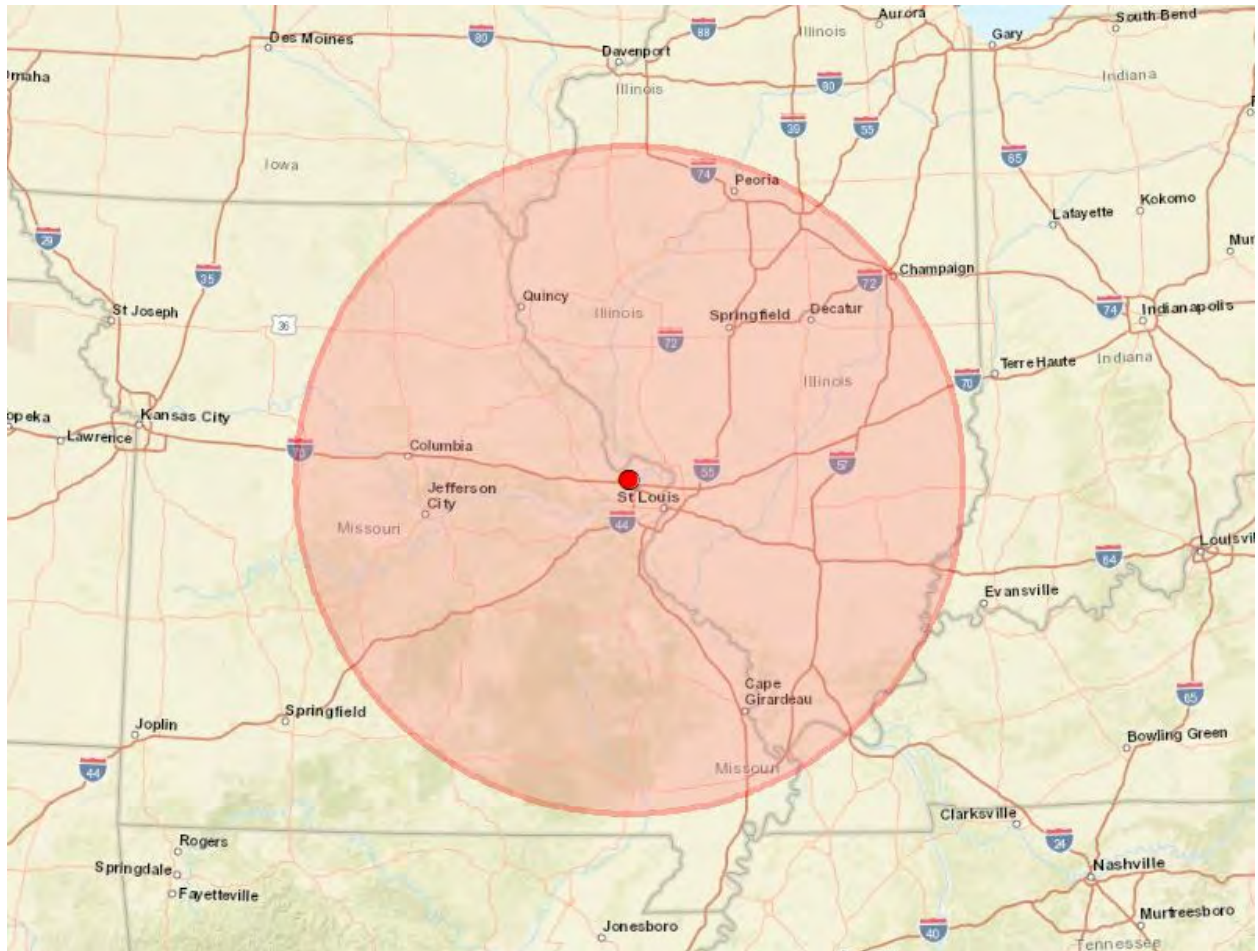


NASHVILLE, TN



PITTSBURGH, PA

ST. LOUIS, MO



GENERAL SAFE OPERATING PRACTICES

WET WEATHER SAFETY

[WSM100.21](#)

Building issues:

1. Employees should be aware and alert to wet floor hazards in their area and report them to the individual responsible for notifying building maintenance.
2. Housekeeping and custodial crews shall inspect entrances and remove water accumulation throughout the work day.
3. Door mats should be periodically examined for saturation.
4. Umbrella and wet apparel should be stored in enclosed containers and away from door and entrance ways.
5. Accessible handrails should be used to aid in preventing slipping accidents.
6. Report and document in writing leaks found around doors, windows and other locations to the building maintenance staff and building owner.

Driving issues:

7. Adjust travel times and travel speed to road conditions.
8. Ensure adequate visibility by keeping windshield wipers at optimum capacity.
9. Use headlights on overcast and rainy days. If wipers are in use, turn on daytime running lights or headlights.
10. Do not take street vehicles off road during wet weather conditions. Use off road vehicles where available.
11. Listen for updated weather conditions and take appropriate precautions to ensure safe arrival at your destination.
12. Ensure tires are in good condition.

GENERAL SAFE OPERATING PRACTICES USE OF MOBILE ELECTRONICS WHILE DRIVING

[WSM100.22](#)

Hazard Review

Bodily Injury
Inattention to Road Conditions
Single Vehicle Accidents

Property Damage
Mental Distraction
Multiple Vehicle Accidents

The use of mobile electronic devices of any type including, but not limited to, cell phones, Blackberry, Smartphones, iPads, iPods, or GPS units while driving may distract the driver from the safe operation of the vehicle resulting in a hazard to the driver, passengers, and the general public. The prime responsibility of the driver is the safe operation of the vehicle. The objective of this safe operating practice is to aid in the safe operation of company, rental, or private vehicles while an employee is on work time and conducting activities within the scope of business. This SOP does not prohibit passengers from the use of mobile electronic devices as long as such use does not distract the driver.

All Cell Phone Usage

Employees must adhere to all federal, state or local rules and regulations regarding the use of mobile electronic equipment while driving. Accordingly, employees must not use such equipment if such conduct is prohibited by law, regulation or other ordinance. It is the employee's responsibility to determine whether such use is restricted or prohibited in a particular area.

While driving for business purposes, employees shall not use hand held cellular communications devices. If permitted by law, regulation, or other ordinance, employees may use hands-free devices.

The use of hands-free devices shall not be used under moderate to heavy traffic conditions or during hazardous weather conditions requiring enhanced driver attention. At all times, it is the employee's responsibility to judge whether permitted cellular phone use would jeopardize safe vehicle operation and act accordingly.

Employees are responsible for the distraction created by placing or taking calls while driving. To avoid distraction, incoming calls can be allowed to go to cellular voice mail for a return call later. The employee can also locate a lawfully designated area to pull over and park before making or taking a call.

Discipline

Employees who are charged with traffic violations resulting from the use of cellular devices while driving will be solely responsible for all liabilities that result from such actions. Violations of this policy will be subject to disciplinary procedures, up to and including dismissal.

GENERAL SAFE OPERATING PRACTICES STOP WORK AUTHORITY AND PROCESS

[WSM100.34](#)

1. A goal of Civil & Environmental Consultants, Inc. (CEC) is to provide and maintain a safe work environment for employees and subcontractors. CEC management acknowledges the role of the employee in, and fosters the free exercise of employee Stop Work Authority as a necessary part of achieving this goal. CEC management is responsible for the communication, implementation and follow-up actions required by this safe operating practice.
2. CEC Employees and Subcontractors contracted by CEC have a personal responsibility to report safety hazards identified during the performance of Work.
3. The Stop Work process involves four-steps: stop work, notification, investigation and correction, and resuming work. Each employee will be trained in the requirements of the Stop Work process before initial assignment. Training will be documented for each employee.
4. Stop Work - Each employee has the authority to stop work when the health and safety risks associated with the performance of a task are not clearly understood or safe work procedures are not in place or established. Employee exercise of stop work authority will be without reprimand or performance evaluation consequence.
5. Notification: Hazards, unsafe working conditions, unclear or uncertain health and safety conditions must be reported to the on-site CEC employee responsible for performance of the Work and be documented in field notes.
6. Investigation and Correction: The on-site CEC employee responsible for the performance of the Work is required to :
 - Inform the CEC Project Manager of the stop work intervention;
 - Make written notes describing the employee safety concern/ stop work intervention;
 - Assess the hazards, working conditions, and take direct action to mitigate or correct the hazards or conditions;
 - Provide the documentation to the CEC Project Manager of the hazard assessment and mitigation performed;
 - Make written notes on the resolution of the reported safety hazard or working condition; and
 - Communicate the resolution of the reported safety hazard to the employee reporting the hazard and other affected employees or Subcontractors.
7. Resuming Work: Work shall not resume until the employee issues or concerns have been resolved and the resolution has been clearly communicated to the affected employees and subcontractors. The closure of the stop work process should be reviewed with the Project Manager, Project Team including necessary documentation to identify changes to work practices. The CEC Project Manager is to follow through with implementation of the changes to work practices.

1.0 PURPOSE

CEC field employees have the potential for exposure to stinging or biting insects, which can be hazardous to outdoor workers. Stinging or biting insects include bees, wasps, hornets, biting flies (deer, black, stable and horse flies), mosquitoes, and fire ants. This procedure has been developed to reduce the potential for adverse reactions to employees.

2.0 SCOPE

Bees, wasps, and hornets are most abundant in the warmer months. Nests and hives may be found in trees, under roof eaves, in the ground, or on equipment such as ladders. This procedure applies to all CEC field operations where the potential for exposure to stinging or biting insects exist.

3.0 HAZARDS

The health effects of stinging or biting insects range from mild discomfort or pain to a lethal reaction for those who are allergic to the insect's venom. Anaphylactic shock is the body's severe allergic reaction to a bite or sting and requires immediate emergency care.

Many biting flies including no-see'ums, black flies, horse flies, deer flies, and mosquitoes breed in water or in mucky areas near ponds and swamps. Certain mosquitoes are carriers of vector-borne diseases such as West Nile virus. Biting flies are most active in still-air areas. Many biting flies are active at certain times during the day and particular months during the year. Horse flies, deer flies, black flies, and stable flies are usually most active during the day. Mosquitoes and No-see'ums are usually most active around sunrise and sunset. Deer flies and black flies are most prevalent in early to late spring. Mosquitoes and No-see'ums are most abundant during summer months, but may bite at any time during the year.

4.0 CONTROLS

Employees should take the following steps to prevent insect stings and bites:

1. Be aware of known allergic reactions that you or co-workers may have to insect stings and discuss appropriate medical care should a sting occur.
2. Employees with known allergic conditions should carry doctor prescribed emergency epinephrine auto injector (EpiPen, Twinject, etc.) with them during field activities, and should wear a medical identification bracelet or necklace stating their allergy. Employees should consider alerting their co-workers to this condition if they are comfortable doing so. Stings to an allergic employee who does not have an epinephrine auto injector available requires immediate medical attention.
3. Wear light-colored, smooth-finished clothing.
4. Avoid perfumed soaps, shampoos, and deodorants.
 - a. Don't wear cologne or perfume.
 - b. Avoid bananas and banana-scented toiletries.
5. Wear clean clothing and bathe daily. (Sweat may agitate bees.)
6. Wear clothing to cover as much of the body as possible.
7. Avoid flowering plants when possible.
8. Apply commercially available insect repellent approved for the insect type. If necessary, application of a repellent labeled for biting fly protection may be appropriate. It is always

important to apply products according to label directions and to reapply only as needed. Most repellents do not work as well for biting flies as they do for mosquitoes, and therefore must be reapplied more often. Re-apply after 4 hours.

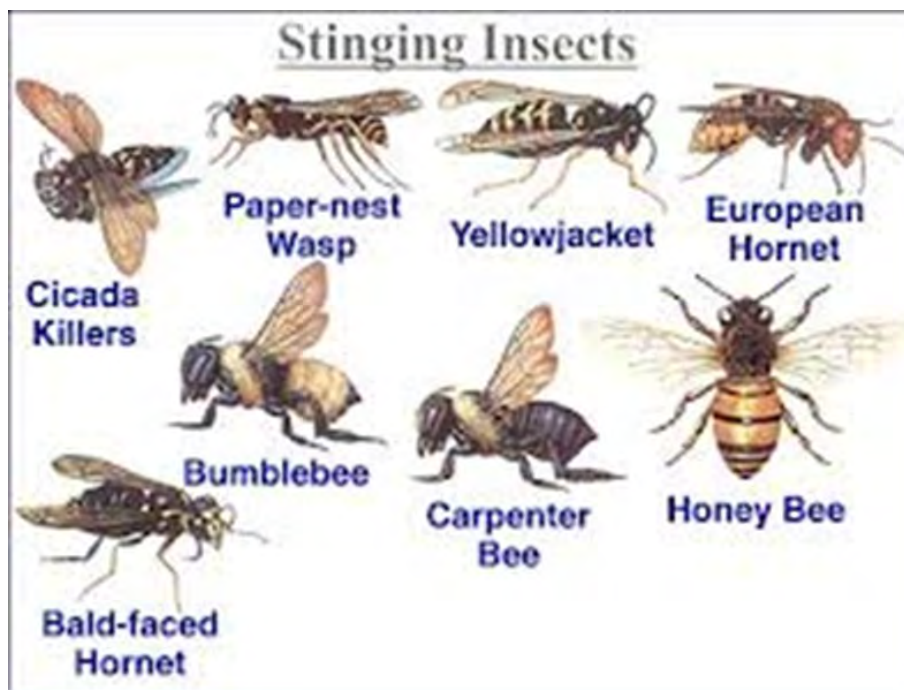
9. Keep work areas clean. Social wasps thrive in places where humans discard food, so properly dispose of food stuff and limit activities as much as possible away from areas where insect are attracted.
10. Remain calm and still if a single stinging insect is flying around. (Swatting at an insect may cause it to sting.)
11. If you are attacked by several stinging insects at once, run to get away from them. (Bees release a chemical when they sting, which may attract other bees.)
12. Go indoors.
13. A shaded area is better than an open area to get away from the insects.
14. If you are able to physically move out of the area, do not attempt to jump into water. Some insects (particularly Africanized Honey Bees) are known to hover above the water, continuing to sting once you surface for air.
15. If a bee comes inside your vehicle, stop the car slowly, and open all the windows.

4.1 First Aid

If a worker is stung by a bee, wasp, or hornet:

1. Have someone stay with the employee to be sure that they do not have an allergic reaction.
2. Wash the site with soap and water.
3. Remove the stinger using gauze wiped over the area or by scraping a fingernail over the area.
4. Never squeeze the stinger or use tweezers.
5. Apply ice or ice pack to reduce swelling.
6. Do not scratch the sting as this may increase swelling, itching, and risk of infection.

4.2 Identification of Common Stinging Insects



1.0 PURPOSE

Most CEC field employees have the potential to be exposed to at least three types of poisonous plants: poison ivy, poison oak and poison sumac. This procedure has been developed to minimize the potential for adverse reactions to employees.

2.0 SCOPE

This procedure applies to all CEC field operations where the potential for exposure to poisonous plants exist.

3.0 HAZARDS – POISONOUS PLANTS

Exposure to poison ivy, poison oak, and poison sumac, can be miserable. Reactions range from mild (very little or none) to severe (rash and blisters). Employees who have no reaction may not have become sensitized, but once they are, future exposures can result in an allergic reaction of increasing severity. Even with treatment, you can expect several days or weeks, of itching. And since most people are sensitive to, and have a reaction when exposed to poison ivy and these other plants, avoiding them is important. But to avoid them, you have to learn what they look like.



To avoid these plants, in addition to the basic 'leaves of three, let it be', you should look for these characteristics of poison ivy, poison oak, and poison sumac:

3.1 Poison Ivy Identification

1. Frequently found around lakes and streams in the Midwestern and the Eastern parts of the United States and is also commonly found growing along trails and roadsides

2. Poison ivy grows as a woody, ropelike vine that can grow along fences or up trees, a trailing shrub on the ground, or a freestanding shrub
3. It normally has three leaflets (groups of leaves all on the same small stem coming off the larger main stem), but may vary from groups of three to nine
4. Leaves are green in the summer and red in the fall yellow or green flowers and white berries

3.2 Poison Ivy Pictures

These pictures of poison ivy will help make it even easier for you to identify and avoid these plants:



Photo Credits (in order of appearance):

- Robert H. Mohlenbrock @ USDA-NRCS PLANTS Database / USDA SCS. 1991. Southern wetland flora: Field office guide to plant species. South National Technical Center, Fort Worth, TX.
- Jennifer Anderson @ USDA-NRCS PLANTS Database
- Copyright: Steve Katz Usage: Royalty Free from istockphoto.com
- Copyright: Audrey Roorda Usage: Royalty Free from istockphoto.com

4.0 CONTROLS – POISONOUS PLANTS

4.1 Preventing a rash from poison ivy, oak, or sumac

You can prevent a rash by staying away from the plants. If this is not possible, be sure to follow these tips:

1. Use a barrier cream that helps prevent the skin from absorbing the oil (urushiol) that causes the rash. These products usually contain bentoquatam. The Office Safety Coordinator should be able to coordinate provision of these creams.
 - a. Those with known sensitivity to poisonous plants must apply these barrier creams or a pre-contact spray to all body parts susceptible to exposure. Re-apply at least every four (4) hours.
2. Wear long pants, long sleeves, boots, and gloves when around these plants. Even when you apply a product that contains bentoquatam, you should protect your skin with clothing.

If you do touch one of these plants, you may prevent a rash by:

1. Apply an Ivy-Wash product that is designed to remove the urushiol from the skin. Those with known sensitivity must have this product available for all fieldwork, and must use it during breaks and after fieldwork concludes each day.
2. Washing your skin well. Use lukewarm water and soap as soon as you think you've touched a plant.
3. Washing all clothing and everything else that may have the oil on it. Urushiol (you-ROO-shee-all) can cause a rash even when it is not on the plant. It remains active for a long time.

4.2 Guidance on Treating Poison Ivy (from the American Academy of Dermatology)

Many people get a rash from poison ivy, poison oak, and poison sumac. This rash is caused by oil found in the plants. This oil is called urushiol. The itchy, blistering rash often does not start until 12 to 72 hours after you are exposed to the oil. The rash is not contagious and does not spread. It might seem to spread, but this is a delayed reaction. Most rashes can be left alone and will go away in a few weeks.

For a *mild rash*, you can often ease your discomfort by doing one or more of the following:

1. Apply hydrocortisone cream or calamine lotion to the rash.
2. Take antihistamine pills.
3. Place cool cloths on your skin or take a cool shower.
4. Take a lukewarm bath and add oatmeal or baking soda to the water to help calm your skin.
5. Try not to scratch. Scratching can cause an infection. Because the rash can be very itchy, dermatologists recommend keeping your skin and fingernails clean. This can help prevent an infection.

For a *serious reaction*, you should seek medical treatment. Use the following to decide whether your reaction is serious:

1. You have trouble breathing or swallowing, immediately go to an emergency room.
2. Nothing seems to help ease the itch and you have trouble sleeping due to the itch.
3. You have rashes on several areas of your body or the rash covers a large part of your body.
4. The skin around the rash seems infected. Signs of an infection are pus, pain, swelling, and warmth.
5. You have a fever (another sign of an infection).
6. The rash appears on your eyelids, lips, face, or genitals.
7. Your face swells, especially if an eyelid swells shut.

4.3 Rash Outcome

A rash from poison ivy, oak, or sumac usually lasts 1 to 3 weeks. Most go away without treatment.

Everyone who gets a rash from one of these poisonous plants should:

1. Wash the clothing and shoes you wore when you touched the plant. To remove the oil, you should wash these in hot sudsy water. If the oil is not washed off, the oil can stay active for a long time.
2. Wash everything else that might have touched the plants. Did any garden tools, sports equipment, or other objects touch the plant? If so, wash the objects with rubbing alcohol or a mix of water and bleach.

5.0 HAZARDS – HAZARDOUS PLANTS

Giant Hogweed, Wild Parsnip, and others shown below all produce sap that contains a toxic chemical called furanocoumarins. When these are exposed to the skin, it causes a reaction called phytophotodermatitis, which changes the way skin protects itself from ultraviolet (UV) light. If affected skin is exposed to sunlight, it causes a severe burn. This chemical reaction can happen as quickly as 15 minutes after getting the sap on the skin, but it can take up to 48 hours after the exposure for burn blisters to develop.

Most of the sap is located in the stem and the stalks that attach the leaves to the plants, so cutting the stem or tearing the leaves can release it. Sap is also found in the roots, seeds, and flowers.

5.1 Giant Hogweed

Giant hogweed is native to Asia, but invasive in North America. Contact with giant hogweed may cause severe irritation to the skin and eyes, blistering rashes, permanent scarring and even blindness. This plant earns the title of giant, regularly reaching heights of more than six feet and sometimes reaching up to 18 feet. Stems are thick and hollow with ridges and purple spots.

5.2 Poison Hemlock

Poison hemlock is native to Europe, Africa and Asia, but invasive in North America. All parts of this plant are highly poisonous to people and animals. Ingestion of even small amounts may result in death. This plant typically measures three to eight feet tall and has stems that are hairless and hollow with ridges and purple spots.

5.3 Spotted Water Hemlock

Spotted water hemlock is widespread and native to North America. Water hemlock is often called the most deadly plant in North America. All parts of this plant are highly toxic to people and animals. Ingestion may cause abdominal pain, convulsions, delirium, nausea, seizures and vomiting - often resulting in death. This plant typically measures three to six feet tall and has stems that are smooth and hollow. Stems may vary in color and pattern, from solid green or purple to green with purple spots or stripes.

5.4 Cow Parsnip

Cow parsnip is native to North America. It is listed as endangered in Kentucky and a species of special concern in Tennessee. Contact with cow parsnip may cause skin irritation, blistering rashes and skin discoloration. This plant can measure four to ten feet tall and has stems that are fuzzy and grooved.

5.5 Wild Parsnip

Wild parsnip is native to Asia and Europe, but invasive in North America. Yellow flowers help differentiate this species, but the effects are similar. Contact with wild parsnip may cause skin irritation, blistering rashes and skin discoloration. This plant typically measures two to five feet tall and has stems that are hairless and grooved.

5.6 Queen Anne's Lace

Queen Anne's lace is native to Asia and Europe, but invasive in North America. If you have sensitive skin, contact with Queen Anne's lace may cause skin irritation. Others may not experience any negative interactions. Before you consider handling this plant, make sure you're positive that it's not one of the similar-looking species listed above. This plant typically measures one to two feet tall and sometimes has a small reddish flower in the center. Stems are fuzzy with small grooves.

6.0 CONTROLS – HAZARDOUS PLANTS

Once the toxin is absorbed into the skin and is exposed to sunlight, some reaction is inevitable. That's why recognition of the plants and avoidance is so important. If exposure does occur, immediately cover exposed skin until it can be washed with soap and water.

To relieve symptoms:

- Cover affected area with a cool, wet cloth.
- If blisters appear, try not to rupture them as long as possible.
- To avoid infection, keep area clean and apply antiseptic cream.

If blisters and swelling do not improve, immediately contact AllOne Health and get medical attention.

Revised 05/202021

ADDENDUM

Poison Ivy/Oak/Sumac Prevention Protocols

Note: Not everyone has an allergic reaction to poison ivy, poison oak, poison sumac, etc. While one individual may not be allergic, a co-worker might be, and the oils that cause the reaction can be transferred from person or equipment to person. Following the protocols outlined below are important and necessary to limit the potential for allergic reactions to yourself and potential transfer of oils to others.

All field staff are required to be able to identify common poisonous plants typically encountered in their region (including but not limited to poison ivy, poison oak, and poison sumac, and giant hogweed). Examples of these plants can be found in WSM100.45. When working in a location where poison ivy has been seen, or is anticipated, ensure that field vehicles are supplied with:

- Trash bags that can be used for disposal of contaminated PPE and securing contaminated clothing for laundering
- Dawn® dishwashing liquid
- Sufficient water for washing exposed areas
- IvyX® **Pre-Contact Poison Ivy Barrier Lotion** (or similar pre-contact barrier treatment)
- tecnu® Extreme or IvyX® Post-Contact Skin Cleanser (or similar post-contact wash)
- Zanfel® Wash for Poison Ivy, Oak, & Sumac

All field staff must implement the following precautions before entering any area where poison ivy might be present:

- Apply IvyX® **Pre-Contact Poison Ivy Barrier Lotion** (or similar pre-contact barrier treatment) to:
 - o Face and neck
 - o Hands and forearms
 - o Ankles and calves above the boot
- Once the lotion has dried, ensure that pants are down over socks, and that shirt sleeves are rolled down all the way and buttoned.
- If practical for the scope of work being performed, wear nitrile surgeons' gloves. This includes wearing them under any other gloves being worn.
 - o The primary purpose of this step is to protect the skin against contact with the oils that may soak through outer gloves, or is on clothing when it's replaced.

When leaving areas where poison ivy has been encountered, all field staff must implement the following actions:

- Wipe clean or wash any surfaces that your gloves or clothes might have come into contact to remove the oils (equipment, truck seats, steering wheel, etc.).
- Remove any outer gloves, if worn, and discard in trash bag.
- Remove nitrile surgeons' gloves, if worn, by turning them inside out as they are pulled off, and discard in trash bag.

- If a change of clothes is available, put on a new pair of nitrile surgeons' gloves, and then remove any potentially impacted clothing (shirt, pants) and store in separate trash bag until they can be laundered.
 - o Remove nitrile surgeons' gloves by turning them inside out as they are pulled off and dispose in trash bag.
- Wash hands, neck, face, and other potentially impacted areas with Dawn® dishwashing liquid. Rinse.
- Wash hands, neck, face, and other potentially impacted areas with a post-exposure ivy wash, like tecnu® Extreme or IvyX® Post-Contact Skin Cleanser (or similar post-contact wash)

Monitor areas of potential exposure for development of rash or other poison ivy symptoms. If a rash develops:

- Follow the instructions to apply Zanfel® Wash for Poison Ivy, Oak, & Sumac.
- Report incident to Office Safety Coordinator.
- Contact AllOne Health for follow-up care as required.

1.0 PURPOSE

There are many different kinds of wildlife that can pose a danger to workers in the United States. Different geographical regions deal with different types of wildlife. Snakes, both venomous and non-venomous, can be a major concern for many different workers across the U.S. It is important to consider if snakes could be in your work area and what steps need to be taken to prevent any type of injury or incident due to them.

2.0 SCOPE

This procedure applies to all CEC field operations where the potential for exposure to snakes exist.

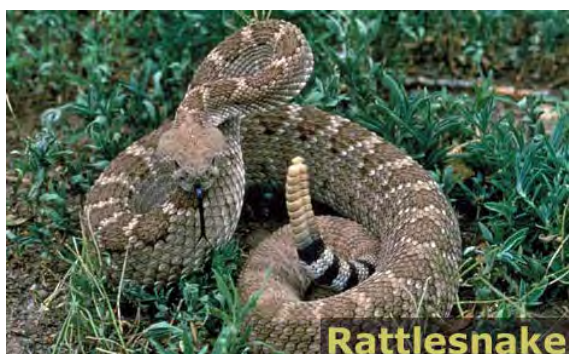
3.0 HAZARDS AND CONTROLS

There are four groups of venomous snakes in the United States. Pictures and approximate ranges are provided on Attachment 1. To protect against snakebites, the following guidelines should be followed:

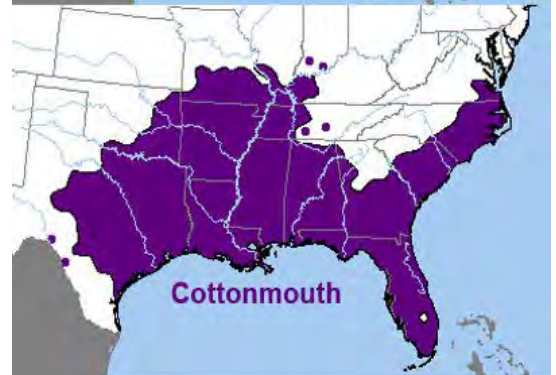
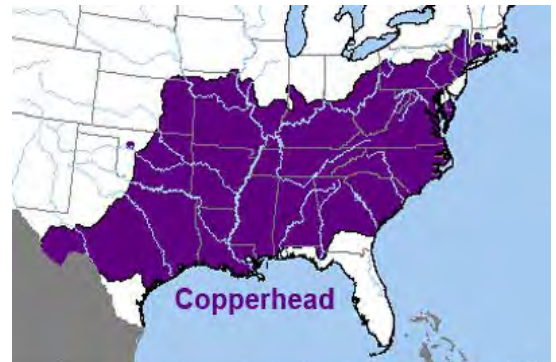
1. Employees shall wear work boots, long pants and long sleeved shirts when going into wooded areas and habitats conducive to snakes.
2. In areas known to be the habitat of venomous snakes, snake chaps, legging or other appropriate PPE shall be worn.
3. Employees working in areas where snakes are expected shall review this WSM in order to understand how to identify venomous snakes.
4. Employees working in vegetative areas where snakes are likely should be equipped with a bush axe or other brush cutter to clear underbrush and for protection. A machete is inappropriate, since it would put the employee too close to the snake.
5. Employees should avoid reaching or stepping into and over hidden and obscured areas.
6. Employees should make as much noise as possible when approaching a potential snake area. This alerts the snake to your presence and offers the snake time to leave.
7. To reduce your risk of snakebite, avoid touching any snake. Instead, back away slowly. Most snakes avoid people if possible and bite only when threatened, surprised, or handled.
8. According to the Mayo Clinic, if a snakebite occurs, the employee should:
 - a. Move beyond the snake's striking distance.
 - b. Remain still and calm to help slow the spread of venom.
 - c. Remove jewelry before you start to swell.
 - d. Position yourself, if possible, so that the bite is at or below the level of your heart.
 - e. Cleanse the wound, but don't flush it with water, and cover it with a clean, dry dressing.
 - f. Apply a splint to reduce movement of the affected area, but keep it loose enough so as not to restrict blood flow.
 - g. Don't use a tourniquet or apply ice.
 - h. Don't cut the wound or attempt to remove the venom.
 - i. Don't drink caffeine or alcohol, which could speed your body's absorption of venom.
 - j. Don't try to capture the snake. Try to remember its color and shape so that you can describe it, which will help in your treatment. If you have a smartphone with you and it won't delay your getting help, take a picture of the snake from a safe distance to help with identification.
 - k. Call 911 or seek immediate medical attention, especially if the area changes color, begins to swell or is painful.

ATTACHMENT 1

Types of Snakes



Locations for Snakes – Approximate, may be in other areas



FIELD SAFE OPERATING PRACTICES CONSTRUCTION SITES

[WSM200.2](#)

Hazard Review

Moving Equipment
Slips, Trips and Falls
Open Excavations
Working in and Around Water

Falling Objects
Hostile or Irrate Persons
Traffic
Surveying Activities

The purpose of this SOP is to identify common hazards that employees may encounter on construction sites. Due to their dynamic nature, all potential hazards cannot be covered in this WSM. Review the Project Safety Plan (PSP) before reporting to the site. Once on site, a hazard assessment must be performed to identify previously unidentified site-specific hazards and control methods. These additional hazards and controls must be documented on the Tailgate Safety Meeting Form (WSM200.25), or Daily Field Report Form, as appropriate.

Basic Precautionary Safety Measures for Construction Sites

- Park vehicle away from active construction areas and oriented in the direction you will head when leaving the site.
- Assess the construction site to identify physical hazards based on the work being performed by you or others.
- Stay out of the way of construction activities i.e. hauling, loading, parking construction equipment.
 - o When working near moving construction vehicles, keep eye contact with the operator if moving within a traffic area. Use a spotter whenever possible.
- Wear personal protective equipment consistent with the hazards that have been identified. At a minimum, this includes hardhat, safety glasses, high-visibility clothing, and safety or composite toe safety boots with puncture-resistant insoles.
- Check-in with site supervisor or foreman.
- Avoid standing, walking or working under suspended loads.
- Avoid standing, walking, or working within the swing radius of equipment.
- Avoid standing, walking, or working downslope of working equipment.
- Note changing conditions on the site and adjust your work as necessary.
- Wear proper clothing consistent with the site conditions, weather and temperature.
 - o Hi-visibility safety vests or shirts must be worn at all times on construction sites.
- Notify site supervisor or foreman when you are leaving the site.

Corrective Action

For all hazards identified in the Project Safety Plan, or during the daily site hazard assessment, utilize the controls from the PSP, or from any applicable WSM, to protect against those hazards. Where there are questions, do not hesitate to implement CEC's Stop Work Authority process.

WSM200.2 (continued)

<i>Safety Areas</i>	<i>Required Actions</i>
<i>Moving Equipment</i>	• All equipment with an obstructed view to the rear shall be equipped with an audible backup alarm or a "spotter" shall be utilized when equipment is operated in the reverse mode. • Do not approach heavy equipment from the rear. Approach from the operator cab side, make eye contact and visually receive a signal from the operator that he sees you before approaching
<i>Slips, Trips & Falls / Walking & Working Surfaces</i>	• Workplaces must be kept clean, orderly, and sanitary. Move or keep clear of obstructions that could create a hazard • Use extra care when working in/around wet, muddy or slippery conditions.
<i>Open Excavations</i>	• CEC employees shall not enter excavations such as pipe trenches (storm drain, under drain, and utility), undercuts, drainage structures, borings, foundations, or retaining walls unless protective systems meeting the requirements of 29 CFR 1926.652 are in place.
<i>Working In and Around Water</i>	• Don't work alone. Be certain to let others know where you're going and when you're expecting to return. • Know the weather forecast. • Wear appropriate personal protective equipment consistent with the hazard • Unless required for work, never wade in swift or high water.
<i>Falling Object</i>	• If working on a construction site where objects can fall from above, make sure that at least one of the following is in place: • Protection from falling objects • Toeboards • Screens • Guardrail system • Barricaded area • Canopy structures
<i>Hostile or Irrate Persons</i>	• If warranted, request law enforcement assistance if the situation escalates into a dangerous condition or if any apparent physical danger is present. • Remain calm. Use a calm voice to respond to the individual. • Where possible, keep a non-threatening item between you and the individual. • Avoid an argument or physical confrontation with the individual(s). • Back away from the situation and leave the scene if possible. • Ensure that others in surrounding areas are immediately notified of the situation. • Maintain visual contact with hostile party from a safe distance. • Always remember to Retreat, Request help, and to Regroup when necessary.
<i>Traffic</i>	• Whenever possible, work should be conducted without any intrusion into a travel lane or within 2 feet of a travel lane. • For work on shoulders that must intrude upon the above area, signs, protective vehicles, and/or flaggers may be required.

WSM200.2 (continued)

<i>Surveying Activities</i>	• Use extreme caution to stay clear of operating vehicles and equipment. Always establish eye contact with operator before approaching. • Proper lifting techniques shall be used. Get help or use equipment if necessary (e.g. lifting and carrying EDM and supplies). • Be careful when removing manhole covers or grates to avoid back strain and avoid feet and finger pinch points. • If working near water, such as on a bulkhead or in a boat, inform each other of your swimming abilities and always wear a personal floatation device.
ADDITIONAL HAZARDS	
<i>Fall Protection</i>	CEC personnel shall assess and avoid areas where fall protection is required unless they have been specifically trained in fall protection (refer to WSM400.8). The assessment should include: • Safety railing meeting the requirements of 29 CFR 1926.451 is required on all substructure and superstructure false work more than 4 feet above the ground. • On operations more than 6 feet above the ground where the use of other fall protective measures is impractical, fall protection shall consist of the use of harnesses and lanyards. Note: safety belts cannot be used as fall protection, only as positioning devices.
<i>Crane Safety</i>	• Avoid walking or driving underneath suspended loads. • Avoid walking, standing, or driving within the swing area of the rotating superstructure of the crane. • When used to hoist personnel, the personnel basket shall meet OSHA requirements. Cranes shall be equipped with controlled load lowering and a two block damage prevention devices.

Related SOPs

General SOPs – WSM100 series

Excavating, Trenching and Shoring – WSM200.13

Equipment SOPs – WSM300

FIELD SAFE OPERATING PRACTICES

GEOLOGIC FIELD MAPPING

[WSM200.5](#)

Hazard Review

Irregular, Unstable or Uneven Terrain	Slips, Trips, and Falls	Changing Weather Conditions
Irate Landowner	Poisonous Snakes, Insects, & Plants	Sun and Heat Hazards
Flying/Biting Insects	Domestic and Wild Animals	Open Water/Deep Mud

1. Review files for information on past hazards.
2. Take and wear personal protective equipment for hiking and sampling (vest, boots, glasses, insect repellent, sunscreen). Wear blaze orange vests when working in wooded areas during hunting season.
3. Notify office of your intended travel plans. Bring cell phone.
4. Use sun block lotions and wear appropriate clothing, such as a long sleeve shirt to prevent sunburn. Know signs, symptoms, preventive measures, and treatment of heat exhaustion, dehydration, and heat stroke. Observe the Air Quality Index (AQI) and follow the recommended actions. Drink plenty of water and rest frequently in shade during excessive heat or high ozone alerts.
5. Park vehicle away from obvious potential hazards (traffic, unstable slopes, etc.).
6. Upon arrival, conduct a visual hazard assessment to determine potential hazards in the area where you will be working or traveling. Carefully observe the terrain to avoid holes and other slip, trip and fall hazards. Notify someone at the site of your presence, if possible.
7. Be aware of and avoid poisonous plants around site.
8. Wear boots or snake leggings when working in conditions favorable for the presence of snakes. Avoid snake-infested and brushy areas until cleared and checked. Use insect repellent. Wear long sleeves, light clothing, and tuck pant legs in socks when traversing through areas that support the presence of ticks. Seek immediate help in case of snake or spider bites. Avoid wasp or hornet nests. If allergic to these insects, inform your coworkers about the measures to take should you get stung.
9. Look for and avoid farm animals. Note demeanor of domestic dogs and contact owner if needed. In wilderness areas, make plenty of noise to alert animals. Avoid contact with wild animals showing any possible signs of distemper or rabies. Be aware of and cautious of dens/holes that you may come across.
10. Be cautious while moving on irregular terrain and around top/bottom of high walls or slopes.
11. Be aware of on-site equipment in operation around you, and stay visible to operator(s). Use orange safety vest to increase visibility.
12. Avoid unventilated, confined spaces.
13. Be aware of tall vegetation and deep leaf cover that may hide holes, fire ant hills, yellow jacket nests, etc.
14. Bathe and wash field clothes in hot soapy water as soon as possible after returning.
15. Periodically check for ticks on yourself. Report to your supervisor the body part where any attached ticks are found. Monitor/treat insect bites for several days.
16. Be aware of changing weather. Avoid tall trees or antennas in case of lightning. Seek shelter in vehicles away from tall objects during periods of nearby lightning strikes.

WSM200.5 (continued)

17. Avoid working alone where possible. Ensure access to communication devices (radio or cell phone) when working in isolated areas or when working alone.

Related SOPs

General SOP's- WSM100 Series

Environmental Assessment Activities-WSM200.20

Surveying Activities -WSM200.4

WSM200.5 - Rev. 11/2006

FIELD SAFE OPERATING PRACTICES WASTE MATERIALS HANDLING AND STORAGE

[WSM200.14](#)

Hazard Review

Chemical Burns
Toxic Environment
Explosives

Slips, Trips and Falls
Pinch Points
Unknown Substances

This field safe operating practice is to be followed by employees of Civil & Environmental Consultants, Inc. when project activities involve waste materials generated from the activities.

1. Identify potential waste materials that are present or may be generated by project activities as part of project and/or project safety plan.
2. Many materials (e.g., steel, aluminum, copper wire, etc.) may be recycled in lieu of disposal in a landfill. Options and availability of recycle options will be considered and recyclable materials segregated.
3. Determine the regulatory status of waste materials and define the handling and storage requirements for the materials. Consult with the project manager or client site manager to determine specific requirements for handling.
4. MSDS's should be read and complied with in relation to all hazardous materials on site.
5. Hazardous materials should only be handled by properly trained personnel.
6. Be familiar with the facility plans and other related rules/guides for handling hazardous waste materials. Notify the supervisor if a hazardous substance is spilled. Use proper procedure for cleanup, including the use of personal protective equipment.
7. Wear Personal Protection Equipment (PPE) consistent with the hazard and as directed by your supervisor.
8. Be aware of fire extinguishers, alarm and hose locations. Follow good housekeeping practices to reduce the risk of fires.
9. Be aware of loose or slippery materials, tripping hazards and other obstructions. Take appropriate measures to eliminate them.
10. Have local emergency and spill response phone numbers readily available.
11. Be aware of containers with unknown and/or unlabeled substances. Accidentally mixing waste materials could cause a chemical reaction resulting in fire, explosion, or atmospheric release of toxic vapors. Be alert for heat build-up, vapors, rumbling noise, etc. In such cases, stop work, vacate the area and notify supervisor.
12. Material handling equipment (forklifts, trucks, etc.) can result in punctures and the subsequent release of the contents within the container. Be alert for leaks, dampness, unusual debris and/or strange odors caused by airborne contaminants.
13. When project work is complete, make sure all waste materials and other materials used at the site are removed and site is orderly.
14. Complete all appropriate documentation.

Related SOP's

General SOP's – WSM100 Series
Fork Lifts – WSM300.2

FIELD SAFE OPERATING PRACTICES

EARTH MOVING ACTIVITIES

Including Grading on Sites

[WSM200.17](#)

Hazard Review

Moving Equipment	Poisonous Plants/Snakes/Insects	Noise
Slip, Trip and Fall	Suspended Loads	Utilities
Moving Traffic	Explosives	Temperature Extremes
Animals		

CEC personnel may be required to observe earth moving and grading activities at client sites. In these cases, CEC personnel should adhere to the following requirements.

1. Determine whether a traffic control plan is in effect at the site and if so, comply with the traffic control plan requirements.
2. Park in areas that provide safe entrance and exit of the work area; do not create potential conflicts with other vehicles and equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicles.
3. Wear appropriate personal protective equipment consistent with any potential hazard.
4. Employees on foot must use extreme caution to stay clear of operating equipment. Always establish eye contact with operator before approaching equipment. Avoid areas behind moving equipment.
5. Be aware of escape routes in case of emergency. It is a good practice to work facing oncoming traffic while on foot.
6. Take extra precautions to prevent heat and cold stress when working in extremely hot or cold temperatures.
7. Be aware of loose material, excavation drop-off, tripping hazards, uneven ground and other obstructions.
8. Be aware of poisonous plants, insects, snakes, animals, and animal waste products and carcasses. It is a good practice to wear long sleeve shirts, gloves and high-top boots when hazards cannot be avoided.
9. Avoid walking and working under suspended loads. Wear hard hat when working around backhoes, cranes, excavators or where there is a potential for overhead falling objects.
10. Before backing any vehicle that you are operating, make sure area is clear and use an observer when available.

Related SOPs

General SOPs –WSM 100 Series

WSM200.17 - Rev. 12/2006

FIELD SAFE OPERATING PRACTICES HAND REMOVAL OF VEGETATION

[WSM200.19](#)

Hazard Review

Chain Saws
Sharp Edged Tools
Poisonous
Plants/Snakes/Insects

Thorns
Unwieldy Brush
Slip, Trip and Fall
Overcrowding of Workers

Moving Equipment
Utility Lines
Animals

1. Review Safe Operating Practices for applicable equipment and perform pre-operational checks.
2. Determine whether a traffic control plan is needed and if so, what the requirements for traffic control are. Comply with the traffic control plan requirements.
3. Park in areas that provide safe entrance and exit to the work area. Do not create potential conflicts with other vehicles and equipment operating in the work area and provide maximum protection for workers getting in and out of their vehicles.
4. Wear appropriate personal protective equipment consistent with the hazard. Hearing, face, and eye protection and chaps are required when using chain saws or chippers. The use of worker leg protection is required when operating chain saw.
5. Cut and stack brush in pieces that are easily handled to avoid back injuries.
6. Utilize appropriate mechanical means when moving large quantities of brush.
7. Be aware of poisonous plants, insects, snakes, animals, and animal waste products and carcasses. It is a good practice to wear long sleeve shirts, gloves and high-top boots when hazards cannot be avoided.
8. Allow ample space for each employee to work safely.
9. Stay clear of equipment operating in your work area. Always establish eye contact with the operator before approaching moving equipment.
10. Operators of power hand equipment must be trained and qualified according to WSM300.5 or WSM300.8.
11. Use caution when handling hand tools with sharp edges. Gloves and eye protection are required when sharpening tools.
12. Be aware of loose material, excavation drop-off, tripping hazards, uneven ground and other obstructions.

WSM200.19

13. Do not cut limbs that may contact overhead utility lines. Observe and stay clear of overhead utilities.
14. Tree-trimming which would require climbing shall only be performed by a trained specialist or with the assistance of a bucket truck.
15. Use extreme care when cutting trees, brush, etc. that are under stress, e.g., ice conditions.
16. Use appropriate disposal procedures for removed vegetation.

FIELD SAFE OPERATING PRACTICES OBSERVING DRILLING OPERATIONS

[WSM200.21](#)

Hazard Review

Moving Machinery Parts	Uneven Terrain	Adverse Weather Conditions
Cathead Operation	Drill Rod/Auger Stacking	Overhead Items
Slippery Surfaces	Noise	Winching
Buried and Overhead	Poisonous	Animals
Utilities	Plants/Snakes/Insects	Drill Rig Emissions
Moving Equipment	Lifting	

1. Field operation activities **with the potential for exposure to hazardous materials or hazardous wastes, whether known or suspected**, must comply with the CEC Corporate Health & Safety Program and all operations must be performed under a site-specific Health and Safety Plan – See WSM100.1.
2. Contact known landowner about any known environmental hazards in the drill area.
3. Conduct a site Hazard Assessment (See WSM 100.23) prior to beginning drilling operations.
4. Ensure that the state “One-Call” has been contacted and all drilling locations have been cleared before commencing drilling.
5. Ensure that operators and crew are properly trained in drilling operations and associated hazards.
6. Wear appropriate personal protective equipment consistent with the hazard and as noted by your supervisor. Never wear clothing or jewelry that could get caught in rotating equipment.
7. During drilling operations always be aware of the possibility of encountering potentially hazardous materials such as petroleum hydrocarbons, herbicides, pesticides, chemical manufacturing by-products, and/or solid waste materials. In the event that any unknown or questionable materials are encountered, immediately suspend the drilling operations and contact the Project Manager. Do not handle any suspected contaminated materials.
8. During drilling operations always be aware of the possibility of striking an unlocated or improperly located gas or power line. In the event that a buried utility line is struck, drilling operations are to be suspended IMMEDIATELY. If the utility line is electric, keep a safe distance from all metal surfaces connected with the drill rig. If the utility is gas, the area should be evacuated and secured. Immediate notification of the appropriate utility company is MANDATORY.
9. In the event of a gas or oil spill, the proper authorities shall be immediately notified so that contaminant removal operations can be implemented. The type of contaminant operation and proper authority will depend on the geographic location of the spill.
10. Avoid contact with rotating drilling equipment.
11. When cathead is in use, stay away from the travel path for the rope to avoid entanglement. Do not stand on the rope.
12. Observe and stay clear of overhead utility lines. (See WSM200.36)
13. Employees on foot must use extreme caution to stay clear of operating equipment. Always establish eye contact with the operator before approaching operating equipment.
14. Be aware of drop-offs, uneven ground and hidden objects which may create unstable drill set-ups or cause a loss of control when maneuvering drill rigs. In heavily wooded terrain, use additional measures to locate hidden/obscured hazards.

WSM200.21 (continued)

15. Drilling may release fluids that can create slippery conditions and ice during cold weather. Stay away from muddy or frozen areas. Move slowly and watch your step while walking.
16. A combination of conditions can lead to slippery surfaces. High groundwater conditions resulting in muddy soils brought to the surface by augers; as well as the utilization of drilling fluid are two predominant concerns. Be alert for these conditions!
17. Be aware of poisonous plants, insects, snakes, animals, and animal waste products and carcasses. Wear long sleeve shirts, gloves and high-top boots when these hazards cannot be avoided. Proper first aid and insect repellents shall accompany field crews. One employee in any crew must be trained and certified in First Aid.
18. Drilling operations shall be immediately suspended when conditions indicate an approaching lightning storm.
19. Be aware of overhead items that may come in contact with the drill rig while moving or setting up equipment.
20. DO NOT climb on drill rig or rigging. If it is necessary for the drilling subcontractor to climb on rigging, ensure all moving parts are shut down. The subcontractor should use lockout/tagout practices and fall protection measures pursuant to OSHA regulations and where necessitated by conditions.

Related SOPs

General SOPs – WSM 100 Series

FIELD SAFE OPERATING PRACTICES

SOLID WASTE-LANDFILL OPERATIONS

[WSM200.22](#)

HAZARD REVIEW

Biological Hazards	Vision Hazards	Poisonous Plants and Insects
Pressure Hazards	Slips, Trips, Falls	Domestic and Wild Animals
Noise	Vision Hazard	Windy Conditions
Chemical Exposure	Unstable Terrain	Temperature Extremes
Traffic Hazards	Hidden Hazards	

SITE-SPECIFIC INFORMATION

In preparation for site activities, contact the CEC project manager to determine the scope-of-services and field activities to be performed. At the end of your discussion with the project manager you should know the following:

- Site contact;
- What you will be doing, where, when, and for how long;
- Identify known hazards in the area of work;
- Procedure for site access (e.g. check-in, check-out, site-specific training);
- Required Personal Protective Equipment (PPE);
- Client requirements for safety;
- Special monitoring equipment required (e.g. four-gas meter);
- Traffic patterns at the facility (one-way roadways, parking restrictions); and
- Site emergency contacts and emergency communications procedures.

PERSONAL PROTECTION EQUIPMENT

CEC requires the use of approved foot protection, hard hat, safety glasses, hearing protection (where necessary), and high visibility clothing (WSM100.17) when performing work at a municipal solid waste (MSW) or construction & demolition (C&D) landfill. Site requirements for high visibility clothing (ANSI Class II vests/t-shirts or Class III jackets) shall be determined prior to departure to the site. The field vehicle shall be equipped with a first aid kit, eyewash, and hand sanitizer. Gloves appropriate to protect against the hazards associated with the work to be performed shall be worn if needed. Follow proper hygiene and hand washing requirements before eating and after leaving the site. Effort should be made to clean field boots, remove mud and other debris that may be stuck to your boots prior to entering a CEC owned or rented vehicle. A second pair of shoes is advisable to wear at the end of the day when leaving the site.

SOLID WASTE LANDFILL HAZARDS

A MSW or C&D Landfill is an active construction site with heavy equipment and waste vehicle traffic, uneven topography, trenches and depressions, steep slopes, slippery surfaces (aggregate and some geomembranes), ground obstructions (stock piles of earth, aggregate, pipe, rolls of synthetics, etc.) and potential gas (H₂S, NH₃, CO and CH₄) hazards. It is important to use all of your senses to identify and mitigate hazards. You must STOP, LOOK, LISTEN, and use your sense of SMELL constantly. If possible when planning to use a cell phone on site, either drive or walk away from moving heavy equipment, waste vehicles and other construction activity and find a safe location to stand or park your field vehicle in which to make the cell call.

WSM200.22 (continued)

Landfill Gas:

Oxygen deficiency and unknown chemicals, gases and vapors, with and without odors can be present at landfills. These include flammable and toxic gasses such as carbon monoxide, hydrogen sulfide (See WSM100.30), ammonia, and methane gas. Utilize personal air monitoring devices to ascertain the safe levels of these pollutants (methane – 1,000 ppm TLV, hydrogen sulfide – 1 ppm TLV/5 ppm STEL, carbon dioxide – 5,000 ppm PEL, others) and learn to recognize the distinctive odor of hydrogen sulfide and diesel exhaust to minimize exposure to them. During landfill gas well construction documentation and monitoring activities, stay upwind of open boreholes to minimize exposure to landfill gas. Boreholes have the potential to collapse, especially if the waste is saturated, so gas well construction observations should be conducted from a distance.

Leachate:

Landfill leachate contains high concentrations of chemicals that can be hazardous through direct skin contact or ingestion and can release hazardous gasses. If you will be working with or believe there may be a possibility of coming into contact with leachate, ensure you have gloves, splash guards, eye protection, Tyvek suits, etc. as required. Appropriate respiratory protection may also be required based on the activity to be conducted and the corresponding hazard assessment.

Driving on Site:

1. When on-site always drive defensively. Expect to see moving heavy equipment and waste hauling vehicles. Do *not* assume that they see you - always maneuver your field vehicle to avoid site traffic. Learn the site access roads and know what vehicles travel on them. When at the landfill site destination, park your field vehicle away from traffic patterns. Recognize the sound of heavy equipment (especially approaching off highway end dumps) and vehicle back up alarms and move your field vehicle away from the area.
2. Give heavy equipment and waste collection vehicles the full right of way on travel paths. Do not assume that the equipment or waste vehicle operator sees you. They cannot stop as quickly as your car or field vehicle.
3. Do not stop on a haul road running up or down a slope. Use it to get where you are going then pull off the road. Heavy equipment may not readily see you and have ample time to stop.
4. Never cross a haul road intersection without stopping. Roll down the window to look and listen for equipment and make sure the path is clear before crossing. Accelerate across the crossing so you are out of the pathway as soon as possible.
5. If you are traveling a single lane haul road, make sure you know which way the trucks are traveling and travel with the flow.
6. Watch for deep ruts, soil clods and large rocks within roadways. They can disable a low ground clearance vehicle.
7. You should primarily drive only on the site's designated roadways, with limited off road driving only as necessary to complete tasks or visit site areas too far to access by foot. Know that driving off site roads can increase the likelihood of damaging the field vehicle such as running over sharp debris that may cause tire damage, flats or slow leaks that can lead to dangerous highway driving conditions. Off-road driving increases the potential of "bottoming out" as the field vehicle may not be able to clear rocks and other hard debris thus striking and damaging the undercarriage components such as the oil pan.
8. Be careful of low areas both on and off road where stormwater collects. These depressions may be deeper than they appear and the field vehicle may sink and be unable to drive through and out of them.

WSM200.22 (continued)

9. Watch where you park your vehicle at the landfill site. Do not park on haul roads. It is best to park well off the road. High dust conditions can make your vehicle difficult to see and subject to collision.

Heavy Equipment:

1. Initially when approaching heavy equipment, ALWAYS assume that the heavy equipment operator does not see you. Keep a safe distance away either on foot or in your field vehicle from the equipment until you and the operator make eye contact and you can confirm that he sees you.
2. If you are working near or observing work done by heavy equipment, be aware of back up alarms. Note that back up alarms may not always be functional on equipment. If you determine that a given piece of equipment does not have a back-up alarm tell the contractor superintendent, landfill manager and your project manager. Most likely, the landfill site requires ALL heavy equipment and waste hauling vehicles to have a functioning back-up alarm.
3. Do not approach heavy equipment from the rear. The operators have limited visibility to the rear and may not be able to see you in their "6 o'clock position".
4. Do not approach swinging equipment (e.g. hydraulic excavator, gas well drill rig, a crane, etc.) from the rear. Approach this equipment from the operator cab side, make eye contact and visually receive a signal from the operator that he sees you before approaching.
5. If you must mount a piece of equipment, use the 3 point of contact method (See WSM100.5).
6. Stay away from any piece of heavy equipment towing or attempting to retrieve a stuck vehicle. A minimum distance of 1.5 times the distance between the two vehicles is required. Tow chains, cables, or straps can snap and cause personal injury or equipment damage.
7. If the dozer or compactor is pushing a load stay away from it, watch for pipes or long items kicking up.
8. Do not stand or park near a body-elevating dump truck while operating. Keep a minimum of 20-feet away from the truck. The wind, unstable and uneven ground and other vehicles can cause the dump body to tip over during operation.

Walking across a Landfill Site:

1. When walking the landfill site perimeter, near groundwater monitoring wells, landfill gas probes or other areas of interest where there is dense vegetation, recognize and mitigate hazards associated with poisonous plants, snakes, ticks, insects, and scorpions. Refer to WSM100.18.
2. Before conducting landfill density surveys, meet with the site manager(s) informing him of your plan to access and get survey shots of the working face area such that compactor and the other heavy equipment is idle while surveyors and or other field technicians are conducting the survey. When walking across or around the working face, be careful where you step, watch for items such as medical sharps, red bag wastes, signs of asbestos waste, and drums that could indicate hazards. Do not pick up medical sharps. Notify site management if you see sharps in vehicle turn around areas.
3. Some geosynthetic liner materials (e.g. geomembrane and geonet) become slippery when wet. Use caution when walking on these surfaces after rain events or early in the morning when surfaces may be covered with the morning dew.
4. Stand upwind when a dusty load is being pushed (fly ash, sand blast material, carbon black, etc.).
5. When walking across a landfill site, watch where you are walking. The ground surface is most likely uneven, equipment cleat marks, track marks, holes, trenches, settlement, protruding materials, debris, etc. can cause trips and falls.

WSM200.22 (continued)

6. Do not move or pick up landfill refuse materials. These materials may be sharp or have poisonous snakes, insects underneath them.
7. When walking, note the characteristics of a potential Sub Surface Oxidation (SSO) event area. These areas can exhibit depressions, smoke rising, surface heat, patches of dead or dying vegetation, and areas of sudden odors. These areas require extreme caution and should be avoided due to the potential for surface collapse. Let others (the project manager, on-site contractor(s), site manager(s) know that you are walking some specific area of the landfill site.
8. When walking along the crest of landfill sideslopes, be aware of signs of a potential slide or unstable slope. These signs include bulges at toe of the slope, severely tilted gas wells, parallel tension cracks and separation along the crest of the landfill slope.

SPECIAL AREA HAZARDS

Transfer Stations:

1. The inside of transfer stations can have low visibility from dust and typically poor lighting. As previously mentioned, do not assume the operator can see you. Waste depositing vehicles backing from the daylight into the dimly lit transfer station will not be able to see you in contrast to the waste piles. Do not walk across the tipping floor while vehicles are backing.
2. Transfer station floors can be covered with liquid and be slippery especially near the loading pit; floor cracks and irregularities are trip hazards
3. You should not position yourself between the waste piles and the dumping vehicles; always stay in front of the vehicles. If you must examine the waste load, make sure that the traffic lane is shut off before approaching the waste pile.

Solidification Pits:

- Stay outside the railed areas of solidification pits. Edges of the pits will be slippery from moisture or sludge residue. Be aware of splashing material. Hose off boots to remove contaminants, caustics or other potentially dangerous materials. If the site uses fly ash or cement kiln dust (CKD) as a solidification medium wear a disposable dust mask in the pit area, even if no actual mixing is taking place. Around the pit, a slight breeze can generate airborne particulates that present inhalation and ingestion hazards. Be aware of odors around the pit, if you smell ammonia exit the pit area immediately to a well-ventilated area. Watch for incompatible materials in the same pit generating gasses, odors, or excessive heat. Exit the area and report it.
- If you are handling anything around a solidification pit you should have nonabsorbent gloves (neoprene or rubber) so the liquids or solidified material do not contact your skin.
- Decontaminate or dispose of the hand protection to prevent contamination of your field vehicle or equipment.

Related SOPs

General SOPs –WSM 100 Series

FIELD SAFE OPERATING PRACTICES PLAN FOR THE DAY

WSM200.25

Purpose

Plan for the Day safety discussions are held at the beginning of each workday and are to be conducted for all field activities by CEC. The purpose of Plan for the Day is to have a conversation with the field employees about any potential hazards expected on the job during the upcoming day's work and determine which controls and personal protective equipment (PPE) are necessary to protect employees.

The Plan for the Day discussions can be conducted as a group, supporting several similar type projects (e.g. a practice group) or individuals on a project site. These safety discussions can be done in person, or virtually, before the daily site work activities occur. The expectation is these discussions are to be a dialogue between the project manager/leader of the field team(s) and the member(s) of the field team(s) to help identify hazards that may be encountered during the workday. Dialogue can be initiated by the project manager/leader of the field team(s) by asking open-ended questions, such as those noted on the attached form, to increase the focus on hazard awareness and proper planning and actions to help perform the field activities safely during the workday.

If CEC is a subcontractor for a project site, CEC employees should participate in the daily field safety meeting of the prime contractor and document the discussion of this meeting on their Plan for the Day form.

Process

1. Plan for the Day safety discussions shall be held at the beginning of each work period and when work hazards change. The discussions should promote an open dialogue and shall include:
 - a. A review and discussion of the field activities to be performed during the day.
 - b. Review the anticipated hazards and site conditions associated with the work. Consider anything that could result in changed conditions (rain, snow, temperature changes, seasonal changes that change groundcover) and how those changes should be considered when planning field activities to be performed.
 - c. Discuss potential safety scenarios that may occur during the workday ("What might happen if?")
 - d. Discuss the Project Safety Plan and any Safe Operating Practices (SOP's) and required PPE that relate to the tasks being performed that day. Does everyone have the necessary and appropriate PPE for the work activities?
 - e. Review of each person's responsibility for the day's work activities.
2. Utilize the Plan for the Day to support and help direct the discussion of the hazards. Document the completion of the Plan for the Day discussion using the form attached. This form can be utilized for multiple projects and project sites where field crews will be working for the day.

3. Discuss and remind all field employees to complete “Stretch and Flex” to prepare for the workday.
4. Review the topics of the Plan for the Day with any person that is not present at the initial meeting, prior to that person beginning work.
5. Complete the How was your Day section of the form at the end of the workday to document any injuries, incidents, near misses, stop work actions, lessons learned, or good catches. If any “yes” boxes are checked, CEC’s Incident Reporting Procedures shall be followed to make certain the appropriate notification requirements are being met.

If there are any changes to work procedures needed, the CEC Project Manager shall be notified immediately.

6. Save copies of all Plan for the Day records in the Safety folder of the Project directory.

PLAN FOR THE DAY SAFETY DISCUSSION



Civil & Environmental
Consultants, Inc.

Date: _____ Location(s): _____

Project Name(s): _____

Project No(s): _____

CEC Work Type: ☐ Observation ☐ General Field Work ☐ Surveying ☐ Design-Build

Plan for the Day Participants: _____

1. WHAT ARE THE SITE CONDITIONS LIKE TODAY?

2. WHAT IS THE WEATHER EXPECTED TO BE LIKE TODAY?

3. WHAT IS BELOW MY FEET AND ABOVE MY HEAD TODAY?

4. WHAT EQUIPMENT OR TOOLS AM I USING TODAY?

5. WHAT PPE DO I NEED TODAY?

**Minimum PPE required for all field activities is safety glasses, long pants, and hazard appropriate footwear*

☐ Safety Glasses ☐ Hard Hat ☐ Hi-Vis Vest ☐ Steel-toed boots ☐ Hiking Boots ☐ FR Clothing

☐ Long Sleeves ☐ Leather Gloves ☐ Rubber Gloves ☐ Goggles ☐ Face Shield ☐ Fall Harness ☐ Respirator

Additional PPE: _____

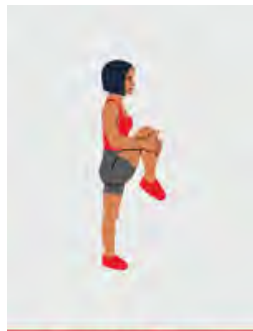
Are there any new or unexpected hazards not identified in the Project Safety Plan? ☐ Yes (list below) ☐ No

Are there any subcontractor activities that may impact work? ☐ Yes (list below) ☐ No

☐ Pre-Work Stretch & Flex Completed (see reverse side)



Toe Touch



Knee to Chest



Arm Circles



Shoulder Stretch



Quadriceps Stretch

HOW WAS YOUR DAY?

1. Did any injuries/incidents occur?

☐ Yes (list below)

☐ No

2. Did any near misses occur?

☐ Yes (list below)

☐ No

3. Did you implement a stop work action?

☐ Yes (list below)

☐ No

4. Are there any lessons learned/good catches to share?

☐ Yes (list below)

☐ No

5. Are there any changes to work procedures needed?

☐ Yes (list below)

☐ No

Questions 1 through 4: If any “yes” boxes are checked, CEC’s Incident Reporting Procedures shall be followed to make certain the appropriate notification requirements are being met.

Question 5: Project Manager must be notified immediately.

FIELD SAFE OPERATING PRACTICES

HOISTING EQUIPMENT

[WSM200.31](#)

Hazard Review

Slip, trip and fall

Falling Objects

Struck By

Hoisting equipment is used for raising, lowering and rigging equipment, material and supplies to overhead locations. This section will discuss guidance for the use of hoisting equipment. The services provided by CEC employees typically involves material handling of sampling equipment used to perform air, water and soils testing.

Hoisting and lowering sampling equipment safely requires:

- Rope and gloves
- A clear path in which to raise and lower the equipment
- A reliable method of stopping or controlling the rate of descent
- A pulley or block and tackle for lifting heavy equipment
- Support for the hoisting device
- Methods of attaching loads
- Reliable hooks and ropes

Safe use of rope requires sturdy gloves for protection of the hands and for a secure grip on the rope. Gloves with leather palms are usually effective.

All overhead hoists in use shall meet the applicable requirements for construction, design, installation, testing, inspection, maintenance, and operation, as prescribed by the manufacturer.

Hoisting and lowering loads safely also requires communication and coordination between the person hoisting the load and the person guiding or receiving the load. If distances are great and ambient noise levels are high, the team may need to utilize both visual and audible signals.

THE KEY OPERATING PRACTICES ARE:

1.0 Clear the Path

- 1.1 Hoisting equipment requires a clear vertical path that is unobstructed and wide enough for safe passage of the equipment that has to be hoisted. If there is no clear path that can be used for hoisting, it will take a lot more effort to transport the equipment up to the sampling site without risk of damage.
- 1.2 To prepare for hoisting equipment and supplies up to the sampling site, determine whether there is a clear path for hoisting or what route will have to be followed. This information should be obtained as soon as possible, either during the initial visit or as part of a pre-sampling or preliminary survey. The hoist shall only be installed in locations that will permit the ground operator to stand clear of the load at all times.

WSM200.31 (continued)

2.0 **Hoisting Procedure**

- 2.1 Before lifting any loads, the hoisting area should be roped off or marked to warn pedestrians. Access to the hoisting area should be limited to the employees doing the hoisting or guiding the load, and the personnel must be wearing hard hats.
- 2.2 The rope or signs should be removed after the hoisting has been completed and there is no danger of tools or equipment falling, or after the sampling has been completed. You may have to remove the signs and barricades around the hoisting area immediately after you complete the hoisting should the area be needed for work or for traffic. No one should be directly under a load being hoisted, even if block and tackle is being used.
- 2.3 If possible, when loads are lifted, the hoisting line should be directly above the load so that the load is lifted straight up from its resting position. Pulling a load sideways as it is being lifted may cause it to swing and damage the load.
- 2.4 To keep loads from swinging or blowing while they are being hoisted, a tail line or guideline is recommended for control. The tail line or guideline is controlled by a crew member on the lower level at the hoisting site.

3.0 **Controlling the Rate of Descent**

- 3.1 Controlling the rate of descent of a load is important to prevent damage to the load or injury to personnel. If equipment is lowered directly on rope by hand or over a simple pulley, personnel could lose their grip and drop the load or burn their hands on the rope as the load accelerates downward. Although the rate of descent can be controlled best by use of a power-driven hoist or a block and tackle, a load can be lowered safely on a rope if the controlling end of the rope is looped around a support, such as a railing or post, so that friction can be used for braking.

The use of proper equipment and equipment/materials in good condition is an important aspect of this procedure.

4.0 **Pulleys, Block, and Tackle**

- 4.1 Although hoisting without pulleys is common, use of one or more pulleys is recommended. Using a pulley for hoisting a load will usually reduce the strength required for hoisting, and may allow the person hoisting the load to work from a safer position.
- 4.2 The supporting structure to which the hoist is attached shall have a safe working load equal to that of the hoist. The support shall be arranged so as to provide for free movement of the hoist and shall not restrict the hoist from lining itself up with the load.
- 4.3 Sites over 50 feet high and those which are sampled regularly should have a pulley support installed. Some companies have permanently installed gallows frames and pulleys in such locations. The condition of frames and supports should be checked before using them, particularly in corrosive atmospheres.
- 4.4 A block and tackle is a combination of rope and two pulleys used to reduce the amount of force needed for lifting. If heavy loads need to be lifted or controlled carefully on long lifts, the job can be done with less stress on the crew by use of block and tackle. The reduction of force required to

WSM200.31 (continued)

lift a load with block and tackle is offset by the need for longer rope and the time to pull it through the pulleys.

- 4.5 Rigging block and tackle can be accomplished by placing the blocks or pulleys close together in the same relative position as they will be used, and threading the end of the coiled rope through the pulleys to the connecting point on one of the pulleys. The blocks can then be pulled apart as needed without kinking or tangling the line.

The recommended storage procedure for rope used in block and tackle is to pull the blocks together, coil the rope, and store the coiled rope with the end on the bottom and the block and tackle on top. With this procedure, the block and tackle is ready to use without tangling or kinking of the rope.

5.0 Hooks and Other Devices for Attaching Loads

- 5.1 Hoisting ropes should be provided with hooks to be used for reattaching loads. All hooks used for hoisting should have locking safety catches to keep loads attached to the hook until the Safety catch is released. The safety catch is designed to prevent the load attachment or supporting eye or line from slipping out of the eye of the hook. The hook used for hoisting loads should be strong enough to hold the load without bending out of shape. If carabineers are used, only the locking type should be used to prevent accidental opening. Use only load-rated carabineers large enough for the rope and load.

6.0 Loads

- 6.1 Loads to be hoisted should have well-attached connections (such as an eye or sturdy handle) for the hoisting hook or the hoisting line. If loads do not have connections, or if a half-hitch is not employed, the loads should be supported in slings or be lashed so that the load will not shift or drop during the hoisting and lowering.
- 6.2 When hoisting equipment without a specific attachment point, it is safer to provide a separate sling or binding rope than to use the hoisting rope to wrap or tie the load.
- 6.3 The most commonly used sling is composed of two lengths of rope with a galvanized ring spliced into each end of each rope. To use the sling, one length is passed under each end of the load and the four ring eyelets are hooked onto the tackle hook of the hoisting line.

7.0 Rope

- 7.1 The rope needs to be strong enough to support the load to be lifted, and large enough in diameter to allow a firm grip for the load to be lifted. Care should be taken to avoid kinking or damaging the rope, getting it wet, or dragging it in the dirt. If the rope gets dirty, it should be hosed off and then loosely coiled to dry. If the rope must be passed over sharp corners or edges, the sharp corners or edges should be padded or protected with chafing gear to prevent damage to the rope.

The rope needs to be inspected for wear, breaks, or other defects either prior to each use. Manila sisal rope may need to be replaced routinely or at least yearly if it is used often or gets wet frequently. Rope that is defective, rotten, frayed, or severely worn is not reliable, is not safe, and is to be removed from service and not used.

WSM200.31 (continued)

8.0 Inspection of Equipment

Any equipment used for hoisting or material handling is to be inspected before use. Damage or wear noted on pulleys, block and tackle, hooks and rope/slings requires the material handling device be removed from service and replaced.

Reference: *Source Evaluation Society, Safety Guidelines Handbook, 1st edition, December 20, 2001.*

FIELD SAFE OPERATING PRACTICES

WORKING NEAR OVERHEAD HIGH VOLTAGE LINES

[WSM200.36](#)

Hazard Review

Electrocution
Fire
Moving Equipment

Burns
Electrical Arc Explosions
Moving Traffic/Equipment

CEC employees may be required to observe and be in close proximity to sub-contractors performing work near overhead high voltage lines. The following provides guidance on measures the sub-contractor might perform to mitigate hazards and provides information regarding certain types of electrical hazards.

1. Prior to beginning a job task in unknown areas, inquire of the client or the local power company if there are any overhead high voltage lines (600 volts or higher) at the worksite. If it is necessary to perform work within six feet (or ten feet for equipment) measured radially from overhead high voltage lines (600 volts or higher), ensure that the project supervisor has contacted the utility company and has provided the utility company or their representatives with the following information:
 - His/her name, address and telephone number
 - The location of the proposed work
 - The name, address and telephone number of the person responsible for the work
 - The field telephone of the worksite, if available
 - The type, duration and extent of the proposed work
 - The name of the person for whom the proposed work is being performed
 - The time and date of the notice
 - The approximate date and time when the work is to begin.
2. If it is necessary to perform work within six feet (or ten feet for equipment) measured radially from overhead high voltage lines (600 volts or higher), inquire of the project supervisor what precautionary safety measures have been made by the utility company. These may include any or all of the following:
 - The overhead high voltage lines have been de-energized
 - Temporary placement of mechanical barriers to separate and prevent contact between equipment, material, other objects, or persons and high voltage lines
 - Temporary relocation or raising of the high voltage lines being done
 - Other precautionary safety measures as recommended by the utility company

If these provisions have not been implemented, the employee shall remain at least 25 feet from the overhead line.

WSM200.36 (continued)

3. Drill rigs should not be moved with the mast up at any times. The mast may contact overhead electrical lines or overturn and contact electrical lines.
4. Personnel on the worksite shall wear Class B hard hats which provide protection against high voltage. Additionally, any other electrical protective devices (e.g., rubber insulating gloves, rubber matting, etc.) shall be used as applicable.
5. No materials or any covered item is to be stored within ten feet of the overhead high voltage line.
6. The overhead high voltage line is not to be raised, moved or displaced for any reason unless precautionary safety measures have been made with the utility company.
7. No excavation of any portion of any foundations of the structures, including guy anchors which support any overhead high voltage lines should be performed.
8. If the equipment does contact an overhead high voltage line, the equipment operator and other on-board personnel shall remain on that piece of equipment until the overhead high voltage line is de-energized.
9. If fire breaks out from the contact between the equipment and the overhead high voltage line, the equipment operator and any other persons, shall jump off the piece of equipment with **both legs touching** each other (not spread apart). These individuals shall then "bunny" jump/hop with both legs against each other as far as possible from the overhead high voltage line, but no less than 25 feet.
10. For worksites that have high voltage lines that enter buildings, ensure that the client or building owner has taken the necessary steps to eliminate the potential for exposure to high voltage lines. If you have questions, contact your supervisor.

FIELD SAFE OPERATING PRACTICES

RAIL LINE SAFETY

[WSM200.38](#)

Many clients served by Civil & Environmental Consultants, Inc. (CEC) move materials by rail. Additionally, CEC project activities also involve work in areas where active rail traffic occurs. The loading, unloading, and movement of raw materials, waste materials, and finished products by rail in close proximity to manufacturing or industrial activity presents known physical hazards during the performance of CEC services.

1. Training

This Safe Operating Practice provides a basis for pre-assignment training of CEC employees performing technical services near railroad and rail car operations. Observational assessments will determine whether the employee has acquired the needed safety skills. Unsafe or unsatisfactory work in rail line areas will result in retraining.

2. General Safe Practices

- a. Review facility-specific rail safety protocols with the facility contact or the rail line operator before performing work near or on rail lines.
- b. Wear PPE appropriate for the work being performed and as required by client facility PPE requirements. This may include hard hats, metatarsal boots, and safety glasses containing side shields. CEC employees shall wear high visibility vests when performing services within 50 feet of a rail line.
- c. STOP, LOOK, and LISTEN before crossing railroad tracks when driving or walking.
- d. Stay at a safe distance (20 feet) from all railroad equipment.
- e. Never place any part of your body near couplers or any other pinch point; rail equipment may move at any time in either direction.
- f. Remote-controlled locomotives in use at many facilities may start moving without warning.
- g. Maintain safe distance from rail equipment transporting hot materials (e.g. hot metal, slag) since these materials may erupt and splash a considerable distance.
- h. Do not crawl under, over, on, or go into a locomotive or other railroad car.
- i. Do not attempt to cross in front of moving rail equipment.
- j. Employees should also be aware that in many facilities, rail line operations are conducted with radio control locomotives. Check with facility operations before beginning work to determine if radio control operations are in use and define the required safety procedures.

3. Rail Crossings

- a. When driving, cross tracks only at designated vehicle crossings.
- b. When walking inside of facilities or outside of facilities, cross tracks only at designated pedestrian crossings. Vehicle crossings are not for pedestrian crossing unless identified as pedestrian crossings and no other pedestrian crossings exist in the area.
- c. DO NOT step or stand on rails, they are slippery and are tripping hazards.
- d. If a designated crossing is not available:

WSM200.38 (continued)

- Never cross between uncoupled cars.
- Never cross within 20 feet of the end of parked railroad equipment.

4. Operations Near Rail Lines

- a. CEC employees are prohibited from:
 - i. Riding on rail equipment
 - ii. Moving rail equipment
 - iii. Removing any track or rail warning devices
- b. Work planned within 50 feet of a rail line requires notification to the CEC Chief Financial Officer (CFO) prior to initiation of work to activate railroad insurance coverage.
- c. Work within 6 feet of a rail line (or other facility-specific distance) requires permission of the facility rail Supervisor, rail line operator or other Designated person to take the track out of service. Do not work on the or within 6 feet of the rail line without the track or line being out of service. CEC employees working on or near rail lines will verify that there are physical features (derailers, lights, lights, blocks, etc.) in place, which limit the ability for rail traffic to enter the work area, before each work event.

1.0 PURPOSE

CEC employees perform a variety of testing (i.e., nuclear density, infiltration, concrete/grout, etc.) in both active and non-active construction zones. The purpose of this SOP is provide awareness prior to testing operations, and to provide safety to the CEC employee during testing operations at the site.

2.0 SCOPE

This SOP should be used in accordance with the requirements of the specific work site location and specific requirements of the Client's Safety Department. The SOP should also be used in conjunction with other, similar SOPs (WSM 200.2, WSM 200.8, WSM 200.23, as applicable).

3.0 RESPONSIBILITIES

3.1 Project Managers/Supervisors/Office Leaders

Review this SOP and the Project Safety Plan with all employees and contractors under their supervision assigned to perform testing at the construction site. Ensure that all personnel follow all requirements listed in this procedure.

3.2 Corporate Safety Director

1. Create and maintain this SOP
2. Assist with interpretation and methods of compliance with this procedure.
3. Perform an annual program review, to confirm that:
 - a. Employees are aware of the requirements of this practice, and
 - b. Employees are meeting the requirements of this practice.

4.0 HAZARDS

4.1 Construction Traffic – Examples: Compactors, trucks, sheepsfoot compactors, excavators, etc.

4.2 Lifting – Nuclear gauges and other test equipment are heavy and awkward, and care must be taken when lifting/handling.

4.3 Body Posture – Bending over repeatedly or awkward body positions can result in strain and body stresses that can lead to injury.

4.4 Noise – Noise from construction equipment can damage an employee's hearing, as well as prevent an employee from knowing when hazards are present by blocking out warning sounds.

4.5 Slip, Trip and Fall – Footing in construction zones can be limited/impacted by vegetation, slippery surfaces, and obstructions.

4.6 Site Lines/Limited Visibility – Excavation walls, vehicles, and construction equipment can obstruct site lines and limit visibility, preventing employees from seeing all hazards.

5.0 CONTROLS

- 5.1 Employees must wear all specific project-required Personal Protective Equipment (PPE). Additionally, when performing testing in any active construction zone (e.g. moving vehicles/construction equipment within site location), high visibility safety vests must be worn. Reflectorized safety vests must be worn during diminished lighting conditions and during nighttime work.
- 5.2 If testing in/near an area of public transportation, determine whether a traffic control plan is in effect at the site location and if so, comply with the given traffic control plans.
- 5.3 Take extra precautions to prevent heat and cold stress when working in extremely hot or cold temperatures.
- 5.4 At the beginning of each work day, CEC should notify the contractor(s) and equipment operator(s) what sampling/testing will be performed by CEC during the work day. CEC must notify the contractor(s) generally where and when the testing will occur, and how long the testing will take. Where possible, have the contractor/equipment operator sign the Project Safety Plan indicating acknowledgement that this communication has occurred.
- 5.5 Immediately prior to performing a test, if equipment is being operated in the area to be tested, CEC should notify the operator that a test is to be performed and the exact location of the test. Notification should be performed using a radio (CB, two-way hand-held, etc.), cellular phone, or through the use of hand signals. Hand signals should only be used if all other methods are not able to be utilized. Do not get any closer to operating equipment than 100 feet when getting the attention of an operator.

5.6 Preconstruction Safety Meeting

- 1. Prior to arriving at the site for construction services, a safety meeting shall be requested by the CEC Project Manager. The meeting should include the CEC Project Manager, all CEC field staff working at the site, the contractor(s) operating equipment in the area, and the general contractor. The meeting should occur with sufficient lead time to allow an appropriate level of planning and to establish procedures for safe field testing.
- 2. The preferred method that should be requested during the meeting to help assure the safety of the person performing density testing is that at least one piece of equipment (specifically the compactor for nuclear density testing) stop operating and park at the location of the test to be performed.
- 3. If the contractor will not agree to stopping equipment, a method of verbally communicating with the equipment operator, such as CB radio, will be established so that the equipment operator can be notified before any testing in the test area proceeds. The equipment operator shall be notified before each test.
- 4. Providing CEC field vehicles access to the test areas shall also be discussed during the safety meeting. The intent is that the CEC field vehicle be parked at the test locations to reduce the time of testing and provide additional protection.
- 5. If the contractor will not or cannot stop equipment and access cannot be provided to CEC vehicles, to permit testing to occur, CEC shall request a meeting with the contractor's safety director to develop a site specific, safe, and acceptable method to protect CEC field personnel during testing. If no procedure can be agreed upon, testing shall only be performed before equipment starts operating for the day, during breaks, and at the end of the work shift when equipment is not operating.

6. Daily project safety meetings should also be discussed during the preconstruction safety meeting to outline and reinforce the communication methods for testing. Provided the contractor conducts daily safety meetings, all CEC field staff shall attend the meetings and discuss the areas to be tested that day, review the procedures for notifying the equipment operator before testing begins, and discuss what equipment will be parked (if applicable) during testing. If the contractor does not perform daily project safety meetings the CEC Project Manager shall request that they be held.

5.7 Prior to entering testing/sampling location:

1. Familiarize yourself with the site (entrance/exit points, terrain, field conditions, possible hazards, traffic flow or public or construction vehicles, etc.).
2. Determine the location(s) where testing/sampling will take place. Attempt to identify a testing/sampling location free of construction traffic/equipment usage.
3. Follow the testing protocol established during the preconstruction safety meeting.

5.8 After contractor(s) and equipment operators have been notified of testing procedures:

1. CEC personnel should place the field vehicle at the testing location to provide additional barricade from traffic/equipment during testing/sampling;
2. Create a perimeter around the testing location (i.e., field vehicle and construction cones).
3. Four-way flashers shall be used on vehicles parked next to testing/sampling location.
4. Be aware of tripping hazards in testing location (i.e., loose material, excavation drop-offs, uneven ground, etc.).
5. Always perform testing facing construction activities/traffic flow. If not possible, utilize a spotter to give advance warning of a possible hazardous situation.
6. Check surroundings frequently.
7. Do not leave any testing equipment unattended.

5.9 After completion of testing:

1. Remove any equipment from testing location.
2. If utilized, remove perimeter barricades.
3. Confirm construction activities/traffic flow is clear of exit pathway.
4. Exit testing location at same point of entrance (if possible).
5. If in active construction zone, notify contractor and equipment operator (verbally) that testing area is cleared and construction activities may resume.

EQUIPMENT SAFE OPERATING PRACTICES

FIELD VEHICLES

[WSM300.3](#)

Hazard Review

Death/serious injury Backing
Mounting/Dismounting
Rollover
Pinching/Crushing
Adverse/ Inclement Weather

Traffic conditions
Uneven Terrain

1. All drivers shall be properly licensed.
2. Be familiar with and review the manufacturer's operation manual. Pay special attention to the safety section and operating rules for inclines, slopes, hills, rough terrain and water crossings.
3. Supervisors shall verify that drivers are capable and qualified on each type of equipment before allowing the equipment to be operated unsupervised.
4. Drivers shall perform a vehicle service check prior to use. A visual inspection should be made before each use. Tires and fluid levels should be checked for proper operating levels. Report all needed repairs promptly. Do not use any equipment that is unsafe.
5. All airbags should be in the on position. Seat belts will be worn during operation of the vehicle.
6. Operator will read the vehicle owner's manual and obey all safety warnings before operating any CEC vehicle.
7. Operator will follow the vehicle owner's manual reference on how to operate the vehicle in the four-wheel drive position.
8. Doors shall be in the closed position when the vehicle is being operated.
9. Head restraint should be adjusted so that the top of the restraint is closest to the top of your head.
10. Operator will drive with due regard for the safety of all persons using the road and in a manner cognizant of traffic conditions at the time.
11. When operating off roadways, be aware of uneven terrain, ditches and streams.
12. Do not drive through moving water.
13. If so equipped, avoid use of roll bar lights and overhead lights at night when traveling on public highways
14. If the vehicle experiences equipment failure, the operator will terminate use of the vehicle until it is safe to operate.
15. Any modifications to personalize CEC vehicles, either exterior or interior, are not permitted.

Related SOPs

General SOPs – WSM100
Vehicle Operation WSM100.21

EQUIPMENT SAFE OPERATING PRACTICES HAND TOOLS (POWER AND MANUAL)

[WSM300.6](#)

Hazard Review

Electrical Shock
Dust
Flying Particles

Noise
Sharp Edges and Points
Cuts and Abrasions

Pinch Points
Improper Tool

Civil & Environmental Consultants, Inc. (CEC) employees may utilize a variety of hand and/or power tools in the performance of services. The following safe equipment operating procedures are designed to reduce the potential for injury during the use of hand or power tools:

1. Employees shall perform a preoperational check of their equipment. Be familiar with the operator's manual. Tools shall be maintained in a safe condition or be immediately taken out of service by tagging or locking out the controls. Report needed repairs promptly. Do not use any equipment that is unsafe.
2. Wear safety glasses and other appropriate personal protective equipment (such as gloves and hearing protection) consistent with the hazard associated with the tool.
3. Only use tools in the manner for which they are designed to avoid tool damage and personal injury.
4. Visually inspect all tools prior to use and remove damaged tools from service.
5. Ensure that tool handles are free from cracks, splits and splinters prior to use.
6. Ensure that impact tools are free from "mushroomed" heads.
7. Keep work area clean to avoid slipping, tripping or falling.
8. Avoid using dull power tools or hand tools. Power saws, chain saws and drills that have dull blades or bits can cause binding or kickback which can result in cuts, bruises and loss of fingers or limbs to the operator and others.
9. Ensure proper grounding for power tools.
10. Be aware of safety devices on tools; check regularly and use only tools with all safety devices properly operating. Do not use electric power tools with damaged cords or switches.
11. Place tools in safe position when not in use so that sharp points are not exposed. Carry all sharp tools in a sheath or holster.
12. When using knives, shears or other cutting tools, cut in a direction away from your body.
13. Store tools in an appropriate manner, such as storage cabinets and wall storage units.

Related SOPs

General SOPs WSM100

EQUIPMENT SAFE OPERATING PRACTICES

POSTHOLE DIGGER-GAS POWERED AUGERS

[WSM300.7](#)

Hazard Review

Nose, Eyes
Underground Utilities (Water, Sewer, Electrical,
Natural Gas)
Irregular Terrain
Back Strain

Gas Fuel
Slips, Trips, Falls
Bending
Burns

1. Review manufacturer's operation manual. Pay special attention to the safety section and operating rules.
2. Be properly trained on the use of this equipment by Supervisor/Certified Trainer prior to performing operations. Supervisors shall verify that operators are capable and qualified on each type of equipment before allowing the equipment to be operated.
3. Inspect equipment prior to use. Auger flights may have sharp burrs or edges that can cause cuts. If available, use a hand file to remove burrs prior to transport and after use.
4. Make sure all safety devices are in place and working.
5. Wear appropriate PPE: gloves, eye and hearing protection, safety toe shoes.
6. Inspect for and inquire about underground hazards and utilities.
7. Be familiar with the soil type. Avoid soil with rocks or obstructions that can cause abrupt stoppage of the auger and rapid counter rotation of the auger handles.
8. Secure all equipment prior to transportation to worksite.
9. Never leave machine unattended when running.
10. Make sure the engine has cooled down prior to refueling. Avoid ignition sources when fueling/refueling.
11. Immediately report damaged equipment to the Maintenance Supervisor. Lockout and tagout damaged equipment and do not use.
12. Review this safe operating practice at least annually.

Related SOPs

General SOP's – WSM100

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.

HAZARD COMMUNICATION PROGRAM

WSM400.1

1.0 PURPOSE

Civil & Environmental Consultants, Inc. (CEC) is committed to complying with the requirements of OSHA's Hazard Communication Standard (29 CFR 1910.1200) with the Globally Harmonized System of Classification and Labeling of Chemicals (HAZCOM/GHS) for its field projects and in all its offices. This compliance is in keeping with CEC's obligation to inform and train employees about the hazardous chemicals they may encounter during field and project activities. All CEC offices and project locations will participate in and comply with the requirements of CEC's Hazard Communication Program (HCP). This written HCP will be available at each office and project location for review by any interested employee and available on CybErC.

2.0 SCOPE

2.1 This HCP applies to work operations where employees may be exposed to hazardous chemicals under normal working conditions or during an emergency.

1. Consumer Products or hazardous substances being used in the workplace in the same manner that a consumer would use it, and where the duration and frequency of use, and therefore, exposure is not greater than what a typical consumer would experience, are not covered by this program.
2. When the Consumer Product or hazardous substance is used for a greater duration or frequency than a normal consumer would experience, this program is applicable. For example, daily use of spray paint by an employee for field survey markings is covered.
3. This HCP, including Chemical Inventories and Safety Data Sheets (SDS), is available to employees, their designated representatives, the Assistant Secretary of Labor for Occupational Safety and Health (OSHA) and the Director of the National Institute for Occupational Safety and Health (NIOSH). A copy of this HCP is available at each office in paper form or can be accessed in electronic format on CybErC. In addition, a copy of the HCP will be maintained at project sites where hazardous chemicals are present.

3.0 ASSIGNMENT OF RESPONSIBILITY

3.1 Employer

1. The overall administrative responsibility for the implementation of this HCP is with the President of CEC who delegates responsibility to the Corporate Safety Officer (CSO). The CSO will document that the HCP is carried out at the Corporate Level and will establish a mechanism to document compliance at each Office. The day-to-day responsibility for administration of the HCP will be with the Office Safety Coordinators (OSC) located at each CEC office location. In this role, some of the tasks will be carried out directly by the OSC and some of the tasks will be delegated by the OSC to various Project Managers (PM) or Site Safety Officers (SSO).

3.2 Office Leaders

1. Maintain an inventory of products containing hazardous chemicals within the workplace.
2. Inform employees regarding hazardous chemicals specific to their projects and/or work areas and provide access to Safety Data Sheets (SDS) for the products to which they may be exposed.
3. Discontinue use of product if it is not labeled properly.

4. Maintain SDS for all products containing hazardous chemicals so they are current and readily available.
5. Provide access to HAZCOM/GHS training for employees.
6. Do not accept materials without a proper label and SDS.
7. Do not allow materials to be transferred from original containers, unless the label and hazard information are transferred as well.

3.3 Project Managers

1. Maintain an inventory of products containing hazardous chemicals associated with their project work.
2. Communicate with clients and other employers on site regarding potential exposure to controlled products on the worksite.
 - a. CEC PM will document chemicals CEC is bringing on site, including subcontractors if applicable.
 - b. The CEC PM will review with the Client and will document chemicals that CEC personnel may be exposed to during the execution of work, including those used by subcontractors, if applicable.
3. Inform employees regarding hazardous materials specific to their projects and/or work areas and provide access to Safety Data Sheets (SDS) for the products to which they may be exposed. This information and communication will be documented using the project-specific Health and Safety Plan (HASP).
4. Discontinue use of product if it is not labeled properly.
5. Maintain SDS for all project-specific products containing hazardous chemicals so they are current and readily available.
6. Provide access to HAZCOM/GHS training for employees.
7. Do not accept materials without a proper label and SDS.
8. Do not allow materials to be transferred from original containers, unless the label and hazard information is transferred as well.

3.4 Office Safety Coordinator

1. Ensure SDS collections within the office/project site are complete, up-to-date and readily available. Obtain new SDS from the supplier or manufacturer of the product as required.
2. Maintain an inventory of all products containing hazardous chemicals within the office, lab, and/or project site. On an annual basis review the inventory for accuracy and determine if less-hazardous replacement products may be recommended for use. (Refer to Section 5.0 B. for the inventory requirements)
3. Inform CEC personnel of the location of the office inventory and SDS.
4. Facilitate the implementation of the HAZCOM/GHS requirements through communication.

3.5 Employees

1. Affix workplace labels for products transferred to containers other than the original container.
2. Affix replacement labels where supplier labels have become worn and illegible.
3. Review SDS when appropriate (e.g. prior to using a new product), report missing SDS, and any other health and safety concerns.
4. Review SDS for materials with exposure potential at least annually.
5. Complete the required HAZCOM/GHS training and retraining when new hazards or chemicals are introduced. Employees should be prepared to:

- a. Read and interpret Hazard Communication labels, pictograms, and SDS
- b. Follow SDS and employer work procedures
- c. Use personal protective equipment as instructed
- d. Protect themselves and others in the workplace

3.6 Vendors and Subcontractors

1. On projects where CEC is the General Contractor (GC), subcontractors will operate under their own HCP. It must be at least as stringent as this HCP and must comply with client site requirements and all pertinent OSHA regulations.
2. Check in with the appropriate CEC representative and provide them with a chemical inventory consisting of all hazardous materials being brought into the office or on-site and the corresponding SDS.
3. Ensure that all containers of hazardous materials being brought into an office or on-site are affixed with the appropriate warning labels.

4.0 HAZARDS

Hazards of controlled products/hazardous chemicals are described in detail in SDS and are shown on supplier labels and/or workplace labels.

Exposure to hazardous materials can cause or contribute to a variety of health effects such as irritation, burns, sensitization, heart ailments, kidney and lung damage and cancer. Some materials may also be a safety hazard and can contribute to fires, explosions and other accidents if not properly stored or handled.

- 4.1** CEC does not typically store large amounts of hazardous materials in its offices and labs, nor does CEC transport bulk chemicals. Periodically, small quantities of hazardous materials are used to calibrate or fuel field instrumentation (e.g. PIDs, FIDs, field gas chromatographs, etc. These materials may include:

compressed isobutylene	compressed methane	tetrahydrofuran
compressed hydrogen	compressed nitrogen	trichloroethylene
compressed ultra-pure air	acetone	vinyl chloride
benzene	2-butanone	cleaning products
1,1-dichloroethane	1,2-dichloroethane	toluene
ethylbenzene	hexane	1,1,1-trichloroethane
hydrochloric acid	hydrogen peroxide	xylene
isopropyl alcohol	methanol	tetrachloroethene
methylene chloride	methyl ethyl ketone	1,1,2,2-tetrachloroethane
methyl isobutyl ketone	4-methyl-2-pentanone	sodium hydroxide
methyl tert butyl ether	nitric acid	sulfuric acid
Pentane	propane	

- 4.2** Each employee working with the compounds listed above will be given instructions that will allow safe use, handling, storage and disposal of the products. These compounds are used in very small quantities, often less than 1 ounce/50 mL each, and at any one time there may only be a few compounds present in the workplace.
- 4.3** CEC personnel may also be exposed to chemicals via non-routine tasks, in the soil, water and air while working at various project sites. Employees will be informed of the hazards of these non-routine tasks as they are identified in Section 5 of the Project Safety Plan (WSM 100.1). The Hazardous Waste Operations and Emergency Response (HAZWOPER) standard, 29 CFR

1910.120, includes the requirements for employees to work safely in those environments. Controlled products destined for disposal will be treated as solid wastes and appropriate characterization of the materials will be completed to determine disposal requirements. Appropriate labels must be maintained on the products. Transportation of Dangerous Goods requirements must be reviewed and implemented prior to shipment.

- 4.4** Always consult the SDS for potential health hazard exposures and follow the precautions noted on the SDS. Where more detailed procedures or controls are required by the client or the contractor responsible for the work site, the Project Manager will coordinate with them and provide the necessary information, and if required training, to employees required to work there. This information will be used by the Project Manager when the HASP is completed.

5.0 CONTROLS

5.1 Labels and Other Forms of Warning

1. Any hazardous chemical at a CEC Office or project site must possess a label that specifies the chemical identity and appropriate hazard warnings. These hazard warnings may be in the form of words, pictures, symbols or some combination that will provide general information to the employee regarding the hazards of the chemicals and their specific health and physical hazards.
2. Acceptable labels shall be legible, in English, and shall include:
 - a. Symbols (hazard pictograms): Convey health, physical and environmental hazard information, assigned to a GHS hazard class and category.
 - b. Signal Words: "Danger" or "Warning" are used to emphasize hazards and indicate the relative level of severity of the hazard, assigned to a GHS hazard class and category.
 - c. Hazard Statements: Standard phrases assigned to a hazard class and category that describe the nature of the hazard.
 - d. Precautionary Statements and Pictograms: Measures to minimize or prevent adverse effects.
 - e. Product Identifier (ingredient disclosure): Name or number used for a hazardous product on a label or in the SDS.
 - f. Supplier identification: The name, address and telephone number should be provided on the label.
 - g. Supplemental information: non-harmonized information.
3. Employees who place hazardous chemicals into portable containers need not label the portable container if the hazardous chemical is intended for use only by the employee within their 8-hour work shift. The employee must either return the unused portion of the hazardous chemical to the original container or dispose of it properly. Should the employee choose to retain the unused portion in the portable container for use at another time, he/she must create a temporary label that contains the chemical identity and appropriate hazard warnings.
4. If the label of the container of a hazardous chemical becomes so damaged as to be unreadable by the employees, a temporary label must be created and affixed to the container. This temporary label must contain the chemical identity and appropriate hazard warnings. Alternatively, the employee may obtain a new label from the chemical manufacturer or distributor, but a temporary label must be in place while awaiting the receipt of the new label.
5. Product Exemptions
 - a. The following types of substances do not fall under the labeling requirements of HAZCOM/GHS:
 - i. Pesticides as defined by the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA);

- ii. Any chemical substance or mixture as defined in the Toxic Substances Control Act (TSCA);
- iii. Any hazardous waste as defined by the Solid Waste Disposal Act and as amended by the Resource Conservation and Recovery Act (RCRA);
- iv. Any hazardous substance as is defined by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA);
- v. Any food, food additives, color additives, drugs or cosmetics and other substances covered under the Federal Food, Drug and Cosmetic Act; and
- vi. Any consumer product or hazardous substances, as those terms are defined in the Consumer Product Safety Act and Federal Hazardous Substance Act.

5.2 Chemical Inventory

1. A chemical inventory is a written list of hazardous chemicals known to be present on CEC project sites or in CEC Offices. The inventory will contain three pieces of information on each hazardous chemical:
 - a. The chemical name;
 - b. The type of product or typical use; and
 - c. The name of the manufacturer or distributor.
2. As new hazardous chemicals are ordered, the OSC will be responsible for adding the hazardous chemical to the inventory. This will require that the OSC establish procedures and controls for all office employees who have the responsibility for ordering products so that the OSC is made aware of new products that are purchased. In addition to the process of adding new products as they are purchased, each OSC will be responsible for ensuring that a yearly update of the chemical inventory takes place. This yearly update must be completed by the OSC or his/her designee by February 28th of each year.

5.3 Safety Data Sheets

1. A SDS is a document that provides information on a specific hazardous chemical. The SDS must contain the following elements:
 - a. Identification of the substance or mixture and of the supplier
 - b. Hazards Identification
 - c. Composition/information on ingredients
 - d. First aid measures
 - e. Firefighting measures
 - f. Accidental release measures
 - g. Handling and storage
 - h. Exposure controls/personal protection.
 - i. Physical and chemical properties
 - j. Stability and reactivity
 - k. Toxicological information
 - l. Ecological information
 - m. Disposal considerations
 - n. Transport information
 - o. Regulatory information
 - p. Other information including information on preparation and revision of the SDS
2. Typically, either the manufacturer or distributor provides a SDS with the initial shipment of a hazardous chemical. In addition, any time a SDS is modified, a revised copy of it is sent along with any subsequent shipments of the product.

3. SDSs for hazardous chemicals being utilized at each Office will be maintained in hard copy form, along with a copy of this HCP and the chemical inventory, in the office of the OSC. As new SDSs are received, the OSC will be responsible to ensure that the old SDS is removed from the file and the new one is put in its place. (For details regarding the maintenance of SDSs for hazardous chemicals no longer in use, see Section 7.0)
4. On project sites where CEC is the GC, the PM/SSO will inform and document that subcontractor employees who may encounter specific hazardous chemicals are aware of the location of the SDS on the project site. The CEC PM/SSO will also be responsible for providing a copy of SDSs requested by an appropriate representative of a subcontractor.
5. On project sites where CEC is a subcontractor, or is otherwise providing site services, the CEC PM/SSO will inform and document that appropriate management employees of each contractor whose employees may encounter hazardous chemicals being brought onto the project site by CEC are aware of the location of the SDSs.
6. The PM/SSO will also be responsible for providing a copy of SDSs requested by an appropriate representative of any subcontractor or the GC.

5.4 Hazard Assessment

CEC's Hazard Assessment Process utilizes a hierarchy of control to reduce employees' exposure to hazards including hazardous substances/materials/wastes to acceptable levels. The controls utilized are listed below in order of implementation.

1. Elimination/Substitution: If a hazardous material's use or presence can be eliminated, then it should be. If a less hazardous material can be utilized to perform the same function of the more hazardous material, then the less hazardous material should be substituted in place of the more hazardous material.
2. Engineering Control: If a hazardous material cannot be eliminated using the above control, then engineering controls such as ventilation, blocking, air conditioning, etc. shall be utilized.
3. Warnings: Where appropriate, storage areas should be labeled or placarded to indicate contents, and areas of use should have precautionary information posted.
 - a. Incompatible products must be segregated in accordance with legislation (e.g. flammable materials and oxidizers must be kept separate).
 - b. Label and decanted product requirements do not apply to controlled products contained in or transferred through piping or vessels (such as process vessels, reaction vessels, tank cars, or ore cars). Stantec employees should be aware that identification conventions can vary between worksites
4. Administrative Controls: Limiting the amount of time a person is exposed to a hazardous material or taking more breaks in the afternoon as it gets hotter are forms of administrative controls.
5. Personal Protective Equipment (PPE): PPE is the lowest level in the hierarchy of controls since PPE only places a barrier between the employee and the hazard. PPE is a last resort.
 - a. PPE requirements are described on individual SDS, in addition to other reference materials, such as PPE compatibility charts, and the NIOSH handbook. Employees must properly use PPE as described in the SDS and reference materials, as it relates to the product being used.
 - b. Refer to WSM100.17 – Personal Protective Equipment for Field Operations.

5.5 Client Sites

1. Where there is a concern about exposure to chemicals, the Project Manager will coordinate the required controls and procedures with the client or contractor responsible for the site or facility. Where required the client or contractor should provide all air samples or other tests performed

according to an approved method. Where the possibility of an exposure above the permissible exposure limit exists, the Project Manager shall coordinate with the client or contractor, and inform all employees required to go to the site of the controls needed to limit the exposure or provide the necessary PPE and/or procedures to protect employees. At no time will the concentration of a chemical be allowed to exceed the ceiling level for that specific chemical. Applicable Federal and State regulations for where the work is performed shall be reviewed to identify the exposure limits that shall be used for the project.

2. As part of the HASP, Project Managers shall include an inventory of chemicals anticipated on the jobsite, along with copies of their SDS.
3. The SDS will be consulted prior to any potential exposure, with precautions noted on the SDS implemented to limit exposure. Where more detailed procedures or controls may be required by client or contractor, the Project Manager will coordinate and provide the necessary information and, if required, training.

5.6 Office Locations

As indicated in section 5.0 B, each office will develop and maintain an inventory of all chemical and biological substances that are regularly handled, used, stored, produced or disposed of in the course of work processes and that may be hazardous to the health and safety of staff present. All chemical and biological substances that are controlled products must be identified on this list which will be readily available for reference at the office.

5.7 Storage of Hazardous Substances/Materials/Wastes

1. Hazardous substances/materials/wastes shall be stored in a clean and organized manner paying attention to their characteristics (flammable, combustible, etc.) and compatibilities. Proper storage and good housekeeping are the best way to prevent the occurrence of spills.
2. Hazardous substances/materials/wastes shall be stored in proper containers and in proper storage locations including the use of secondary containment to minimize the potential for spills, when appropriate.
3. All hazardous substances/materials/wastes used or stored at a worksite must be clearly identified with proper labels and must be used and stored in such a way that the use or storage is not a hazard to workers.

5.8 Spill Prevention and Response

1. In the event of an uncontrolled release, CEC personnel and their Subcontractors shall follow the site specific (office, facility, field location) emergency response plan including communication with the appropriate CEC and/or client personnel.
2. An adequate number of spill kits must be available to handle the quantity of hazardous substances/materials/wastes that could potentially spill.
3. The spill kits should be staged for immediate access without exposing the responder(s) to any hazards.
4. The supplies, equipment and materials in the spill kit need to be compatible with the materials involved.
5. Only those personnel who are trained in emergency spill response, the materials available for use, proper waste disposal, and the communication procedures should attempt to contain or arrest the release.

6.0 INFORMATION AND TRAINING

Information and training are a critical part of the HCP at CEC and CEC provides employees formal opportunities to learn about the hazardous chemicals they may be working with, how they might know if they were being exposed to those chemicals, and how to protect themselves from exposure. The following procedures will be followed with respect to training.

6.1 Initial Training

1. New employees will receive a brief overview of the HCP by a representative of CEC. This overview will take place around the time of their orientation and will include:
 - a. The contents of HAZCOM/GHS;
 - b. The contents of this HCP;
 - c. The location of the written HCP, Chemical Inventory, and SDSs in the office to which they will be assigned;
 - d. Details regarding the labeling system in use;
 - e. The hazardous chemicals they are routinely or are likely to be working with, including their physical and health hazards;
 - f. The proper methods for handling hazardous chemicals and measures to take to protect themselves from these chemicals, including work practices, emergency procedures, and personal protective equipment to be used; and
 - g. Methods and observations that may be used to detect the presence or release of a hazardous chemical.
2. This training may include information on the specific hazardous chemicals the employee will be working with, if known, but the focus of the training will be information on general classes of hazardous chemicals that are maintained at the employee's assigned office or project site. The employee will also be given an opportunity to review sample SDSs and be given information on how to read and understand the basic content of an SDS.
3. In addition to the basic orientation training as described above, employees whose job tasks require them to work in the field may also receive project-specific training. This training usually takes place during mobilization activities or during the first few days of a project's start-up. The PM/SSO will be responsible for providing this level of training, if needed, and will use it to focus on the specific hazardous chemicals that will be used on the site as opposed to the above training which will be more generic in nature with regards to physical and health hazards.

6.2 Ongoing Training

1. Whenever new products are introduced into an Office or a project site that present a new physical or health hazard for which the employee has not previously been trained, employees will be given an opportunity to learn more about the specific new hazardous chemical via additional training. This type of training will occur when a hazardous chemical is being introduced into the workplace that possesses a physical or health hazard for which the employee has not previously been trained. As noted in Section 5.1, the employee's orientation training will typically cover most types of physical or health hazards to focus additional training on new chemical hazards.
2. This training can occur on two different levels as described below:
 - a. Employees who typically do not spend their time on project sites will receive training at their assigned Office. The training will be conducted by the OSC or an appropriate designee and will focus on the purpose of the new product(s), the hazards posed by the new product(s) and the proper methods for handling the product(s). Employees will also be given a copy of the SDS(s) to read and review. This training may occur in a variety of

formats; in an informal “brown bag” luncheon, using electronic mail/internal memo, or as part of other regularly scheduled annual health and safety training (i.e. HAZWOPER Refresher).

- b. Ongoing training may also take place whenever a new hazardous chemical is introduced on a project site. The PM/SSO will be responsible for conducting the training, which will often be part of the Tailgate Safety Meetings that occur on CEC projects. It may also occur when employees are trained on the contents of the site-specific Health and Safety Plan prior to the start of the project. The PM/SSO will be responsible for ensuring that this training takes place before any employee is required to work with or around the new hazardous chemical.

7.0 RECORDKEEPING

- 7.1 Each OSC will be responsible for maintaining records with respect to the implementation of this HCP. This includes training records as well as copies of previous chemical inventories and SDSs for products no longer in use by CEC.

- 7.2 All training records will include the date of the training, the content, the name of the instructor and the employees attending. Training records will be maintained by the respective OSC and will be kept for at least three years.

- 7.3 Per the OSHA Standard on access to employee’s exposure records (29 CFR 1910.1020), chemical inventories and SDSs can be considered an employee exposure record because they provide details regarding the type of chemicals an employee may have been exposed to during the duration of their employment as well as where and when the specific hazardous chemical was used. The standard requires that all employee exposure records be maintained for thirty years beyond the duration of an employee’s employment. CEC will retain copies of chemical inventories and/or SDSs for the requisite period unless some other record exists to provide the necessary documentation as described above. Chemical inventories compiled by the OSC will be maintained along with other health and safety files at each Office location. Chemical inventories compiled on each project site will be maintained in the project files.

8.0 DEFINITIONS

- 8.1 For purposes of these policies and procedures, the following definitions apply [see 29 CFR 1910.1200(c)]:

- 1. **Hazardous Chemical:** any chemical (element, compound, or mixtures of elements and/or compounds) which is a physical hazard or a health hazard.
- 2. **Physical Hazard:** a chemical for which there is scientifically valid evidence that it is a combustible liquid, a compressed gas, explosive, flammable, an organic peroxide, an oxidizer, pyrophoric, unstable (reactive) or water reactive.
- 3. **Health Hazard:** a chemical for which there is statistically significant evidence based on at least one study conducted in accordance with established scientific principles that acute or chronic health effects may occur in exposed employees. This includes chemicals which are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotoxins, agents which act of the hematopoietic system and agents which damage the lungs, skins, eyes, or mucous membranes.
- 4. **Global Harmonization System (GHS):** The Globally Harmonized System of Classification and Labeling of Chemicals (GHS) is an internationally agreed-upon system, created by the United

Nations. It is designed to replace the various classification and labeling standards used in different countries by using consistent criteria for classification and labeling on a global level.

5. Within this plan, the following CEC acronyms are used:
 - a. OSC–Office Safety Coordinator
 - b. CEC – Civil & Environmental Consultants
 - c. CEO – Corporate Chief Executive Officer
 - d. CSO – Corporate Safety Officer
 - e. PM – Project Manager
 - f. SSO – Site Safety Officer

WSM400.1 – Rev-11/2024

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.

1.0 INTRODUCTION

Employees of Civil & Environmental Consultants, Inc. (CEC) do not perform work that creates hazardous noise levels but may potentially encounter hazardous noise levels created by others at manufacturing facilities or at construction sites. These potential employee exposures are typically of limited duration due to the nature of CEC's consulting work.

CEC employees exposed to sound levels of 85 dbA or greater on an 8 hour time-weighted average basis:

- Must wear hearing protection appropriate to mitigate the noise level to which they are exposed;
- Must be included in CEC's Hearing Conservation Program;
- Must be trained annually on CEC's Hearing Conservation Program and any updated changes in PPE requirements associated with applicable work practices.

During short-duration visits to manufacturing sites, CEC employees are required to comply with hearing protection PPE requirements established by the host facility for their employees.

Management, supervisory, and employee commitment to hearing conservation is an important aspect of the overall Hearing Conservation Program. The key elements of the CEC's hearing conservation program are:

1. Noise exposure measurements
2. Audiometric testing and follow-up
3. Employee training
4. Engineering and administrative noise exposure control
5. Personal hearing protection
6. Recordkeeping

The CEC Corporate Safety Officer is the program administrator for Hearing Conservation.

2.0 NOISE EXPOSURE MEASUREMENT

At work locations where CEC employees have potential to be exposed to sound levels of 85 dbA or greater on an 8 hour time-weighted average basis, noise exposure measurement will be performed. Noise exposure measurement will confirm work locations where employees must wear hearing protectors and must be included in the Hearing Conservation Program.

Noise exposure measurement will be conducted using Type II Noise Dosimeters worn by employees working in the area.

Noise Dosimeters will be worn for the duration of the workshift or at least long enough to establish a conservative average noise exposure. Affected employees will be notified regarding the results.

WSM400.7 (continued)

Additional monitoring will be conducted whenever changes in work practices or methods may change workplace noise exposures including addition of new equipment or a change in the workplace layout.

3.0 AUDIOMETRIC TESTING PROGRAM

All employees exposed to sound levels of 85 dbA or greater on an 8 hour time-weighted average basis (affected employee) will be required to be enrolled in the audiometric testing program. Audiometric testing will be performed at no cost to the employee. The audiometric testing program consists of a baseline audiogram and annual monitoring.

1. Baseline audiograms will be obtained for each affected employee within 6 months of first exposure. A valid baseline audiogram shall be established against which future audiograms can be compared. The baseline audiogram requires that the employee not be exposure to workplace noise at least 14 hours before testing. Hearing protection may be used to meet the requirement. Employees shall be notified to avoid high levels of noise prior to baseline testing.
2. Annual audiograms will be obtained for each affected employee for comparison to baseline audiograms. An audiologist, physician, or someone working under a licensed audiologist or physician must conduct baseline and annual audiograms and comparisons. Each employee's annual audiogram will be compared to that employee's baseline audiogram to determine if the audiogram is valid and if a standard threshold shift has occurred. If a comparison of the annual audiogram to the baseline audiogram indicates a standard threshold shift, the employee shall be informed of this in writing, within 21 days of the determination. If a threshold shift has occurred, use of hearing protection shall be re-evaluated and/or refitted and if necessary, a medical evaluation may be required.

4.0 EMPLOYEE TRAINING

Each employee exposed to sound levels of 85 dbA or greater on an 8 hour time-weighted average basis will be trained before initial assignment and at least annually on the following topics:

- Effects of noise on hearing
- Purpose of hearing protectors
- Advantages and disadvantages of various types of hearing protectors
- Proper use, selection, fit, and care of hearing protectors
- Purpose and procedures of audiometric testing
- Company requirements for hearing protection
- Use of specific hearing protectors provided by the company

5.0 ENGINEERING AND ADMINISTRATIVE NOISE CONTROLS

CEC recognizes the desirability of controlling the existing noise levels by engineering and/or administrative controls. The feasibility of applying such controls will be carefully considered in evaluating the use of distance, the building of partial or total enclosures, and other engineering noise control procedures for reducing noise levels. Due to the variability if the work locations of CEC employees, some noise levels may not be amenable to mitigation using these methods.

WSM400.7 (continued)

Within the limitation of work schedules and employee skills, administrative controls are also considered. Where feasible, over-exposed employees can be rotated to other areas or jobs having noise levels below the required levels. In addition, operational procedures can be modified as necessary so that during any one twenty-four hour period the allowed exposure times will not be exceeded.

Engineering and administrative controls are considered and will be implemented where feasible.

6.0 PERSONAL HEARING PROTECTION

Appropriate personal hearing protective devices are made available, are issued, and replaced as necessary, at no charge to any employee that is potentially exposed to sound levels of 85 dbA or greater on an 8 hour time-weighted average. The measured or anticipated noise levels are used to identify the appropriate noise reduction rating (NRR) required for protection. Since CEC doesn't own the equipment or processes where we work, we depend on our clients that do own the equipment/processes to evaluate hearing protector attenuation for the specific noise environments in which the protector will be used and to communicate that to CEC.

It is recognized that the use of these devices is a temporary solution to the problem of overexposure until feasible controls are provided.

Hearing protection use is mandatory for each employee who has incurred a standard threshold shift as reported by the program administrator.

Employees are responsible for wearing personal hearing protection equipment provided. All supervisors are required to enforce hearing protection requirements. Continuing failure of an employee to properly wear the protection provided could result in disciplinary action according to the WSM400.4.

CEC will make at least two "TYPES" of hearing protectors available to employees that provide suitable noise reduction to the exposure. Types include self-molding, pre-molded, custom molded, and ear muffs.

7.0 RECORDKEEPING

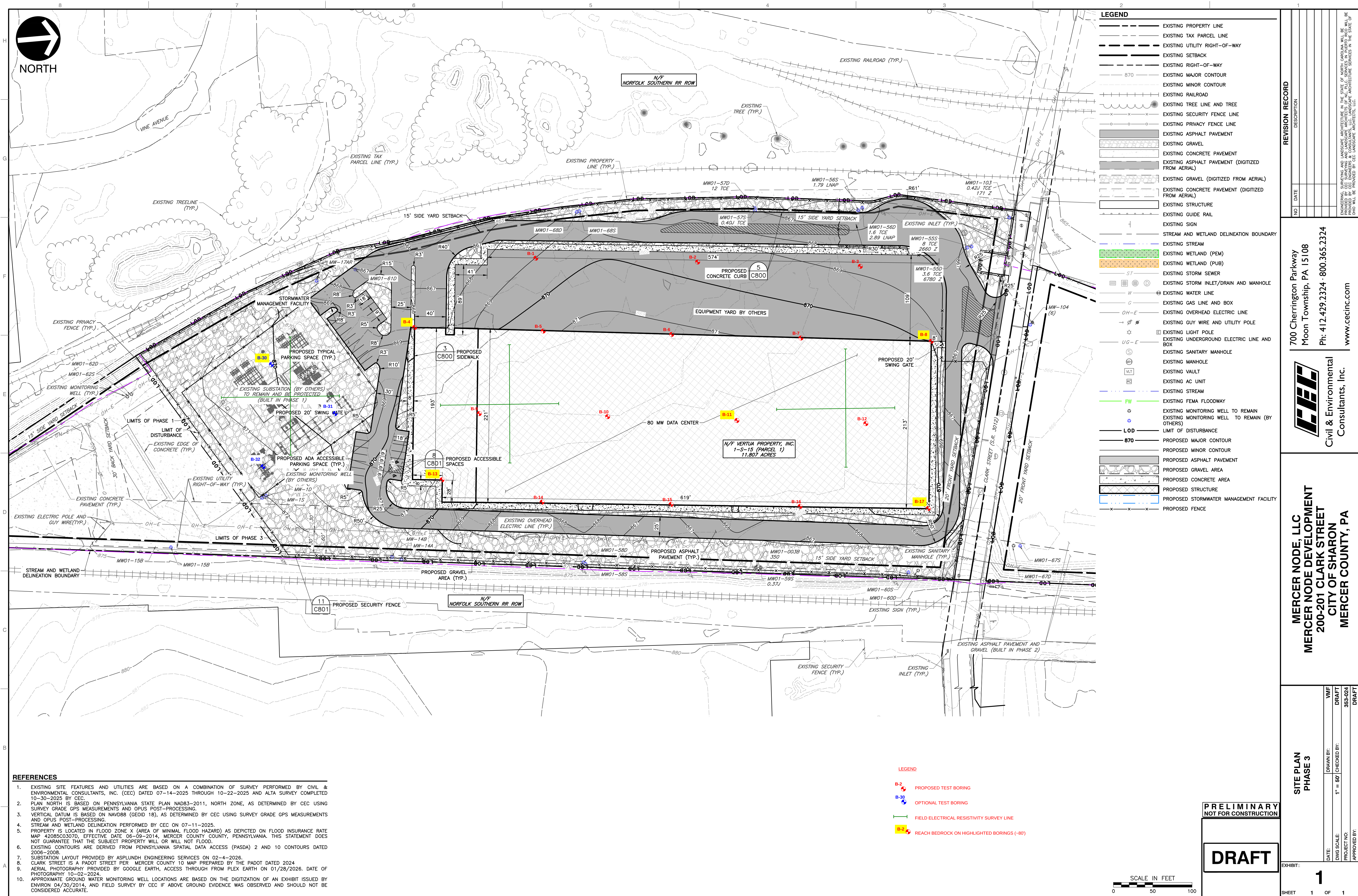
CEC Human Resources is responsible for maintaining exposure measurement records and audiometric test results for each affected employee in their employee file. These records will be maintained for the duration of the employment of the affected employee.

All records related to this program will be provided upon request to employees, former employees, or representatives designated by the individual employee.

FIGURES



NORTH



REFERENCES

1. EXISTING SITE FEATURES AND UTILITIES ARE BASED ON A COMBINATION OF SURVEY PERFORMED BY CIVIL & ENVIRONMENTAL CONSULTANTS, INC. (CEC) DATED 07-14-2025 THROUGH 10-22-2025 AND ALTA SURVEY COMPLETED 10-30-2025 BY CEC.
2. PLAN NORTH IS BASED ON PENNSYLVANIA STATE PLAN NAD83-2011, NORTH ZONE, AS DETERMINED BY CEC USING SURVEY GRADE GPS MEASUREMENTS AND OPUS POST-PROCESSING.
3. VERTICAL DATUM IS BASED ON NAVD80 (GEOID 18), AS DETERMINED BY CEC USING SURVEY GRADE GPS MEASUREMENTS AND OPUS POST-PROCESSING.
4. STREAM AND WETLAND DELINEATION PERFORMED BY CEC ON 07-11-2025.
5. FLOODING IS LOCATED IN FLOOD ZONE X (AREA A MINIMAL FLOOD HAZARD) AS DEPICTED ON FLOOD INSURANCE RATE MAP # 42085C03070, EFFECTIVE DATE 06-09-2014, MERCER COUNTY COUNTY, PENNSYLVANIA. THIS STATEMENT DOES NOT GUARANTEE THAT THE SUBJECT PROPERTY WILL OR WILL NOT FLOOD.
6. EXISTING CONTOURS ARE DERIVED FROM PENNSYLVANIA SPATIAL DATA ACCESS (PASDA) 2 AND 10 CONTOURS DATED 2006-2008.
7. SUBSTATION LAYOUT PROVIDED BY ASPLUNDH ENGINEERING SERVICES ON 02-4-2026.
8. CLARK STREET IS A PADOT STREET PER MERCER COUNTY 10 MAP PREPARED BY THE PADOT DATED 2024
9. AERIAL PHOTOGRAPHY PROVIDED BY GOOGLE EARTH, ACCESS THROUGH FROM PLEX EARTH ON 01/28/2026. DATE OF PHOTOGRAPHY 10-02-2024.
10. APPROXIMATE PROPERTY CORNER MONITORING WELL LOCATIONS ARE BASED ON THE DIGITIZATION OF AN EXHIBIT ISSUED BY ENMOR 04/30/2014, AND FIELD SURVEY BY CEC IF ABOVE GROUND EVIDENCE WAS OBSERVED AND SHOULD NOT BE CONSIDERED ACCURATE.

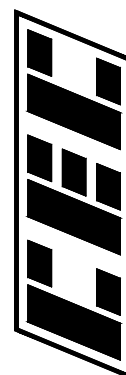
LEGEND

- | | |
|--|--|
| | EXISTING PROPERTY LINE |
| | EXISTING TAX PARCEL LINE |
| | EXISTING UTILITY RIGHT-OF-WAY |
| | EXISTING SETBACK |
| | EXISTING RIGHT-OF-WAY |
| | EXISTING MAJOR CONTOUR |
| | EXISTING MINOR CONTOUR |
| | EXISTING RAILROAD |
| | EXISTING TREE LINE AND TREE |
| | EXISTING SECURITY FENCE LINE |
| | EXISTING PRIVACY FENCE LINE |
| | EXISTING ASPHALT PAVEMENT |
| | EXISTING GRAVEL |
| | EXISTING CONCRETE PAVEMENT |
| | EXISTING ASPHALT PAVEMENT (DIGITIZED FROM AERIAL) |
| | EXISTING GRAVEL (DIGITIZED FROM AERIAL) |
| | EXISTING CONCRETE PAVEMENT (DIGITIZED FROM AERIAL) |
| | EXISTING STRUCTURE |
| | EXISTING GUIDE RAIL |
| | EXISTING SIGN |
| | STREAM AND WETLAND DELINEATION BOUNDARY |
| | EXISTING STREAM |
| | EXISTING WETLAND (PEM) |
| | EXISTING WETLAND (PUB) |
| | EXISTING STORM SEWER |
| | EXISTING STORM INLET/DRAIN AND MANHOLE |
| | EXISTING WATER LINE |
| | EXISTING GAS LINE AND BOX |
| | EXISTING OVERHEAD ELECTRIC LINE |
| | EXISTING GUY WIRE AND UTILITY POLE |
| | EXISTING LIGHT POLE |
| | EXISTING UNDERGROUND ELECTRIC LINE AND BOX |
| | EXISTING SANITARY MANHOLE |
| | EXISTING MANHOLE |
| | EXISTING VAULT |
| | EXISTING AC UNIT |
| | EXISTING STREAM |
| | EXISTING FEMA FLOODWAY |
| | EXISTING MONITORING WELL TO REMAIN |
| | EXISTING MONITORING WELL TO REMAIN (BY OTHERS) |
| | LIMIT OF DISTURBANCE |
| | PROPOSED MAJOR CONTOUR |
| | PROPOSED MINOR CONTOUR |
| | PROPOSED ASPHALT PAVEMENT |
| | PROPOSED GRAVEL AREA |
| | PROPOSED CONCRETE AREA |
| | PROPOSED STRUCTURE |
| | PROPOSED STORMWATER MANAGEMENT FACILITY |
| | PROPOSED FENCE |

REVISION RECORD

NO	DATE	DESCRIPTION

700 Cherrington Parkway
Moon Township, PA 15108
Ph: 412.429.2324 • 800.365.2324
www.cecinc.com



Civil & Environmental
Consultants, Inc.

**MERCER NODE, LLC
MERCER NODE DEVELOPMENT
200-201 CLARK STREET
CITY OF SHARON
MERCER COUNTY, PA**

**SITE PLAN
PHASE 3**

DATE:		DRAWN BY:	VMF
DWG SCALE:	1" = 50'	CHECKED BY:	DRAFT
PROJECT NO:	353-024		
APPROVED BY:	DRAFT		

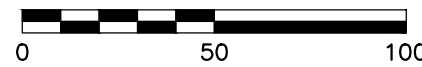
PRELIMINARY
NOT FOR CONSTRUCTION

DRAFT

EXHIBIT:

1 OF

SCALE IN FEET



ATTACHMENTS

**ATTACHMENT A: SITE SPECIFIC HEALTH AND SAFETY PLAN
ACKNOWLEDGEMENT**

Site Specific Health and Safety Plan Acknowledgment

The undersigned personnel certify by their signature that they have received a copy of the above-referenced Site Specific Health and Safety Plan and have read, understood, and agree to comply with the provisions for work activities at this Site and consent to comply with the specifications, procedures, and protocols outlined in these documents.

[illegible]

ATTACHMENT B: 2015 ENVIRONMENTAL COVENANT



Image ID: 000002707136 Type: GEN
Recorded: 01/27/2015 at 10:21:56 AM
Fee Amt: \$52.50 Page 1 of 21
Mercer County, PA
Dee Dee Zickar Recorder of Deeds

File **2015-00000810**

Environmental Covenant

When recorded, return to:
Clark Street Properties, LLC
ATTN: Paul E. O'Brien
7337 Warren-Sharon Road, Box 9
Brookfield, Ohio 44403-0009

The County Parcel Identification Nos. of the Property are: Parcels 1 and 4 Combined, and
Parcels 2, 3, and 5 of a tract of land conveyed to ARMCO, Inc. by 92-06119 of Mercer County
records.

GRANTOR: Clark Street Properties, LLC

PROPERTY ADDRESS: Sharon Pipe Plant, 200 Clark Street, Sharon, PA 16146

ENVIRONMENTAL COVENANT

This Environmental Covenant is executed pursuant to the Pennsylvania Uniform Environmental Covenants Act, Act No. 68 of 2007, 27 Pa. C.S. §§ 6501 – 6517 (UECA). This Environmental Covenant subjects the Property identified in Paragraph 1 to the activity and/or use limitations in this document. As indicated later in this document, this Environmental Covenant has been approved by the Pennsylvania Department of Environmental Protection (Department).

1. **Property affected.** The property affected (Property) by this Environmental Covenant is located in the City of Sharon, Mercer County.

The postal street address of the Property is: 200 Clark Street, Sharon, Pennsylvania, 16146.

The latitude and longitude of the center of the Property affected by this Environmental Covenant is: Latitude = +41.243964; Longitude = -80.506547.

The Property has been known by the following name(s): Wheatland Tube Co – Sharon Pipe Plant / f.k.a. Armco Sawhill Tubular Division

The DEP Primary Facility ID No. is: 625900

A complete description of the Property is attached to this Environmental Covenant as **Exhibit A**. A map of the Property is attached to this Environmental Covenant as **Exhibit B**.

complete (2/2)



2. **Property Owner / GRANTOR / GRANTEE.** Clark Street Properties, LLC is the owner of the Property and the GRANTOR and GRANTEE of this Environmental Covenant.

The mailing address of the owner is:

Clark Street Properties, LLC
7337 Warren-Sharon Road
Box 9
Brookfield, Ohio 44403-0009
ATTN: Paul E. O'Brien

3. **Holder(s) / GRANTEE(S).** The following is/are the GRANTEE(s) and a "holder," as that term is defined in 27 Pa. C.S. § 6502, of this Environmental Covenant: There are no Holder(s) or other Grantee(s) other than named herein.

4. **Description of Contamination & Remedy.** In accordance with a Consent Order and Agreement (COA) between the Commonwealth of Pennsylvania Department of Environmental Protection (PADEP), the JMC Steel Group (JMC) (f/k/a John Maneely Company) submitted the following documents to PADEP: (1) an April 2007 Conceptual Site Model (CSM) Report; (2) an August 24, 2007 Notice of Intent to Remediate (NIR); (3) a January 31, 2008 Remedial Investigation (RI) Report; (4) a July 1, 2008 revised RI Report; (5) a November 2008 Site-Specific Risk Assessment (RA) Report; (6) a March 26, 2009 Revised RA Report; (7) an August 7, 2009 Cleanup Plan; (8) a September 23, 2013 Final Report; and (9) a May 7, 2014 Revised Final Report. Through these documents, JMC has demonstrated compliance with Act 2 standards through a combination of the Background, Statewide Health, and/or Site-Specific cleanup standards set forth in Sections 302, 303 and 304 of Act 2 and related regulations.

Groundwater: The RI identified concentrations of VOCs, SVOCs, PCBs, dioxins, metals, sulfate, and nitrate in groundwater at levels exceeding applicable PADEP groundwater media-specific concentrations (MSCs) and/or surface water quality standards (SWQS). The RI also identified the presence of nonaqueous phase liquids (NAPL) and a low pH plume (collectively, the Groundwater Plumes). The Groundwater Plumes are located within the limits of a City of Sharon groundwater ordinance, which restricts potable, non-potable, and industrial use of groundwater. Portions of the Groundwater Plumes are also located within the Technical Impracticability Waiver area defined for the upgradient Westinghouse Superfund Site to the east, for which USEPA has determined that restoration of the alluvial (upper) aquifer to drinking water quality is technically impracticable as a result of the contamination at and migrating from the Westinghouse Superfund Site. A site-specific evaluation of potentially complete human and ecological exposure pathways for the Property indicates that there are no unacceptable exposures to site-related contaminants under current conditions. Future exposures to site-related contaminants for on-site construction and redevelopment workers via direct contact with shallow groundwater is possible (see Exhibit C-1). Engineering and institutional controls have been implemented to appropriately manage these potential future exposures.

Soil: The RI identified concentrations of VOCs, SVOCs, PCBs and metals in soil at levels exceeding applicable PADEP Statewide Health Standards for soil, including direct contact



MSCs and vapor intrusion screening criteria. The evaluation of potentially complete human and ecological exposure pathways for the Property indicated the following: (1) no buildings are currently present in areas where exposure to vapor intrusion is a concern; (2) one location (GP01-042) in the Waste Storage Area (shown on Exhibit C-2) has a benzo(a)pyrene concentration in soil above the Non-Residential Direct Contact MSC; (3) soil concentrations in the Former Settling Basin Area (shown on Exhibit C-2) area may result in exposure to vapor intrusion depending on whether and when a building is constructed over the area; and (4) soil concentrations in the Former Settling Basin Area (shown on Exhibit C-2) may result in exposure during future site construction and redevelopment activities. Engineering and institutional controls have been implemented to appropriately manage these current and potential future exposures.

Prior site remediation activities have included the implementation of a pump and treat system to hydraulically control and reduce groundwater contamination. In addition, during the RI, building decommissioning was completed and source area remediation was conducted at the Former Galvanizing Area.

To address residual groundwater and soil contamination at the site, the final remedy includes a combination of engineering and institutional controls as described in Section 5 below. In addition, a minimum of eight quarters of groundwater monitoring were conducted to demonstrate attainment of the Background Standard for constituents of concern associated with the upgradient Westinghouse Superfund Site and to confirm that the Groundwater Plumes are stable and contaminants are not discharging to the Shenango River at levels of concern.

Maps that delineate the areas on the Property with institutional and/or engineering controls are attached as Exhibits C-1 and C-2.

5. **Activity & Use Limitations.** Clark Street Properties, LLC agrees to implement the following activity and use limitations on the Property:

- a. The Property and each portion thereof shall be used solely for nonresidential purposes;
- b. Each part or portion of any building, structure or paved surface in the vicinity of the Waste Storage Area (GP01-042) that serves to eliminate pathways of exposure to potential contamination, as shown on Exhibit C-2, shall be maintained to prevent complete pathways of exposure to soil and/or groundwater contamination;
- c. There shall be no demolition, removal, replacement, or reconstruction of, or other modification to, any part or portion of any building, structure, or paved surface in the vicinity of GP01-042 that serves to eliminate pathways of exposure to potential contamination, as shown on Exhibit C-2, unless PADEP is notified in writing;
- d. No new structures shall be erected at the Property until a re-evaluation of potential vapor intrusion exposure pathways is completed, and until mitigation measures are implemented, as necessary, to prevent any significant exposures via this pathway;
- e. Unless deemed necessary or desirable for environmental monitoring, inspection and/or remediation activities, no person or entity will be permitted to (i) use any groundwater now or hereafter located on or under any portion of the Property; (ii)



cause any groundwater to rise to the surface; (iii) alter the natural flow or infiltration of any groundwater; or (iv) perform any drilling or excavation activity that would disturb any groundwater or create a potential risk of human exposure to contaminants that may be in any groundwater;

- f. There shall be no excavation on the Property, and no soils shall be taken off of the Property, unless PADEP is notified and a site-specific health and safety plan (HSP) and a soil management plan (SMP) are developed and implemented;
- g. Annual monitoring inspections will be undertaken to assess the condition of the engineering controls and verify that the City of Sharon groundwater use ordinance is still in effect as detailed in the Post Remediation Care Plan section of the Revised Final Report;
- h. Annual groundwater monitoring and reporting will be conducted at three monitoring wells (MW01-55D, MW01-69D and MW01-70D) to verify that cadmium concentrations and pH levels in groundwater do not result in surface water impacts that contravene the surface water quality standards, as described in the Post Remediation Care Plan section of the Revised Final Report.
- i. The obligations described in the Post Remediation Care Plan section of the Revised Final Report (Exhibit D).
- j. For the property described in 92 DR 06119, Second Described, Parcel No. 1, the following applies: There shall be no disturbance of the surface of the land by filling, drilling, excavation, removal of topsoil, rocks or minerals, or change in the topography of the land without at least thirty (30) days prior written approval from U.S. EPA.

6. **Notice of Limitations in Future Conveyances.** Each instrument hereafter conveying any interest in the Property subject to this Environmental Covenant shall contain a notice of the activity and use limitations set forth in this Environmental Covenant and shall provide the recorded location of this Environmental Covenant.

7. **Compliance Reporting.** After written request by the Department or by the end of every June following the Department's approval of this Environmental Covenant, the then current owner of the Property shall submit, to the Department and any Holder listed in Paragraph 3, written documentation stating whether or not the activity and use limitations in this Environmental Covenant are being abided by. In addition, within 1 month after any of the following events, the then current owner of the Property shall submit, to the Department and any Holder listed in Paragraph 3, written documentation of noncompliance with the activity and use limitations in this Environmental Covenant; transfer of the Property; changes in use of the Property; or filing of applications for building permits for the Property and any proposals for any site work, if the building or proposed site work will affect the contamination on the Property subject to this Environmental Covenant.

8. **Access by the Department.** In addition to any rights already possessed by the Department, this Environmental Covenant grants to the Department a right of reasonable access of the Property in connection with implementation or enforcement of this Environmental Covenant.



Image ID: 000002707140 Type: GEN
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File **2015-00000810**

9. **Recording & Proof & of Notification.** Within 30 days after the date of the Department's approval of this Environmental Covenant, Clark Street Properties, LLC shall file this Environmental Covenant with the Recorder of Deeds for each County in which the Property is located, and send a file-stamped copy of this Environmental Covenant to the Department within 60 days of recording. Within that time period, Clark Street Properties, LLC also shall send a file-stamped copy to each of the following: the City of Sharon and the County of Mercer.

10. **Termination or Modification.**

- a. This Environmental Covenant may only be terminated or modified in accordance with 27 Pa. C.S. §§ 6509 or 6510, or in accordance with this paragraph.
- b. This Environmental Covenant may be amended or terminated as to any portion of the Property that is acquired for use as state highway right-of-way by the Commonwealth provided that: (1) the Department waives the requirements for an environmental covenant and for conversion pursuant to 27 Pa. C.S. §6517 to the same extent that this Environmental Covenant is amended or terminated; (2) the Department determines that termination or modification of this Environmental Covenant will not adversely affect human health or the environment; and (3) the Department provides 30-days advance written notice to the current property owner, each holder, and, as practicable, each person that originally signed the Environmental Covenant or successors in interest to such persons.
- c. This Environmental Covenant may be terminated upon attainment, in accordance with 35 P.S. §§ 6026. 101 – 6026.908, with an unrestricted use remediation standard for the above-described contamination at the Property. The Department must approve, in writing, of such termination.
- d. In accordance with 27 Pa. C.S. § 6510(a)(3)(i), Grantor hereby waives the right to consent to any amendment or termination of the Environmental Covenant by consent; it being intended that any amendment to or termination of this Environmental Covenant by consent in accordance with this Paragraph requires only the following signatures on the instrument amending or terminating this Environmental Covenant: (i) the Holder at the time of such amendment or termination; (ii) the then current owner of the Property and (iii) the Department.

11. **This Paragraph Intentionally Left Blank.**



12. **Department's address.** Communications with the Department regarding this Environmental Covenant shall be sent to:

Regional Manager
Environmental Cleanup and Brownfields
Pennsylvania Department of Environmental Protection
230 Chestnut Street
Meadville, PA 16335

13. **Severability.** The paragraphs of this Environmental Covenant shall be severable and should any part hereof be declared invalid or unenforceable, the remainder shall continue in full force and effect between the parties.

ACKNOWLEDGMENTS by Owner(s) and any Holder(s), in the following form:

Date: 12-11-14

Clark Street Properties, LLC, Grantor

By: [Signature]

Name: Paul E. O'Brien

Title: President / Member

Date: 12-29-14

APPROVED, by Commonwealth of Pennsylvania,
Department of Environmental Protection

By: Anita M. Stainbrook

Name: Anita M. Stainbrook

Title: Environmental Program Manager



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State of Ohio

~~COMMONWEALTH OF PENNSYLVANIA~~)

COUNTY OF Trumbull) SS:

On this 11th day of December, 2014, before me, a Notary Public, the undersigned person, PAUL E O'Brien, personally appeared and acknowledged himself to be authorized on behalf of Clark Street Properties, LLC to sign the foregoing Environmental Covenant, dated 12-11-14.

IN WITNESS WHEREOF, I hereunto set my hand and official seal.

Judith A DeMay
Notary Public

My Commission Expires:

JUDITH A. DEMAY
NOTARY PUBLIC • STATE OF OHIO
My commission expires Mar. 24, 2018

Seal:



COMMONWEALTH OF PENNSYLVANIA)

COUNTY OF CRAWFORD) SS:

On this 29th day of December, 2014, before me, a Notary Public, the undersigned person, personally appeared Anita M. Stainbrook, Regional Manager, Environmental Cleanup and Brownfields of the Commonwealth of Pennsylvania, Department of Environmental Protection, Northwest Regional Office, whose name is subscribed to this Environmental Covenant, and acknowledged that he executed same for the purposes therein contained.

IN WITNESS WHEREOF, I hereunto set my hand and official seal.

Jane O Butryn
Notary Public

My Commission Expires: Aug. 26, 2015

Seal:

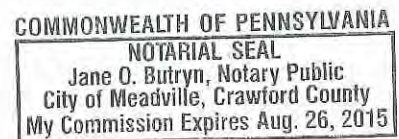




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EXHIBIT A

METES AND BOUNDS DESCRIPTION OF PROPERTY



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File 2015-00000810

MAIN

First Described
Parcel 1 and Parcel 4 Combined

Situated in the Commonwealth of Pennsylvania, County of Mercer and the City of Sharon and known as being part of a tract of land conveyed to ARMCO, Inc. by 92-06119 of Mercer County records and being further bounded and described as follows to wit:

Beginning at the centerline Intersection of Clark Street (40' wide) and Sharpsville Road aka State Route 718 (51' wide), thence, North 87 degrees 48 minutes 03 seconds West, along the centerline of said Clark Street, a distance of 461.29 feet to a point; thence 75 degrees 44 minutes 25 seconds West, continuing along the centerline of said Clark Street, a distance of 99.38 feet to a point on the west line of the Erie and Pittsburgh Railroad right of way (formerly the Pennsylvania Railroad) and being the TRUE PLACE OF BEGINNING for the tract of land herein described;

Thence, South 06 degrees 55 minutes 25 seconds West, along the said Erie and Pittsburgh Railroad right of way (formerly the Pennsylvania Railroad), a distance of 1415.43 feet to a track spike set in a large rock and being in the easterly line of the Norfolk and Southern Railroad (formerly the Erie Railroad) and passing over a capped rebar set at a distance of 20.00 feet;

Thence, the following 11 courses along the easterly line of lands of Norfolk and Southern Railroad (formerly the Erie Railroad);

- North 28 degrees 57 minutes 50 seconds West, 427.05 feet to a 5/8" iron bar found
- North 24 degrees 56 minutes 08 seconds West, 163.03 feet to a 5/8" iron bar found
- North 19 degrees 10 minutes 31 seconds West, 129.93 feet to a capped rebar set
- North 04 degrees 01 minutes 14 seconds West, 81.20 feet to a 5/8" iron bar found
- North 09 degrees 15 minutes 14 seconds West, 107.00 feet to a capped rebar set
- North 04 degrees 00 minutes 14 seconds West, 95.00 feet to a capped rebar set
- North 01 degrees 21 minutes 14 seconds West, 96.00 feet to a capped rebar set
- North 03 degrees 57 minutes 46 seconds East, 145.00 feet to a capped rebar set
- North 07 degrees 02 minutes 46 seconds East, 150.00 feet to a capped rebar set
- North 04 degrees 04 minutes 11 seconds East, 8.84 feet to a capped rebar set
- North 09 degrees 48 minutes 14 seconds West, 32.31 feet to a capped rebar set
- North 12 degrees 36 minutes 46 seconds East, 170.38 feet to a point in the centerline of said Clark Street and passing over a capped rebar set at a distance of 150.38 feet

Thence, South 75 degrees 44 minutes 25 seconds East, along the centerline of said Clark Street, a distance of 474.51 feet to the place of beginning and containing 11.809 acres of land more or less as determined by a survey performed by Marlowe F. Houillon P.S. 050803-R of Campbell & Associates, Inc. in March of 2002.



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NORTH YARD

First Described Parcel 5

Situated in the Commonwealth of Pennsylvania, County of Mercer and the City of Sharon and known as being part of a tract of land conveyed to ARMCO, Inc. by 92-06119 of Mercer County records and being further bounded and described as follows to wit:

Beginning at a drill hole set at the intersection of the north line of Clark Street (40' wide) with the west line of Sharpsville Road aka State Route 718 (51' wide); thence, South 63 degrees 12 minutes 57 seconds West, along the north line of said Clark Street, a distance of 12.38 feet to a drill hole set; thence, North 87 degrees 48 minutes 03 seconds West, continuing along the north line of said Clark Street, a distance of 422.11 feet to a 1 inch brass bar in concrete monument found; thence, North 75 degrees 44 minutes 25 seconds West, continuing along the north line of said Clark Street, a distance of 99.84 feet to the west line of the Erie and Pittsburgh Railroad right of way (formerly the Pennsylvania Railroad) the TRUE PLACE OF BEGINNING for the parcel of land herein described:

Thence, North 75 degrees 44 minutes 25 seconds West, continuing along the north line of said Clark Street, a distance of 405.40 feet to a capped rebar set on the east line of lands of the Norfolk and Southern Railroad;

Thence, North 25 degrees 58 minutes 06 seconds East, along the east line of said lands of the Norfolk and Southern Railroad, a distance of 1134.00 feet to a capped rebar set;

Thence, North 76 degrees 42 minutes 48 seconds East, a distance of 41.14 feet to a capped rebar set on the west line of the said Erie and Pittsburgh Railroad right of way (formerly the Pennsylvania Railroad);

Thence, Southerly, along the west line of said Erie and Pittsburgh Railroad right of way (formerly the Pennsylvania Railroad) which is along the arc of a curve to the left, an arc distance of 100.92 feet, said curve having a central angle of 04 degrees 10 minutes 58 seconds, a radius of 1382.45 feet and a chord distance of 100.90 feet which bears South 09 degrees 09 minutes 34 seconds West to a capped rebar set at the point of tangency;

Thence, South 07 degrees 0 minutes 06 seconds West, along the west line of the Erie and Pittsburgh Railroad right of way (formerly the Pennsylvania Railroad), a distance of 1037.09 feet to the true place of beginning and containing 5.625 acres of land more or less as determined by a survey performed by Marlowe F. Houillon P.S. 050803-R of Campbell & Associates, Inc. in March of 2002.



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SETTLING BASIN

First Described
Parcel 2

Situated in the Commonwealth of Pennsylvania, County of Mercer and City of Sharon and known as being part of a tract of land conveyed to ARMCO, Inc. by 92-06119 of Mercer county records and being further bounded and described as follows to wit:

Beginning at the centerline intersection of Clark Street (width varies) and North Water Avenue (width varies); thence, South 57 degrees 12 minutes 45 second East, along the center line of said Clark Street, a distance of 390.27 feet to a point; thence, South westerly along the arc of a curve to the left, an arc distance of 183.95 feet, said curve having a central angle of 16 degrees 33 minutes 19 seconds, a radius of 636.62 feet, a chord distance of 183.31 feet, which bears south 65 degrees 29 minutes 30 seconds East to the point of tangency; thence, South 73 degrees 46 minutes 14 seconds East, along the centerline of said Clark Street, a distance of 272.79 feet to the centerline of Shenango Avenue (33' wide); thence, South 75 degrees 44 minutes 25 seconds East, along the centerline of said Clark Street, a distance of 72.06 feet thence, south 14 degrees 15 minutes 35 seconds West, at a right angle to the centerline of said Clark Street, a distance of 20,000 feet to a capped rebar set and being the TRUE PLACE OF BEGINNING for the parcel of land herein described to wit:

Thence, Southerly along the of Norfolk and Southern Railroad (formerly the Erie Railroad) along the arc of a curve to the right, on arc distance of 652.12 feet said curve having a central angle of 19 degrees 44 minute 35 seconds, a radius of 1875.08 feet, and a chord distance of 648.84 feet, which bears South 18 degrees 38 minutes 30 seconds West, to a capped rebar set;

Thence, North 56 degrees 38 minutes 35 seconds West, a distance of 72.50 feet to a capped rebar set on the east line of Shenango Avenue;

Thence, North 26 degrees 14 minutes 41 seconds East, along the east line of said Shenango Avenue, a distance of 77.40 feet to a capped rebar set at an angle point;

Thence, North 18 degrees 56 minute 41 seconds East, along the east line of said Shenango Avenue, a distance of 510.05 feet to a capped rebar set on the south line of said Clark Street;

Thence, North 45 degrees 43 minutes 33 seconds East, along the south line of said Clark Street, a distance of 28.50 feet to a capped rebar set;

Thence, South 82 degrees 46 minutes 51 seconds East, along the south line of said Clark Street, a distance of 42.98 feet to a capped rebar set;

Thence, North 30 degrees 37 minutes 42 seconds East, along the south line of said Clark Street, a distance of 9.98 feet to true place of beginning and containing 1.130 acres of land more or less as determined by a survey performed by Marlowe F. Houillon P.S. 050803-R of Campbell & Associates, Inc.



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UNNAMED PARCEL

First Described Parcel 3

Situated in the Commonwealth of Pennsylvania, County of Mercer and City of Sharon and known as being part of a tract of land conveyed to ARMCO, Inc. by 92-06119 of Mercer county records and being further bounded and described as follows to wit:

Beginning at the centerline intersection of Clark Street (width varies) and North Water Avenue (width varies); thence, South 57 degrees 12 minutes 45 second East, along the center line of said Clark Street, a distance of 390.27 feet to a point; thence, South westerly along the arc of a curve to the left, an arc distance of 183.95 feet, said curve having a central angle of 16 degrees 33 minutes 19 seconds, a radius of 636.62 feet, a chord distance of 183.31 feet, which bears south 65 degrees 29 minutes 30 seconds East to the point of tangency; thence, South 73 degrees 46 minutes 14 seconds East, along the centerline of said Clark Street, a distance of 180.61 feet to a point; thence, South 16 degrees 13 minutes 46 seconds West, at a right angle to the centerline of said Clark Street, a distance of 45.00 feet to a capped rebar set and being the TRUE PLACE OF BEGINNING for the parcel of land herein described to wit:

Thence, South 73 degrees 46 minutes 14 seconds East, along the south line of said Clark Street, a distance of 23.57 feet to a capped rebar set;

Thence, South 07 degrees 41 minutes 55 seconds West, along the south line of said Clark Street, a distance of 20.22 feet to a capped rebar set;

Thence, South 73 degrees 46 minutes 14 seconds East, along the south line of said Clark Street, a distance of 46.01 feet to a capped rebar set on the west line of Shenango Avenue (33' wide);

Thence, South 18 degrees 56 minutes, 41 seconds West, along the west line of said Shenango Avenue, a distance of 500.10 feet to a capped rebar set at an angle point;

Thence, South 26 degrees 14 minutes 41 seconds West, along the west line of said Shenango Avenue, a distance of 61.00 feet to a capped rebar set;

Thence, North 63 degrees 45 minutes 19 seconds West, a distance of 59.81 feet to a capped rebar set;

Thence, North 23 degrees 04 minutes 30 seconds East, but along the low water mark of the Shenango River, a distance of 408.47 feet to a capped rebar set;

Thence, North 06 degrees 29 minutes 46 seconds East, but along the low water mark of the Shenango River, a distance of 166.04 feet to the true place of beginning and containing 0.679 acres of land more or less as determined by a survey performed by Marlowe F. Houillon P.S. 050803-R of Campbell & Associates, Inc. in March of 2002.



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EXHIBIT B

SITE LOCATION MAP



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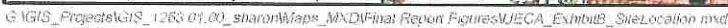




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EXHIBIT C-1

AREAS SUBJECT TO
CITY OF SHARON GROUNDWATER USE ORDINANCE AND/OR SITE-
SPECIFIC INSTITUTIONAL CONTROLS



-  Current Building
 Former Buildings
 River
 Railways
 Roads
 Approximate Property Boundary

* Monitoring Wells where LNAPL was observed



JMC Sharon Plant, Sharon, PA

0 100 200
Feet

EXHIBIT C-1

DRAWN BY: MRJ

DATE: 04/30/2014 REVISED:



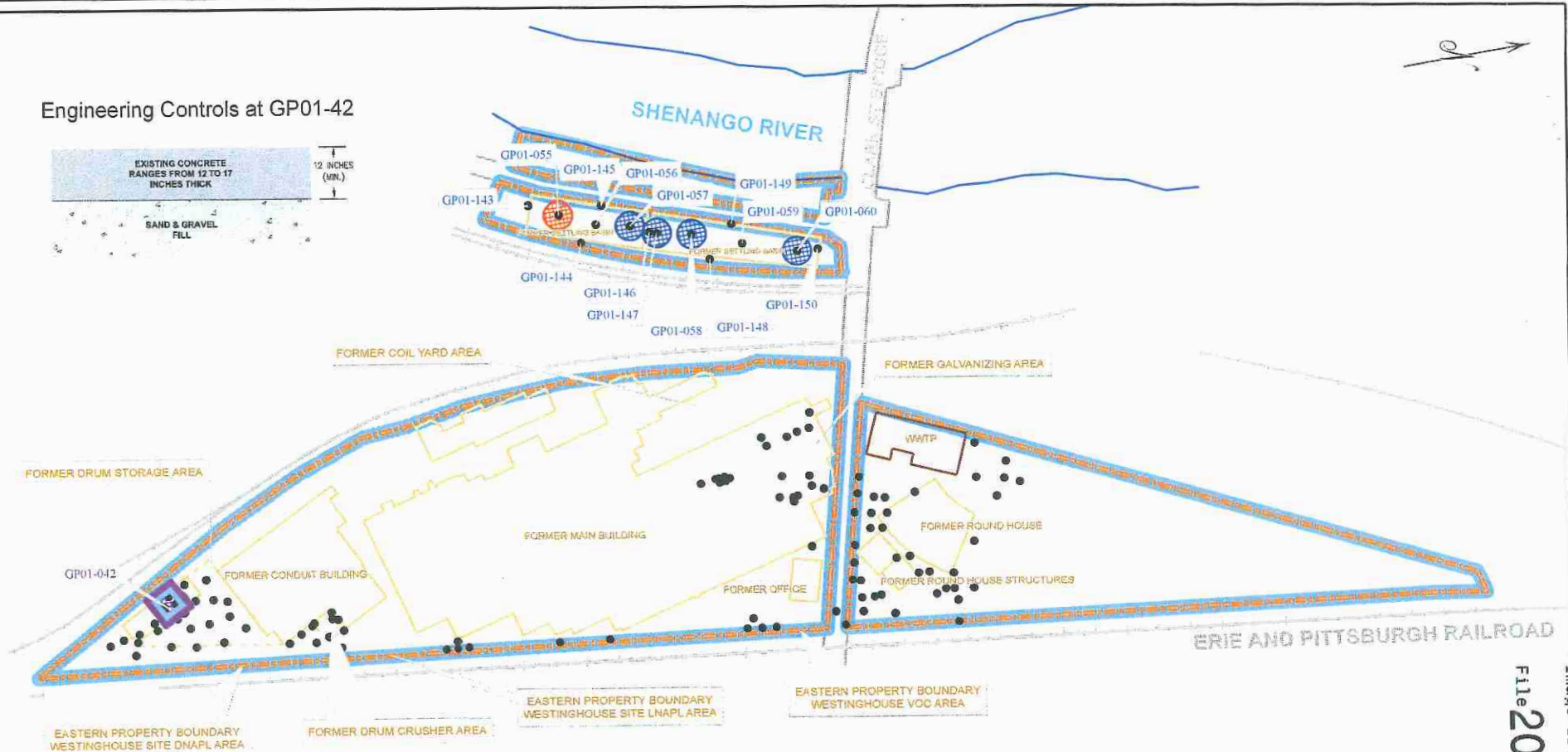
Image ID: 000002707152 Type: GEN
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EXHIBIT C-2

SOIL AREAS SUBJECT TO INSTITUTIONAL AND/OR ENGINEERING CONTROLS

Engineering Controls at GP01-42



Legend

- Soil Boring Locations
- Exceeds PADEP Non-Residential Direct Contact Soil MSC
- Exceeds PADEP Risk or HI Threshold for Redevelopment Exposure
- Exceeds PADEP Risk or HI Thresholds for Vapor Intrusion
- Soil Areas Subject to Institutional Control
- Soil Area Subject to Engineering Control
- Current Building
- Former Buildings
- River
- Railways
- Roads
- Approximate Property Boundary



Soil Institutional and Engineering Controls

JMC Sharon Plant, Sharon, PA

0 100 200
Feet

EXHIBIT C-2

DRAWN BY: MVG

DATE: 07/24/2009

REVISED:

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EXHIBIT D

REVISED FINAL REPORT

SECTION 8 – POST REMEDIATION CARE PLAN



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8 Post Remediation Care Plan

To address groundwater and soil contamination at the site, the selected final remedy for the site includes:

1. engineering controls including the use of the existing concrete cap in the former Waste Storage area (GP01-042) that exhibits a soil concentration above the applicable MSC;
2. institutional controls including the City of Sharon Groundwater Use Ordinance to limit exposures via use of shallow groundwater at the site;
3. use of appropriate health and safety protocols for on-site excavation activities; and
4. the reevaluation of the vapor intrusion pathway and mitigation of this pathway for all new buildings to be constructed at the site.

The requirements for exposure controls during future excavations and the reassessment of the vapor intrusion pathway for future buildings are specified in the site-specific environmental covenant for the site. As part of the remedy implementation, groundwater monitoring was conducted to demonstrate attainment of the Background Standard for constituents associated with the upgradient site, and confirm that the LNAPL areas are stable and groundwater is not discharging to the Shenango River at levels of concern. Post-remedy monitoring will be conducted to ensure that the selected remedy remains protective. This monitoring will include annual confirmation that the City of Sharon Groundwater Use Ordinance has not been repealed or changed; inspection of the concrete cover and identification of any significant changes in site conditions; re-evaluation of vapor intrusion exposure for any new buildings that may be constructed on the site; and limited groundwater stability monitoring to verify that cadmium concentrations and pH levels in groundwater do not result in surface water impacts that contravene the SWQS.

8.1 Cap Inspection and Maintenance Schedule

The engineering cap in the former Waste Storage area will be inspected annually and repaired as needed. The condition of the engineering cap will be discussed in the annual compliance report (See Section 8.6) and noted on the site inspection form, attached as Appendix 12.

8.2 Institutional Control Evaluation Schedule

Compliance with the site-specific Environmental Covenant will be verified on an annual basis in accordance with the Department's approval of the covenant. This will include a compliance report verifying that the restrictions and coverage of the City of Sharon groundwater use ordinance are still in effect, identification of any building permit applications for the property, changes in site use, and an evaluation of whether there have been any changes in laws or regulations that may be applicable to the remedy for the site.

8.3 Limited Groundwater Stability Verification Monitoring Schedule

As noted in Section 7.1.2.1, additional monitoring is proposed to verify that cadmium concentrations and pH levels in groundwater do not result in surface water impacts that contravene the SWQS. The additional groundwater monitoring will be conducted at monitoring wells MW01-55D, MW01-69D and MW01-70D on an annual basis for a period of two years.



The additional sampling data will be evaluated using Mann-Kendall trend testing and LOESS plots to determine whether: the concentrations have stabilized; additional monitoring is necessary; or, remediation should be considered. Upon completion of the additional monitoring, the results, along with recommendations for additional monitoring and/or proposed remedial measures, if any, will be documented in the annual site inspection and compliance report (ASI).

8.4 Contingent Groundwater and Surface Water Monitoring Schedule

Monitoring of groundwater, surface water, and/or storm sewer monitoring may be initiated if changes in site conditions or site redevelopment occur that could affect recharge or groundwater flow at the site, such that the potential impacts to surface water could need to be re-evaluated. Such changes and the need for resumption of post-remediation care monitoring will be identified in the annual site inspection and compliance report. Specifically, contingent groundwater, surface water, and/or storm sewer monitoring will be implemented as follows:

1. One (1) year of quarterly sampling will be performed from a limited number of wells selected based on the observed site conditions. The details of the sampling would be determined prior to implementation of any monitoring.
2. If the results of quarterly monitoring show no changes from conditions documented in this Revised Final Report, then quarterly sampling will cease after one year.
3. If the results of quarterly monitoring indicate potential for impacts to surface water in two consecutive quarters, the need for implementation of remedial measures will be re-evaluated.

The results of any contingent monitoring and/or the need for remedial measures will be documented in the ASI report.

8.5 Health & Safety

In addition, for future activities, such as utility repair or other excavation, to be conducted in excavation restriction areas identified in the environmental covenant, a site-specific HASP will be prepared to identify procedures to be employed to reduce the potential for unacceptable exposures to contaminants in soil and/or groundwater at the site.

8.6 Annual Site Inspection and Compliance Report

An ASI will be prepared to document implementation of the post-remediation care plan activities. This report will include documentation of the engineering and institutional control inspections and confirm that the conditions of the Environmental Covenant are being followed. The report will be prepared by the end of every June following the Department's approval of the site-specific Environmental Covenant. The ASI will be kept in JMC files for at least 5 years following the reporting date.

SAFETY DATA SHEET

Version 6.17
Revision Date 07/29/2025
Print Date 07/30/2025

SECTION 1. IDENTIFICATION

1.1 Product identifiers

Product name : 1,2-Dichloroethane

Product Number : 284505

Brand : Sigma-Aldrich

Index-No. : 602-012-00-7

CAS-No. : 107-06-2

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765

Fax : +1 800 325-5052

1.4 Emergency telephone number

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-
527-3887 CHEMTREC (International) 24
Hours/day; 7 Days/week

SECTION 2. HAZARDS IDENTIFICATION

GHS classification in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200)

Flammable liquids : Category 2

Acute toxicity (Oral) : Category 4

Acute toxicity (Inhalation) : Category 3

Skin irritation : Category 2

Eye irritation : Category 2A

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Carcinogenicity : Category 1B

Specific target organ toxicity - single exposure : Category 3 (Respiratory system)

Aspiration hazard : Category 1

Other hazards

None known.

GHS label elements

Hazard pictograms :



Signal Word : Danger

Hazard Statements :

- H225 Highly flammable liquid and vapour.
- H302 Harmful if swallowed.
- H304 May be fatal if swallowed and enters airways.
- H315 Causes skin irritation.
- H319 Causes serious eye irritation.
- H331 Toxic if inhaled.
- H335 May cause respiratory irritation.
- H350 May cause cancer.

Precautionary statements :

Prevention:

- P201 Obtain special instructions before use.
- P202 Do not handle until all safety precautions have been read and understood.
- P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
- P233 Keep container tightly closed.
- P240 Ground and bond container and receiving equipment.
- P241 Use explosion-proof electrical/ ventilating/ lighting equipment.
- P242 Use non-sparking tools.
- P243 Take action to prevent static discharges.
- P261 Avoid breathing mist or vapours.
- P264 Wash skin thoroughly after handling.
- P270 Do not eat, drink or smoke when using this product.
- P271 Use only outdoors or in a well-ventilated area.
- P280 Wear protective gloves, protective clothing, eye protection and face protection.

Response:

P301 + P310 IF SWALLOWED: Immediately call a

POISON CENTER/ doctor.
P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P311 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/ doctor.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P331 Do NOT induce vomiting.
P332 + P313 If skin irritation occurs: Get medical advice/ attention.
P337 + P313 If eye irritation persists: Get medical advice/ attention.
P370 + P378 In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.

Storage:

P403 + P233 Store in a well-ventilated place. Keep container tightly closed.
P403 + P235 Store in a well-ventilated place. Keep cool.
P405 Store locked up.

Disposal:

P501 Dispose of contents/ container to an approved waste disposal plant.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Substance

Components

Chemical name	CAS No./Unique ID	Concentration (% w/w)	Trade secret
1,2-Dichloroethane	107-06-2*	>= 80 - <= 100	TSC

* Indicates that the identifier is a CAS No.

TSC- the actual concentration or concentration range is withheld as a trade secret

SECTION 4. FIRST AID MEASURES

General advice : First aiders need to protect themselves. Show this safety data sheet to the doctor in attendance.
If inhaled : After inhalation: fresh air. Immediately call in physician.

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	If breathing stops: immediately apply artificial respiration, if necessary also oxygen.
In case of skin contact	: In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Consult a physician.
In case of eye contact	: After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses.
If swallowed	: After swallowing: caution if victim vomits. Risk of aspiration! Keep airways free. Pulmonary failure possible after aspiration of vomit. Call a physician immediately.
Most important symptoms and effects, both acute and delayed	: The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11
Protection of first-aiders	: For personal protection see section 8.
Notes to physician	: No data available

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media	: Water Foam Carbon dioxide (CO ₂) Dry powder
Unsuitable extinguishing media	: For this substance/mixture no limitations of extinguishing agents are given.
Specific hazards during fire fighting	: Combustible.

Pay attention to flashback.

Vapours are heavier than air and may spread along floors.

Development of hazardous combustion gases or vapours possible in the event of fire.

Forms explosive mixtures with air at ambient temperatures.

Hazardous combustion products	: Carbon oxides Hydrogen chloride gas
Specific extinguishing methods	: No data available
Further information	: Remove container from danger zone and cool with water. Suppress (knock down) gases/vapours/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.
Special protective equipment for fire-fighters	: Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	: Advice for non-emergency personnel: Do not breathe vapours, aerosols. Avoid substance contact. Ensure adequate ventilation. Keep away from heat and sources of ignition. Evacuate the danger area, observe emergency procedures, consult an expert. Advice for emergency responders: For personal protection see section 8.
Environmental precautions	: Do not let product enter drains. Risk of explosion.
Methods and materials for containment and cleaning up	: Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

SECTION 7. HANDLING AND STORAGE

For precautions see section 2.2.

- Advice on protection against fire and explosion : Keep away from open flames, hot surfaces and sources of ignition.
Take precautionary measures against static discharge.
- Advice on safe handling : Work under hood. Do not inhale substance/mixture.
Avoid generation of vapours/aerosols.
- Further information on storage conditions : Keep container tightly closed in a dry and well-ventilated place.
Keep away from heat and sources of ignition.
Keep locked up or in an area accessible only to qualified or authorised persons.
- Storage class : 3, Flammable liquids
- Recommended storage temperature : Recommended storage temperature see product label.
- Packaging material : Suitable material: Mild Steel Drum

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Ingredients with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
1,2-Dichloroethane	107-06-2	TWA	10 ppm	ACGIH
		ST	2 ppm 8 mg/m ³	NIOSH REL
		TWA	1 ppm 4 mg/m ³	NIOSH REL
		TWA	50 ppm	OSHA Z-2
		CEIL	100 ppm	OSHA Z-2
		Peak	200 ppm (5 mins. in any 3 hrs.)	OSHA Z-2

Engineering measures : No data available

Personal protective equipment

Respiratory protection : required when vapours/aerosols are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Recommended Filter type: : Filter A (acc. to DIN 3181) for vapours of organic compounds

The entrepreneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.

Hand protection

Material : Viton®
Break through time : 480 min
Glove thickness : 0.7 mm
Protective index : Full contact
Manufacturer : Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Material : Chloroprene
Break through time : 10 min
Glove thickness : 0.65 mm
Protective index : Splash contact
Manufacturer : KCL 720 Camapren®

Remarks : This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Eye protection : Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).
Safety glasses

Skin and body protection : Flame retardant antistatic protective clothing.

Hygiene measures : Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : viscous liquid

Color : colourless

Odor	: of solvents
Odor Threshold	: 3 ppm
pH	: No data available
Melting point/ range	: -31 °F / -35 °C Method: lit.
Boiling point/boiling range	: 181 °F / 83 °C Method: lit.
Flash point	: ca. 55 °F / 13 °C (1,013 hPa) Method: DIN 51755 Part 1, closed cup
Evaporation rate	: 4.1
Flammability (solid, gas)	: No data available
Flammability (liquids)	: No data available
Burning rate	: No data available
Self-ignition	: 824 °F / 440 °C 1,013 hPa Method: DIN 51794
Upper explosion limit / Upper flammability limit	: Upper explosion limit 15.9 %(V)
Lower explosion limit / Lower flammability limit	: Lower explosion limit 6 %(V)
Vapor pressure	: 87 hPa (68 °F / 20 °C) 102 hPa (77 °F / 25 °C)
Relative vapour density	: 4.1 (68 °F / 20 °C)
Relative density	: No data available
Density	: 1.256 g/mL (77 °F / 25 °C) Method: lit.
Solubility(ies) Water solubility	: 7.9 g/l soluble (77 °F / 25 °C) pH: 7.4 Method: OECD Test Guideline 105
Partition coefficient: n-	: log Pow: 1.45 (68 °F / 20 °C)

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octanol/water	pH: 7.4 Method: OECD Test Guideline 107 Bioaccumulation is not expected.
Autoignition temperature	: 824 °F / 440 °C (1,013 hPa) Method: DIN 51794
Decomposition temperature	: 572 °F / 300 °C
Viscosity	
Viscosity, dynamic	: 0.83 mPa.s (68 °F / 20 °C)
Viscosity, kinematic	: No data available
Flow time	: No data available
Explosive properties	: Not classified as explosive.
Oxidizing properties	: none
Surface tension	: 32.45 mN/m, 68 °F / 20 °C
Molecular weight	: 98.96 g/mol
Particle characteristics	
Particle size	: No data available

SECTION 10. STABILITY AND REACTIVITY

Reactivity	: Vapours may form explosive mixture with air.
Chemical stability	: The product is chemically stable under standard ambient conditions (room temperature) .
Possibility of hazardous reactions	: Exothermic reaction with: Alkaline earth metals alkali amides Nitric acid nitrogen oxides Oxidizing agents Chlorine powdered magnesium Zinc Risk of explosion with: Alkali metals powdered aluminium Powdered metals Potassium nitrogen dioxide

Conditions to avoid : Warming.

Incompatible materials : No data available

Hazardous decomposition : In the event of fire: see section 5 products

SECTION 11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - male - 770 mg/kg

(OECD Test Guideline 401)

LC50 Inhalation - Rat - male and female - 4 h - 7.8 mg/l - vapour

(OECD Test Guideline 403)

LD50 Dermal - Rabbit - male - 4,890 mg/kg

(OECD Test Guideline 402)

Skin corrosion/irritation

Skin - Rabbit

Result: irritating

(OECD Test Guideline 404)

Serious eye damage/eye irritation

Eyes - Rabbit

Result: Eye irritation

(OECD Test Guideline 405)

Respiratory or skin sensitization

Local lymph node assay (LLNA) - Mouse

Result: negative

(OECD Test Guideline 429)

Germ cell mutagenicity

Test Type: Ames test

Test system: *S. typhimurium*

Metabolic activation: with and without metabolic activation

Result: positive

Remarks: (ECHA)

Test Type: Ames test

Test system: *Escherichia coli*

Metabolic activation: without metabolic activation

Method: OECD Test Guideline 471

Result: positive

Test Type: In vitro mammalian cell gene mutation test

Test system: human lymphoblastoid cells

Metabolic activation: without metabolic activation

Method: OECD Test Guideline 476

Result: positive

Test Type: In vitro mammalian cell gene mutation test

Test system: human lymphoblastoid cells

Metabolic activation: without metabolic activation

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Result: positive
Remarks: (ECHA)
Test Type: Mutagenicity (mammal cell test): chromosome aberration.
Test system: Chinese hamster lung cells
Metabolic activation: with and without metabolic activation
Result: positive
Remarks: (ECHA)
Test Type: unscheduled DNA synthesis assay
Test system: rat hepatocytes
Metabolic activation: without metabolic activation
Method: OECD Test Guideline 482
Result: positive

Test Type: Micronucleus test
Species: Mouse

Application Route: Intraperitoneal
Method: OECD Test Guideline 474
Result: negative

Test Type: Mutagenicity (mammal cell test): micronucleus.
Species: Mouse
Cell type: Red blood cells (erythrocytes)
Application Route: Oral
Method: OECD Test Guideline 474
Result: negative

Test Type: sister chromatid exchange assay
Species: Rat
Cell type: mammary gland
Application Route: inhalation (vapour)

Result: negative
Remarks: (ECHA)

Species: *Drosophila melanogaster*
Cell type: sperm
Application Route: Inhalation
Method: OECD Test Guideline 477
Result: positive

Test Type: Transgenic rodent somatic cell gene mutation assay
Species: Mouse

Application Route: Intraperitoneal

Result: negative
Remarks: (ECHA)

Carcinogenicity

Presumed to have carcinogenic potential for humans

IARC: 2B - Group 2B: Possibly carcinogenic to humans (1,2-Dichloroethane)
NTP: RAHC - Reasonably anticipated to be a human carcinogen (1,2-Dichloroethane)
OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity

No data available

Specific target organ toxicity - single exposure

May cause respiratory irritation.

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

Aspiration may cause pulmonary oedema and pneumonitis.

11.2 Additional Information

Repeated dose toxicity - Rat - male and female - Oral - 90 d - No observed adverse effect level - 37.5 mg/kg

Remarks: Subchronic toxicity

Repeated dose toxicity - Mouse - male and female - Inhalation - 104 Weeks

RTECS: KI0525000

Acts as a simple asphyxiant by displacing air., anesthetic effects, Difficulty in breathing, Headache, Dizziness, Prolonged or repeated contact with skin may cause:, defatting, Dermatitis, Contact with eyes can cause:, Redness, Blurred vision, Provokes tears., Effects due to ingestion may include:, Gastrointestinal discomfort, Central nervous system depression, Paresthesia., Drowsiness, Convulsions, Conjunctivitis., Pulmonary edema. Effects may be delayed., Irregular breathing., Stomach/intestinal disorders, Nausea, Vomiting, Increased liver enzymes., Weakness, Heavy or prolonged skin exposure may result in the absorption of harmful amounts of material.

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Pancreas. -

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Components:

1,2-Dichloroethane:

Toxicity to fish : LC50 (Pimephales promelas (fathead minnow)): 136 mg/l
End point: mortality
Exposure time: 96 h
Test Type: flow-through test
Analytical monitoring: yes

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Method: OECD Test Guideline 203

Toxicity to daphnia and other aquatic invertebrates	: EC50 (Daphnia magna (Water flea)): 160 mg/l End point: Immobilization Exposure time: 48 h Test Type: static test Analytical monitoring: yes Remarks: (in soft water) (IUCLID)
Toxicity to algae/aquatic plants	: EC50 (Desmodesmus subspicatus (green algae)): 166 mg/l Exposure time: 72 h Test Type: static test Analytical monitoring: yes Method: OECD Test Guideline 201
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	: NOEC (Daphnia magna (Water flea)): 11 mg/l End point: reproduction rate Exposure time: 28 d Test Type: static test Analytical monitoring: yes Remarks: (ECHA)
Toxicity to microorganisms	: EC50 (activated sludge): 35,500 mg/l Exposure time: 3 h Test Type: static test Method: OECD Test Guideline 209

Persistence and degradability

Components:

1,2-Dichloroethane:

Biodegradability	: aerobic Concentration: 0.25 mg/l Result: Inherently biodegradable. Biodegradation: > 90 % Exposure time: 20 d Remarks: (ECHA)
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Bioaccumulative potential

Components:

1,2-Dichloroethane:

Bioaccumulation	: Species: Lepomis macrochirus Bioconcentration factor (BCF): 2 Exposure time: 14 d Temperature: 61 °F / 16 °C Concentration: 0.957 mg/l
-----------------	--

Partition coefficient: n-octanol/water : log Pow: 1.45 (68 °F / 20 °C)
pH: 7.4
Method: OECD Test Guideline 107
Remarks: Bioaccumulation is not expected.

Mobility in soil

Components:

1,2-Dichloroethane:

Distribution among environmental compartments : Adsorption/Soil
Koc: 38, log Koc: 1.58
Method: (experimental)
Remarks: Mobile in soils

Remarks: (Lit.)

Other adverse effects

Product:

Ozone-Depletion Potential : Regulation: 40 CFR Protection of Environment; Part 82 Protection of Stratospheric Ozone - CAA Section 602 Class I Substances
Remarks: This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B).

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues : Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

SECTION 14. TRANSPORT INFORMATION

International Regulations

IATA-DGR

UN/ID No. : UN 1184
Proper shipping name : Ethylene dichloride
Class : 3
Subsidiary risk : 6.1
Packing group : II
Labels : Class 3 - Flammable liquids, Division 6.1 - Toxic substances
Packing instruction (cargo : 364

aircraft)
Packing instruction : 352
(passenger aircraft)

IMDG-Code

UN number : UN 1184
Proper shipping name : ETHYLENE DICHLORIDE

Class : 3
Subsidiary risk : 6.1
Packing group : II
Labels : 3 (6.1)
EmS Code : F-E, S-D
Marine pollutant : no

Transport in bulk according to IMO instruments

Not applicable for product as supplied.

National Regulations

49 CFR Road

UN/ID/NA number : UN 1184
Proper shipping name : Ethylene dichloride

Class : 3
Subsidiary risk : 6.1
Packing group : II
Labels : Class 3 - Flammable liquids, Division 6.1 - Toxic substances
ERG Code : 131
Marine pollutant : no

Poison Inhalation Hazard : No

Special precautions for user

The transport classification(s) provided herein are for informational purposes only, and solely based upon the properties of the unpackaged material as it is described within this Safety Data Sheet. Transportation classifications may vary by mode of transportation, package sizes, and variations in regional or country regulations.

SECTION 15. REGULATORY INFORMATION

CERCLA Reportable Quantity

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
1,2-Dichloroethane	107-06-2	100	100
1,2-Dichloroethane	107-06-2	100	100 (D028)

SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards : Fire Hazard
Acute Health Hazard
Chronic Health Hazard

SARA 313 : The following components are subject to reporting levels established by SARA Title III, Section 313:

1,2-Dichloroethane	107-06-2	>= 90 - <= 100 %
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Clean Air Act

This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B). The following chemical(s) are listed as HAP under the U.S. Clean Air Act, Section 112 (40 CFR 61):

1,2-Dichloroethane	107-06-2	>= 90 - <= 100 %
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This product does not contain any chemicals listed under the U.S. Clean Air Act Section 112(r) for Accidental Release Prevention (40 CFR 68.130, Subpart F). The following chemical(s) are listed under the U.S. Clean Air Act Section 111 SOCM/ Intermediate or Final VOC's (40 CFR 60.489):

1,2-Dichloroethane	107-06-2	>= 90 - <= 100 %
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Clean Water Act

The following Hazardous Substances are listed under the U.S. CleanWater Act, Section 311, Table 116.4A:

1,2-Dichloroethane	107-06-2	>= 90 - <= 100 %
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The following Hazardous Chemicals are listed under the U.S. CleanWater Act, Section 311, Table 117.3:

1,2-Dichloroethane	107-06-2	>= 90 - <= 100 %
--------------------	----------	------------------

This product contains the following toxic pollutants listed under the U.S. Clean Water Act Section 307

1,2-Dichloroethane	107-06-2	>= 90 - <= 100 %
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This product contains the following priority pollutants related to the U.S. Clean Water Act:

1,2-Dichloroethane	107-06-2	>= 90 - <= 100 %
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US State Regulations

Massachusetts Right To Know

1,2-Dichloroethane	107-06-2
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Pennsylvania Right To Know

1,2-Dichloroethane	107-06-2
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Maine Chemicals of High Concern

Product does not contain any listed chemicals

Vermont Chemicals of High Concern

Product does not contain any listed chemicals

Washington Chemicals of High Concern

Product does not contain any listed chemicals

California Prop. 65

WARNING: This product can expose you to chemicals including 1,2-Dichloroethane, which is/are known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

International Regulations

Rotterdam Convention (Prior Informed Consent) : 1,2-Dichloroethane

The components of this product are reported in the following inventories:

TSCA : All substances listed as active on the TSCA inventory

TSCA list

No substances are subject to a Significant New Use Rule.

The following substance(s) is/are subject to TSCA 12(b) export notification requirements:
1,2-Dichloroethane 107-06-2

SECTION 16. OTHER INFORMATION

Full text of other abbreviations

ACGIH	: USA. ACGIH Threshold Limit Values (TLV)
NIOSH REL	: USA. NIOSH Recommended Exposure Limits
OSHA Z-2	: USA. Occupational Exposure Limits (OSHA) - Table Z-2
ACGIH / TWA	: 8-hour, time-weighted average
NIOSH REL / TWA	: Time-weighted average concentration for up to a 10-hour workday during a 40-hour workweek
NIOSH REL / ST	: STEL - 15-minute TWA exposure that should not be exceeded at any time during a workday
OSHA Z-2 / TWA	: 8-hour time weighted average
OSHA Z-2 / CEIL	: Acceptable ceiling concentration
OSHA Z-2 / Peak	: Acceptable maximum peak above the acceptable ceiling concentration for an 8-hr shift

AIIC - Australian Inventory of Industrial Chemicals; ASTM - American Society for the Testing of Materials; bw - Body weight; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DOT - Department of Transportation; DSL - Domestic Substances List (Canada); EC_x - Concentration associated with x% response; EHS - Extremely Hazardous Substance; EL_x - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErC_x - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonised System; GLP - Good Laboratory Practice; HMIS - Hazardous Materials Identification System; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC₅₀ - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO -

International Maritime Organisation; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardisation; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; MSHA - Mine Safety and Health Administration; n.o.s. - Not Otherwise Specified; NFPA - National Fire Protection Association; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organisation for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; RCRA - Resource Conservation and Recovery Act; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RQ - Reportable Quantity; SADT - Self-Accelerating Decomposition Temperature; SARA - Superfund Amendments and Reauthorization Act; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TECI - Thailand Existing Chemicals Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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US / EN

**ATTACHMENT C: SAFETY DATA SHEETS
FOR THE CHEMICALS OF CONCERN**

SAFETY DATA SHEET

Benzene

Airgas
an Air Liquide company

Section 1. Identification

GHS product identifier	: Benzene
Chemical name	: benzene
Other means of identification	: Phenyl hydride; Benzol; benzene, pure; benzene, crude; BENZOL DILUENT; Cyclohexatriene; Benzene (I,T); BENZENE, UNREFINED; COAL NAPHTHA; annulene; carbon oil
Product type	: Liquid.
Product use	: Synthetic/Analytical chemistry.
Synonym	: Phenyl hydride; Benzol; benzene, pure; benzene, crude; BENZOL DILUENT; Cyclohexatriene; Benzene (I,T); BENZENE, UNREFINED; COAL NAPHTHA; annulene; carbon oil
SDS #	: 001062
Supplier's details	: Airgas USA, LLC and its affiliates 259 North Radnor-Chester Road Suite 100 Radnor, PA 19087-5283 1-610-687-5253
24-hour telephone	: 1-866-734-3438

Section 2. Hazards identification

OSHA/HCS status	: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Classification of the substance or mixture	: FLAMMABLE LIQUIDS - Category 2 SKIN IRRITATION - Category 2 EYE IRRITATION - Category 2A GERM CELL MUTAGENICITY - Category 1 CARCINOGENICITY - Category 1 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 1

GHS label elements

Hazard pictograms



Signal word : Danger

Hazard statements : Highly flammable liquid and vapor.
Causes skin irritation.
Causes serious eye irritation.
May cause genetic defects.
May cause cancer.
Causes damage to organs through prolonged or repeated exposure.
May form explosive mixtures with air.

Precautionary statements

General

: Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand.

Prevention

: Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Wear protective gloves, protective clothing and eye or face protection. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Use explosion-proof electrical, ventilating or lighting equipment. Use non-sparking tools. Take action to prevent static discharges. Keep container tightly closed. Do not breathe vapor. Do not eat, drink or smoke when using this product. Wash thoroughly after handling.

Section 2. Hazards identification

Response	: IF exposed or concerned: Get medical advice or attention. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water. IF ON SKIN: Wash with plenty of water. If skin irritation occurs: Get medical advice or attention. 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 or attention.
Storage	: Store locked up. Store in a well-ventilated place. Keep cool.
Disposal	: Dispose of contents and container in accordance with all local, regional, national and international regulations.
Hazards not otherwise classified	: None known.

Section 3. Composition/information on ingredients

Substance/mixture	: Substance
Chemical name	: benzene
Other means of identification	: Phenyl hydride; Benzol; benzene, pure; benzene, crude; BENZOL DILUENT; Cyclohexatriene; Benzene (I,T); BENZENE, UNREFINED; COAL NAPHTHA; annulene; carbon oil
Product code	: 001062

CAS number/other identifiers

CAS number : 71-43-2

Ingredient name	%	CAS number
benzene	100	71-43-2

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact	: Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.
Inhalation	: Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.
Skin contact	: Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Get medical attention. Wash clothing before reuse. Clean shoes thoroughly before reuse.
Ingestion	: Wash out mouth with water. Remove dentures if any. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Most important symptoms/effects, acute and delayed

Section 4. First aid measures

Potential acute health effects

- Eye contact** : Causes serious eye irritation.
- Inhalation** : No known significant effects or critical hazards.
- Skin contact** : Causes skin irritation.
- Frostbite** : Try to warm up the frozen tissues and seek medical attention.
- Ingestion** : No known significant effects or critical hazards.

Over-exposure signs/symptoms

- Eye contact** : Adverse symptoms may include the following:, pain or irritation, watering, redness
- Inhalation** : No specific data.
- Skin contact** : Adverse symptoms may include the following:, irritation, redness
- Ingestion** : No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

- Notes to physician** : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
- Specific treatments** : No specific treatment.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

- Suitable extinguishing media** : Use dry chemical, CO₂, water spray (fog) or foam.
- Unsuitable extinguishing media** : Do not use water jet.

- Specific hazards arising from the chemical** : Highly flammable liquid and vapor. Runoff to sewer may create fire or explosion hazard. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. The vapor/gas is heavier than air and will spread along the ground. Vapors may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back.

- Hazardous thermal decomposition products** : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide

- Special protective actions for fire-fighters** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

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

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

- For non-emergency personnel** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.
- For emergency responders** : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

- Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

- Small spill** : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.
- Large spill** : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

- Protective measures** : Put on appropriate personal protective equipment (see Section 8). Do not get in eyes or on skin or clothing. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Use only non-sparking tools. Take precautionary measures against electrostatic discharges. Do not ingest. Empty containers retain product residue and can be hazardous. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Do not reuse container. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Do not breathe vapor or mist. Avoid exposure - obtain special instructions before use. Do not handle until all safety precautions have been read and understood.
- Advice on general occupational hygiene** : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

- Conditions for safe storage, including any incompatibilities** : Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Eliminate all ignition sources. Store locked up. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
benzene	ACGIH TLV (United States, 1/2021). Absorbed through skin. STEL: 8 mg/m³ 15 minutes. STEL: 2.5 ppm 15 minutes. TWA: 1.6 mg/m³ 8 hours. TWA: 0.5 ppm 8 hours. NIOSH REL (United States, 10/2020). STEL: 1 ppm 15 minutes. TWA: 0.1 ppm 10 hours. OSHA PEL (United States, 5/2018). STEL: 5 ppm 15 minutes. TWA: 1 ppm 8 hours. OSHA PEL 1989 (United States, 3/1989). STEL: 5 ppm 15 minutes. TWA: 1 ppm 8 hours. OSHA PEL Z2 (United States, 2/2013). AMP: 50 ppm 10 minutes. CEIL: 25 ppm TWA: 10 ppm 8 hours.

Appropriate engineering controls

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

Environmental exposure controls

- : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures

- : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection

- : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles.

Skin protection

Hand protection

- : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Body protection

- : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. When there is a risk of ignition from static electricity, wear anti-static protective clothing. For the greatest protection from static discharges, clothing should include anti-static overalls, boots and gloves.

Section 8. Exposure controls/personal protection

- Other skin protection** : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Respiratory protection** : Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use.

Section 9. Physical and chemical properties

Appearance

- Physical state** : Liquid. [Watery liquid.]
- Color** : Colorless. Yellowish.
- Odor** : Characteristic.
- Odor threshold** : Not available.
- pH** : Not available.
- Melting point** : 5.49°C (41.9°F)
- Boiling point** : 80.09°C (176.2°F)
- Critical temperature** : 288.95°C (552.1°F)
- Flash point** : Closed cup: -11°C (12.2°F)
- Evaporation rate** : 3.5 (butyl acetate = 1)
- Flammability (solid, gas)** : Not available.
- Lower and upper explosive (flammable) limits** : Lower: 1.2%
Upper: 7.8%
- Vapor pressure** : 10 kPa (75.01 mm Hg)
- Vapor density** : 2.7 (Air = 1)
- Specific Volume (ft³/lb)** : 1.1403
- Gas Density (lb/ft³)** : 0.877 (20°C / 68 to °F)
- Relative density** : 0.88
- Solubility** : Not available.
- Solubility in water** : 1.88 g/l
- Partition coefficient: n-octanol/water** : 2.13
- Auto-ignition temperature** : 498°C (928.4°F)
- Decomposition temperature** : Not available.
- Flow time (ISO 2431)** : Not available.
- Molecular weight** : 78.12 g/mole
- Aerosol product**
- Heat of combustion** : -40611960 J/kg

Section 10. Stability and reactivity

- Reactivity** : No specific test data related to reactivity available for this product or its ingredients.
- Chemical stability** : The product is stable.
- Possibility of hazardous reactions** : Under normal conditions of storage and use, hazardous reactions will not occur.
- Conditions to avoid** : Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Do not allow vapor to accumulate in low or confined areas.

Section 10. Stability and reactivity

Incompatible materials : Reactive or incompatible with the following materials:
oxidizing materials

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Hazardous polymerization : Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
benzene	LC50 Inhalation Gas. LD50 Oral	Rat Rat	10000 ppm 930 mg/kg	7 hours -

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
benzene	Eyes - Moderate irritant	Rabbit	-	88 mg	-
	Eyes - Severe irritant	Rabbit	-	24 hours 2 mg	-
	Skin - Mild irritant	Rat	-	8 hours 60 uL	-
	Skin - Mild irritant	Rabbit	-	24 hours 15 mg	-
	Skin - Moderate irritant	Rabbit	-	24 hours 20 mg	-

Sensitization

Not available.

Mutagenicity

Not available.

Carcinogenicity

Not available.

Classification

Product/ingredient name	OSHA	IARC	NTP
benzene	+	1	Known to be a human carcinogen.

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Name	Category	Route of exposure	Target organs
benzene	Category 1	-	-

Aspiration hazard

Not available.

Section 11. Toxicological information

Information on the likely routes of exposure : Not available.

Potential acute health effects

Eye contact : Causes serious eye irritation.
Inhalation : No known significant effects or critical hazards.
Skin contact : Causes skin irritation.
Ingestion : No known significant effects or critical hazards.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : Adverse symptoms may include the following: pain or irritation, watering, redness
Inhalation : No specific data.
Skin contact : Adverse symptoms may include the following: irritation, redness
Ingestion : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.
Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.
Potential delayed effects : Not available.

Potential chronic health effects

Not available.

General : Causes damage to organs through prolonged or repeated exposure.
Carcinogenicity : May cause cancer. Risk of cancer depends on duration and level of exposure.
Mutagenicity : May cause genetic defects.
Teratogenicity : No known significant effects or critical hazards.
Developmental effects : No known significant effects or critical hazards.
Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

Product/ingredient name	Result	Species	Exposure
benzene	Acute EC50 1600000 µg/l Fresh water	Algae - Selenastrum sp.	96 hours
	Acute EC50 9.23 mg/l Fresh water	Daphnia - Daphnia magna - Neonate	48 hours
	Acute LC50 21 mg/l Marine water	Crustaceans - Artemia salina	48 hours
	Acute LC50 5.28 µl/L Fresh water	Fish - Oncorhynchus gorbuscha - Fry	96 hours
	Chronic EC10 >1360 mg/l Fresh water	Algae - Desmodesmus subspicatus	96 hours
	Chronic NOEC 98 mg/l Fresh water	Daphnia - Daphnia magna	21 days
	Chronic NOEC 1.5 to 5.4 µl/L Marine	Fish - Morone saxatilis - Juvenile	4 weeks

Section 12. Ecological information

	water	(Fledgling, Hatchling, Weanling)	
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Persistence and degradability

Not available.

Bioaccumulative potential

Product/ingredient name	LogP _{ow}	BCF	Potential
benzene	2.13	11	low

Mobility in soil

Soil/water partition coefficient (K_{oc}) : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Vapor from product residues may create a highly flammable or explosive atmosphere inside the container. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

United States - RCRA Toxic hazardous waste "U" List

Ingredient	CAS #	Status	Reference number
Benzene (I,T)	71-43-2	Listed	U019

Section 14. Transport information

	DOT	TDG	Mexico	IMDG	IATA
UN number	UN1114	UN1114	UN1114	UN1114	UN1114
UN proper shipping name	BENZENE	BENZENE	Benzene	BENZENE	BENZENE
Transport hazard class(es)	3 	3 	3 	3 	3 
Packing group	II	II	II	II	II
Environmental hazards	No.	No.	No.	No.	No.

“Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product.”

Section 14. Transport information

Additional information

- DOT Classification** : **Reportable quantity** 10 lbs / 4.54 kg [1.3675 gal / 5.1767 L]. Package sizes shipped in quantities less than the product reportable quantity are not subject to the RQ (reportable quantity) transportation requirements.
Limited quantity Yes.
Quantity limitation Passenger aircraft/rail: 5 L. Cargo aircraft: 60 L.
- TDG Classification** : Product classified as per the following sections of the Transportation of Dangerous Goods Regulations: 2.18-2.19 (Class 3).
Explosive Limit and Limited Quantity Index 1
Passenger Carrying Road or Rail Index 5
- IATA** : **Quantity limitation** Passenger and Cargo Aircraft: 5 L. Cargo Aircraft Only: 60 L.
 Limited Quantities - Passenger Aircraft: 1 L.

- Special precautions for user** : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

- Transport in bulk according to IMO instruments** : Not available.

Section 15. Regulatory information

- U.S. Federal regulations** : **TSCA 8(a) CDR Exempt/Partial exemption:** Not determined
Clean Water Act (CWA) 307: benzene
Clean Water Act (CWA) 311: benzene

- Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs)** : Listed

- Clean Air Act Section 602 Class I Substances** : Not listed

- Clean Air Act Section 602 Class II Substances** : Not listed

- DEA List I Chemicals (Precursor Chemicals)** : Not listed

- DEA List II Chemicals (Essential Chemicals)** : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

- SARA 304 RQ** : Not applicable.

SARA 311/312

- Classification** : Refer to Section 2: Hazards Identification of this SDS for classification of substance.

SARA 313

	Product name	CAS number	%
Form R - Reporting requirements	benzene	71-43-2	100
Supplier notification	benzene	71-43-2	100

SARA 313 notifications must not be detached from the SDS and any copying and redistribution of the SDS shall include copying and redistribution of the notice attached to copies of the SDS subsequently redistributed.

State regulations

Section 15. Regulatory information

Massachusetts : This material is listed.

New York : This material is listed.

New Jersey : This material is listed.

Pennsylvania : This material is listed.

California Prop. 65

⚠ WARNING: This product can expose you to Benzene, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

Ingredient name	No significant risk level	Maximum acceptable dosage level
Benzene	Yes.	Yes.

International regulations

Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

Montreal Protocol

Not listed.

Stockholm Convention on Persistent Organic Pollutants

Not listed.

Rotterdam Convention on Prior Informed Consent (PIC)

Not listed.

UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

Inventory list

Australia : This material is listed or exempted.

Canada : This material is listed or exempted.

China : This material is listed or exempted.

Europe : This material is listed or exempted.

Japan : **Japan inventory (CSCL):** This material is listed or exempted.
Japan inventory (ISHL): This material is listed or exempted.

New Zealand : This material is listed or exempted.

Philippines : This material is listed or exempted.

Republic of Korea : This material is listed or exempted.

Taiwan : This material is listed or exempted.

Thailand : This material is listed or exempted.

Turkey : This material is listed or exempted.

United States : This material is active or exempted.

Viet Nam : This material is listed or exempted.

Section 16. Other information

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

Health	*	2
Flammability		3
Physical hazards		0

Section 16. Other information

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings and the associated label are not required on SDSs or products leaving a facility under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered trademark and service mark of the American Coatings Association, Inc.

The customer is responsible for determining the PPE code for this material. For more information on HMIS® Personal Protective Equipment (PPE) codes, consult the HMIS® Implementation Manual.

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



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Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

Procedure used to derive the classification

Classification	Justification
FLAMMABLE LIQUIDS - Category 2	Expert judgment
SKIN IRRITATION - Category 2	Expert judgment
EYE IRRITATION - Category 2A	Expert judgment
GERM CELL MUTAGENICITY - Category 1	Expert judgment
CARCINOGENICITY - Category 1	Expert judgment
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 1	Expert judgment

History

Date of printing : 3/15/2022

Date of issue/Date of revision : 3/15/2022

Date of previous issue : 10/7/2021

Version : 1.01

Key to abbreviations

: ATE = Acute Toxicity Estimate
 BCF = Bioconcentration Factor
 GHS = Globally Harmonized System of Classification and Labelling of Chemicals
 IATA = International Air Transport Association
 IBC = Intermediate Bulk Container
 IMDG = International Maritime Dangerous Goods
 LogPow = logarithm of the octanol/water partition coefficient
 MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
 UN = United Nations

References

: Not available.

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

SAFETY DATA SHEET

Revision Date 21-Dec-2025

Revision Number 5

This safety data sheet was created pursuant to the requirements of: US OSHA Hazard Communication Standard 2024 (29 CFR 1910.1200)

1. Identification

Product Name	Benzo[a]pyrene
Cat No. :	15856
CAS No	50-32-8
Synonyms	Benzo[def]chrysene.; 3,4-Benzopyrene; 3,4-Benzpyrene
Recommended Use	Laboratory chemicals.
Uses advised against	Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

Company

Thermo Fisher Scientific Chemicals, Inc.
30 Bond Street
Ward Hill, MA 01835-8099
Tel: 800-343-0660
Fax: 800-322-4757

Emergency Telephone Number

For information **US** call: 001-800-227-6701 / **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 considered hazardous according to [US] OSHA (29 CFR 1910.1200, 2024)

Skin Sensitization	Category 1
Germ Cell Mutagenicity	Category 1B
Carcinogenicity	Category 1A
Reproductive Toxicity	Category 1B

Label Elements

Signal Word

Danger

Hazard Statements

May cause an allergic skin reaction

May cause genetic defects
May cause cancer
May damage fertility. May damage the unborn child

**Precautionary Statements****Prevention**

Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Avoid breathing dust/fume/gas/mist/vapors/spray
Contaminated work clothing should not be allowed out of the workplace
Wear protective gloves
Wear protective gloves/protective clothing/eye protection/face protection

Response

IF exposed or concerned: Get medical attention/advice

Skin

IF ON SKIN: Wash with plenty of soap and water
If skin irritation or rash occurs: Get medical advice/attention
Take off contaminated clothing and wash before reuse

Storage

Store locked up

Disposal

Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)

Very toxic to aquatic life with long lasting effects

Hazards classified under paragraph (d)(1)(ii) of 1910.1200

No information available

WARNING. Cancer - <https://www.p65warnings.ca.gov/>.

3. Composition/information on Ingredients

Component	CAS No	Weight %
Benzo[a]pyrene	50-32-8	<=100

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	None reasonably foreseeable. . 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

Unsuitable Extinguishing Media	No information available
Flash Point	No information available
Method -	No information available
Autoignition Temperature	Not applicable
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

Do not allow run-off from fire-fighting to enter drains or water courses.

Hazardous Combustion Products

Carbon monoxide (CO). Carbon dioxide (CO₂).

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	1	0	N/A

6. Accidental release measures

Personal Precautions	Ensure adequate ventilation. Use personal protective equipment as required. Avoid dust formation.
Environmental Precautions	Do not flush into surface water or sanitary sewer system. Do not allow material to contaminate ground water system. Prevent product from entering drains. Local authorities should be advised if significant spillages cannot be contained.
Methods for Containment and Clean Up	Sweep up and shovel into suitable containers for disposal. Keep in suitable, closed containers for disposal.

7. Handling and Storage

Handling	Wear personal protective equipment/face protection. Ensure adequate ventilation. Do not get in eyes, on skin, or on clothing. Avoid ingestion and inhalation. Avoid dust formation.
Storage.	Keep containers tightly closed in a dry, cool and well-ventilated place. Incompatible Materials. Oxidizing agent.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH	Mexico OEL (TWA)
Benzo[a]pyrene		TWA: 0.2 mg/m ³		

Legend

OSHA - Occupational Safety and Health Administration

Engineering Measures Ensure adequate ventilation, especially in confined areas.

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.

Recommended Filter type: Particulates filter conforming to EN 143.

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

9. Physical and chemical properties

Appearance			
Physical State	Powder Solid		
Color	Dark yellow		
Odor	aromatic		
Odor Threshold	No information available		
Property	Values	Remarks	• Method
Melting Point/Range	175 - 179 °C / 347 - 354.2 °F		
Softening Point	No data available		
Boiling Point/Range	495 °C / 923 °F	@ 760 mmHg	
Flash Point	No information available	Method - No information available	
Flammability (liquid)	Not applicable	Solid	
Flammability (solid,gas)	No information available		
Explosion Limits	No data available		
Autoignition Temperature	Not applicable		
Decomposition Temperature	No data available		
pH	Not applicable		
Viscosity	Not applicable	Solid	
Water Solubility	Insoluble in water		
Solubility in other solvents	No information available		
Partition Coefficient (n-octanol/water)			
Component	log Pow		
Benzo[a]pyrene	6.06		
Vapor Pressure	No data available		
Density / Specific Gravity	No data available		
Bulk Density	No data available		
Vapor Density	Not applicable	Solid	
Particle characteristics	No data available		
Other Information			
Molecular Formula	C20H12		
Molecular Weight	252.31		
Evaporation Rate	Not applicable - Solid		

10. Stability and reactivity

Reactive Hazard	None known, based on information available
Stability	Stable under normal conditions.
Conditions to Avoid	Incompatible products.
Incompatible Materials	Oxidizing agent
Hazardous Decomposition Products	Carbon monoxide (CO), Carbon dioxide (CO ₂)
Hazardous Polymerization	Hazardous polymerization does not occur.
Hazardous Reactions	None under normal processing.

11. Toxicological information

Information on expected route of exposure

Inhalation	Avoid breathing dust or spray mist. May be harmful if inhaled.
Ingestion	May be harmful if swallowed.
Eyes	Avoid contact with eyes. Corrosive to the eyes and may cause severe damage including blindness.
Skin	Skin Corrosion/Irritation. Avoid contact with skin.

Toxicology data for the components

Toxicologically Synergistic Products	No information available
(b) skin corrosion/irritation;	No data available
(c) serious eye damage/irritation;	No data available
(d) respiratory or skin sensitization;	
Respiratory	No data available
Skin	Category 1
	May cause sensitization by skin contact
(e) germ cell mutagenicity;	Category 1B
(f) carcinogenicity;	Category 1B
	The table below indicates whether each agency has listed any ingredient as a carcinogen

Component	CAS No	IARC	NTP	ACGIH	OSHA	Mexico
Benzo[a]pyrene	50-32-8	Group 1	Reasonably Anticipated	A2	X	A2

IARC (International Agency for Research on Cancer)

IARC (International Agency for Research on Cancer)

Group 1 - Carcinogenic to Humans

Group 2A - Probably Carcinogenic to Humans

Group 2B - Possibly Carcinogenic to Humans

NTP: (National Toxicity Program)

Known - Known Carcinogen

Reasonably Anticipated - Reasonably Anticipated to be a Human Carcinogen

A1 - Known Human Carcinogen

A2 - Suspected Human Carcinogen

ACGIH: (American Conference of Governmental Industrial Hygienists)

A3 - Animal Carcinogen

ACGIH: (American Conference of Governmental Industrial Hygienists)

(g) reproductive toxicity; Category 1B

(h) STOT-single exposure; No data available

(i) STOT-repeated exposure; No data available

Target Organs No information available.

(j) aspiration hazard; Not applicable
Solid**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.**Other Adverse Effects** The toxicological properties have not been fully investigated.**Endocrine Disrupting Properties** This product does not contain any known or suspected endocrine disruptors.

Component	EU - Endocrine Disruptors Candidate List	EU - Endocrine Disruptors - Evaluated Substances	Japan - Endocrine Disruptor Information
Benzo[a]pyrene	Group III Chemical	Not applicable	Not applicable

12. Ecological information

Ecotoxicity

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. The product contains following substances which are hazardous for the environment.

Persistence and Degradability May persist**Bioaccumulation/ Accumulation** No information available.**Mobility** Is not likely mobile in the environment due its low water solubility.

Component	log Pow
Benzo[a]pyrene	6.06

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.

Component	RCRA - U Series Wastes	RCRA - P Series Wastes
Benzo[a]pyrene - 50-32-8	U022	-

14. Transport information

DOT

UN-No UN3077
 Proper Shipping Name Environmentally hazardous substances, solid, n.o.s.
 Technical Shipping Name Benzo[a]pyrene
 Hazard Class 9
 Packing Group III

TDG

UN-No UN3077

Proper Shipping Name Environmentally hazardous substances, solid, n.o.s.
Technical Shipping Name Benzo[a]pyrene
Hazard Class 9
Packing Group III

IATA

UN-No UN3077
Proper Shipping Name Environmentally hazardous substances, solid, n.o.s.
Technical Shipping Name Benzo[a]pyrene
Hazard Class 9
Packing Group III

IMDG/IMO

UN-No UN3077
Proper Shipping Name Environmentally hazardous substances, solid, n.o.s.
Technical Shipping Name Benzo[a]pyrene
Hazard Class 9
Packing Group III

15. Regulatory Information

United States of America Inventory

Component	CAS No	TSCA	TSCA Inventory notification - Active-Inactive	TSCA - EPA Regulatory Flags
Benzo[a]pyrene	50-32-8	X	ACTIVE	-

Legend:

TSCA - US EPA (TSCA) - Toxic Substances Control Act, (40 CFR Part 710)

X - Listed

'-' - Not Listed

TSCA - Per 40 CFR 751, Regulation of Certain Chemical Substances & Mixtures, Under TSCA Section 6(h) (PBT)

Not applicable

TSCA 12(b) - Notices of Export

Not applicable

International Inventories

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

Component	CAS No	DSL	NDL	EINECS	PICCS	ENCS	ISHL	AICS	IECSC	KECL
Benzo[a]pyrene	50-32-8	X	-	200-028-5	X	-		-	X	KE-05-0184

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

U.S. Federal Regulations**SARA 313**

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372. Note that PBT chemicals are not eligible for the de minimis exemption. For these chemicals, supplier notification limits are provided.

> 0 % = no low concentration cut-off set, supplier notification limit applies.

Component	CAS No	Weight %	SARA 313 - Threshold Values %	SARA 313 - Reporting thresholds
Benzo[a]pyrene	50-32-8	<=100	-	RT = 100 lb

SARA 311/312 Hazard Categories

Should this product meet EPCRA 311/312 Tier reporting criteria at 40 CFR 370, refer to Section 2 of this SDS for appropriate classifications.

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Benzo[a]pyrene	-	-	X	X

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) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355).

Component	Hazardous Substances RQs	CERCLA Extremely Hazardous Substances RQs	SARA Reportable Quantity (RQ)
Benzo[a]pyrene	1 lb	-	1 lb 0.454 kg

California Proposition 65 This product contains the following Proposition 65 chemicals.

Component	CAS No	California Prop. 65	Prop 65 NSRL	Category
Benzo[a]pyrene	50-32-8	Carcinogen	0.06 µg/day	Carcinogen

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Benzo[a]pyrene	X	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	CAS No	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)
Benzo[a]pyrene	50-32-8	-	Use restricted. See entry 72. (see link for restriction details) Use restricted. See entry 30. (see link for restriction details) Use restricted. See entry 28. (see link for restriction	SVHC Candidate list - 200-028-5 - Carcinogenic (article 57a); Mutagenic (Article 57b); Toxic for reproduction (Article 57c); PBT (Article 57d); vPvB (Article 57e)

			details) Use restricted. See entry 50[a]. (see link for restriction details) Use restricted. See entry 29. (see link for restriction details) Use restricted. See entry 75. (see link for restriction details)	
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After the sunset date the use of this substance requires either an authorization or can only be used for exempted uses, e.g. use in scientific research and development which includes routine analytics or use as intermediate.

REACH links

<https://echa.europa.eu/authorisation-list>

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

<https://echa.europa.eu/candidate-list-table>

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)
Benzo[a]pyrene	50-32-8	Not applicable	Annex III - Substance subject to release reduction	Not applicable	Not applicable

Contains component(s) that meet a 'definition' of per & poly fluoroalkyl substance (PFAS)?

See table for values

PFAS Legend

Listed = Meets the PFAS definition of the named authority

Other International Regulations

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)
Benzo[a]pyrene	50-32-8	Not applicable	Not applicable	Not applicable	Not applicable

16. Other Information

Prepared By

Health, Safety and Environmental Department
 Email: chem.techinfo@thermofisher.com
www.thermofisher.com

Revision Date

21-Dec-2025

Print Date

21-Dec-2025

Revision Summary

Updated to the U.S. Department of Labor's Occupational Safety and Health Administration (OSHA) which published its Final Rule in the Federal Register revising the Hazard Communication Standard (HCS/HazCom), 29 CFR 1910.1200 (2024) (HCS §1910.1200, 2024), May 20, 2024, effective July 19, 2024.

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

End of SDS

SAFETY DATA SHEET

Revision Date 22-Dec-2025

Revision Number 6

This safety data sheet was created pursuant to the requirements of: US OSHA Hazard Communication Standard 2024 (29 CFR 1910.1200)

1. Identification

Product Name Ethylbenzene

Cat No. : L05908

Synonyms No information available

Recommended Use Laboratory chemicals.

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

Details of the supplier of the safety data sheet

Company

Thermo Fisher Scientific Chemicals, Inc.
30 Bond Street
Ward Hill, MA 01835-8099
Tel: 800-343-0660
Fax: 800-322-4757

Emergency Telephone Number

For information **US** call: 001-800-227-6701 / **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 considered hazardous according to [US] OSHA (29 CFR 1910.1200, 2024)

Flammable liquids	Category 2
Acute Inhalation Toxicity - Vapors	Category 4
Germ Cell Mutagenicity	Category 1B
Carcinogenicity	Category 1A
Specific target organ toxicity - (repeated exposure)	Category 2
Aspiration Toxicity	Category 1

Label Elements

Signal Word

Danger

Hazard Statements

Highly flammable liquid and vapor

May be fatal if swallowed and enters airways
Harmful if inhaled
May cause genetic defects
May cause cancer
May cause damage to organs through prolonged or repeated exposure

**Precautionary Statements****Prevention**

Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use only outdoors or in a well-ventilated area
Do not breathe dust/fume/gas/mist/vapors/spray
Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking
Keep container tightly closed
Ground and bond container and receiving equipment
Use explosion-proof electrical/ventilating/lighting equipment
Wear protective gloves/protective clothing/eye protection/face protection
Take action to prevent static discharges
Use non-sparking tools

Response

IF exposed or concerned: Get medical attention/advice

Inhalation

IF INHALED: Remove person to fresh air and keep comfortable for breathing

Skin

IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower

Ingestion

IF SWALLOWED: Immediately call a POISON CENTER or doctor

Do NOT induce vomiting

Fire

In case of fire: Use CO₂, dry chemical, or foam to extinguish

Storage

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

Disposal

Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)

Harmful to aquatic life with long lasting effects

Hazards classified under paragraph (d)(1)(ii) of 1910.1200

No information available

WARNING. Cancer and Reproductive Harm - <https://www.p65warnings.ca.gov/>.

3. Composition/information on Ingredients

Component	CAS No	Weight %
Ethylbenzene	100-41-4	99.88
Benzene	71-43-2	0.12

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. Risk of serious damage to the lungs (by aspiration).
Ingestion	Clean mouth with water and drink afterwards plenty of water. Do NOT induce vomiting. Call a physician or poison control center immediately. If vomiting occurs naturally, have victim lean forward.
Most important symptoms and effects	None reasonably foreseeable. . Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting
Notes to Physician	Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media	Water mist may be used to cool closed containers.
Unsuitable Extinguishing Media	No information available
Flash Point	15 °C / 59 °F
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

Flammable. Containers may explode when heated. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back.

Hazardous Combustion Products

Carbon oxides.

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
3	3	0	N/A

6. Accidental release measures

Personal Precautions	Ensure adequate ventilation. Use personal protective equipment as required. Remove all sources of ignition. Take precautionary measures against static discharges.
Environmental Precautions	Do not flush into surface water or sanitary sewer system.
Methods for Containment and Clean Up	Soak up with inert absorbent material. Keep in suitable, closed containers for disposal. Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment.

7. Handling and Storage

Handling Wear personal protective equipment/face protection. Ensure adequate ventilation. Do not get in eyes, on skin, or on clothing. Avoid ingestion and inhalation. Keep away from open flames, hot surfaces and sources of ignition. Use only non-sparking tools. To avoid ignition of vapors by static electricity discharge, all metal parts of the equipment must be grounded. Take precautionary measures against static discharges.

Storage. Keep container tightly closed in a dry and well-ventilated place. Keep away from heat, sparks and flame.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH	Mexico OEL (TWA)
Ethylbenzene	TWA: 20 ppm	(Vacated) TWA: 100 ppm (Vacated) TWA: 435 mg/m ³ (Vacated) STEL: 125 ppm (Vacated) STEL: 545 mg/m ³ TWA: 100 ppm TWA: 435 mg/m ³	IDLH: 800 ppm REL = 100 ppm (TWA) REL = 435 mg/m ³ (TWA) STEL: 125 ppm STEL: 545 mg/m ³	TWA: 20 ppm
Benzene	TWA: 0.5 ppm STEL: 2.5 ppm Skin	(Vacated) TWA: 10 ppm Ceiling: 25 ppm (Vacated) STEL: 50 ppm (Vacated) Ceiling: 25 ppm TWA: 10 ppm TWA: 1 ppm STEL: 5 ppm	IDLH: 500 ppm REL = 0.1 ppm (TWA) STEL: 1 ppm	TWA: 0.5 ppm STEL: 2.5 ppm

Legend

ACGIH - American Conference of Governmental Industrial Hygienists

OSHA - Occupational Safety and Health Administration

NIOSH: NIOSH - National Institute for Occupational Safety and Health

Engineering Measures Ensure adequate ventilation, especially in confined areas. Use explosion-proof electrical/ventilating/lighting equipment.

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.
Recommended Filter type:	Organic gases and vapours filter. Type A. Brown. conforming to EN14387.
Hygiene Measures	Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Appearance

Physical State
Color

Liquid
Colorless

Odor	aromatic		
Odor Threshold	No information available		
Property	Values	Remarks	• Method
Melting Point/Range	-95 °C / -139 °F		
Softening Point	No data available		
Boiling Point/Range	135 - 136 °C / 275 - 276.8 °F		
Flash Point	15 °C / 59 °F		
Flammability (liquid)	Highly flammable	Method - No information available	
Flammability (solid,gas)	Not applicable	On basis of test data	
Explosion Limits	No data available	Liquid	
Autoignition Temperature	No data available		
Decomposition Temperature	No data available		
pH	Not applicable		
Viscosity	No data available		
Water Solubility	No information available		
Solubility in other solvents	No information available		
Partition Coefficient (n-octanol/water)			
Component	log Pow		
Ethylbenzene	3.6		
Benzene	2.13		
Vapor Pressure	No data available		
Density / Specific Gravity	0.867		
Bulk Density	Not applicable	Liquid	
Vapor Density	No data available	(Air = 1.0)	
Particle characteristics	Not applicable (liquid)		
Other Information			
Explosive Properties	Vapors may form explosive mixtures with air		

10. Stability and reactivity

Reactive Hazard	None known, based on information available
Stability	Stable under normal conditions.
Conditions to Avoid	Keep away from open flames, hot surfaces and sources of ignition.
Incompatible Materials	Strong oxidizing agents
Hazardous Decomposition Products	Carbon oxides
Hazardous Polymerization	Hazardous polymerization does not occur.
Hazardous Reactions	None under normal processing.

11. Toxicological information

Information on expected route of exposure

Inhalation	Not an expected route of exposure.
Ingestion	May be harmful if swallowed. Harmful if swallowed. Potential for aspiration if swallowed.
Eyes	Avoid contact with eyes.
Skin	Avoid contact with skin.

Toxicology data for the components

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Ethylbenzene	3500 mg/kg (Rat)	15400 mg/kg (Rabbit)	17.2 mg/L (Rat) 4 h

Benzene	LD50 = 810 mg/kg (Rat)	LD50 > 8200 mg/kg (Rabbit)	LC50 = 44.66 mg/L (Rat) 4 h
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Toxicologically Synergistic Products No information available

(b) skin corrosion/irritation; Based on available data, the classification criteria are not met

(c) serious eye damage/irritation; Based on available data, the classification criteria are not met

(d) respiratory or skin sensitization;

Respiratory

Based on available data, the classification criteria are not met

Skin

Based on available data, the classification criteria are not met

(e) germ cell mutagenicity; Category 1B Based on available data, the classification criteria are not met

(f) carcinogenicity; Category 1A Based on available data, the classification criteria are not met

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

Component	CAS No	IARC	NTP	ACGIH	OSHA	Mexico
Ethylbenzene	100-41-4	Group 2B	Not listed	A3	X	A3
Benzene	71-43-2	Group 1	Known	A1	X	A1

IARC (International Agency for Research on Cancer)

IARC (International Agency for Research on Cancer)

Group 1 - Carcinogenic to Humans

Group 2A - Probably Carcinogenic to Humans

Group 2B - Possibly Carcinogenic to Humans

NTP: (National Toxicity Program)

NTP: (National Toxicity Program)

Known - Known Carcinogen

Reasonably Anticipated - Reasonably Anticipated to be a Human Carcinogen

ACGIH: (American Conference of Governmental Industrial Hygienists)

A1 - Known Human Carcinogen

A2 - Suspected Human Carcinogen

A3 - Animal Carcinogen

ACGIH: (American Conference of Governmental Industrial Hygienists)

Mexico - Occupational Exposure Limits - Carcinogens

Mexico - Occupational Exposure Limits - Carcinogens

A1 - Confirmed Human Carcinogen

A2 - Suspected Human Carcinogen

A3 - Confirmed Animal Carcinogen

A4 - Not Classifiable as a Human Carcinogen

A5 - Not Suspected as a Human Carcinogen

(g) reproductive toxicity; Based on available data, the classification criteria are not met

(h) STOT-single exposure; Based on available data, the classification criteria are not met

(i) STOT-repeated exposure; Category 2
Based on available data, the classification criteria are not met

Target Organs

No information available.

(j) aspiration hazard; Category 1
Based on available data, the classification criteria are not met

Symptoms / effects, both acute and delayed Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting.

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

Endocrine Disrupting Properties This product does not contain any known or suspected endocrine disruptors.

12. Ecological information

Ecotoxicity

The product contains following substances which are hazardous for the environment. Contains a substance which is: Toxic to aquatic organisms.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Ethylbenzene	EC50: 2.6 - 11.3 mg/L, 72h static (Pseudokirchneriella subcapitata) EC50: 1.7 - 7.6 mg/L, 96h static (Pseudokirchneriella subcapitata) EC50: > 438 mg/L, 96h (Pseudokirchneriella subcapitata) EC50: = 4.6 mg/L, 72h (Pseudokirchneriella subcapitata)	LC50: 9.1 - 15.6 mg/L, 96h static (Pimephales promelas) LC50: 11.0 - 18.0 mg/L, 96h static (Oncorhynchus mykiss) LC50: = 4.2 mg/L, 96h semi-static (Oncorhynchus mykiss) LC50: 7.55 - 11 mg/L, 96h flow-through (Pimephales promelas) LC50: = 32 mg/L, 96h static (Lepomis macrochirus) LC50: = 9.6 mg/L, 96h static (Poecilia reticulata)	EC50 = 9.68 mg/L 30 min EC50 = 96 mg/L 24 h	EC50: 1.8 - 2.4 mg/L, 48h (Daphnia magna)
Benzene	EC50: = 29 mg/L, 72h (Pseudokirchneriella subcapitata)	LC50: = 22.49 mg/L, 96h static (Lepomis macrochirus) LC50: = 5.3 mg/L, 96h flow-through (Oncorhynchus mykiss) LC50: 70000 - 142000 µg/L, 96h static (Lepomis macrochirus) LC50: = 28.6 mg/L, 96h static (Poecilia reticulata) LC50: 22330 - 41160 µg/L, 96h static (Pimephales promelas) LC50: 10.7 - 14.7 mg/L, 96h flow-through (Pimephales promelas)	Not listed	EC50: = 10 mg/L, 48h (Daphnia magna) EC50: 8.76 - 15.6 mg/L, 48h Static (Daphnia magna)

Persistence and Degradability Persistence is unlikely

Bioaccumulation/ Accumulation No information available.

Mobility No information available.

Component	log Pow
Ethylbenzene	3.6
Benzene	2.13

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.

Component	RCRA - U Series Wastes	RCRA - P Series Wastes
Benzene - 71-43-2	U019	-

14. Transport information

DOT

UN-No UN1175
 Proper Shipping Name ETHYLBENZENE
 Hazard Class 3
 Packing Group II

TDG

UN-No UN1175
 Proper Shipping Name ETHYLBENZENE
 Hazard Class 3
 Packing Group II

IATA

UN-No UN1175
 Proper Shipping Name ETHYLBENZENE
 Hazard Class 3
 Packing Group II

IMDG/IMO

UN-No UN1175
 Proper Shipping Name ETHYLBENZENE
 Hazard Class 3
 Packing Group II

15. Regulatory Information

United States of America Inventory

Component	CAS No	TSCA	TSCA Inventory notification - Active-Inactive	TSCA - EPA Regulatory Flags
Ethylbenzene	100-41-4	X	ACTIVE	-
Benzene	71-43-2	X	ACTIVE	-

Legend:

TSCA US EPA (TSCA) - Toxic Substances Control Act, (40 CFR Part 710)

X - Listed

- - Not Listed

TSCA - Per 40 CFR 751, Regulation of Certain Chemical Substances & Mixtures, Under TSCA Section 6(h) (PBT)

Not applicable

TSCA 12(b) - Notices of Export

Not applicable

International Inventories

China, X = listed, Australia, U.S.A. (TSCA), Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Australia (AICS), Korea (KECL), China (IECSC), Japan (ENCS), Philippines (PICCS), Taiwan (TCSI), Japan (ISHL), New Zealand (NZIoC), Japan (ISHL).

Component	CAS No	DSL	NDSL	EINECS	PICCS	ENCS	ISHL	AICS	IECSC	KECL
Ethylbenzene	100-41-4	X	-	202-849-4	X	X	X	X	X	KE-13532
Benzene	71-43-2	X	-	200-753-7	X	X	X	X	X	KE-02150

KECL - NIER number or KE number (<http://ncis.nier.go.kr/en/main.do>)**U.S. Federal Regulations****SARA 313**

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372.

Component	CAS No	Weight %	SARA 313 - Threshold Values %	SARA 313 - Reporting thresholds
Ethylbenzene	100-41-4	99.88	0.1 %	-

Benzene	71-43-2	0.12	0.1 %	-
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SARA 311/312 Hazard Categories

Should this product meet EPCRA 311/312 Tier reporting criteria at 40 CFR 370, refer to Section 2 of this SDS for appropriate classifications.

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Ethylbenzene	X	1000 lb	X	X
Benzene	X	10 lb	X	X

Clean Air Act

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Ethylbenzene	X		-
Benzene	X		-

OSHA - Occupational Safety and Health Administration Not applicable

Component	Specifically Regulated Chemicals	Highly Hazardous Chemicals
Benzene	5 ppm STEL 0.5 ppm Action Level 1 ppm TWA	-

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) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355).

Component	Hazardous Substances RQs	CERCLA Extremely Hazardous Substances RQs	SARA Reportable Quantity (RQ)
Ethylbenzene	1000 lb	-	1000 lb 454 kg
Benzene	10 lb	-	10 lb 4.54 kg

California Proposition 65

This product contains the following Proposition 65 chemicals.

Component	CAS No	California Prop. 65	Prop 65 NSRL	Category
Ethylbenzene	100-41-4	Carcinogen	54 µg/day 41 µg/day	Carcinogen
Benzene	71-43-2	Carcinogen Developmental Male Reproductive	6.4 µg/day 13 µg/day	Developmental Carcinogen

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Ethylbenzene	X	X	X	X	X
Benzene	X	X	X	X	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

Component	CAS No	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)
Ethylbenzene	100-41-4	-	-	-
Benzene	71-43-2	-	Use restricted. See entry 72. (see link for restriction details) Use restricted. See entry 5. (see link for restriction details) Use restricted. See entry 28. (see link for restriction details) Use restricted. See entry 29. (see link for restriction details) Use restricted. See entry 75. (see link for restriction details)	-

REACH links<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)
Ethylbenzene	100-41-4	Listed	Not applicable	Not applicable	Not applicable
Benzene	71-43-2	Listed	Not applicable	Not applicable	Not applicable

Contains component(s) that meet a 'definition' of per & poly fluoroalkyl substance (PFAS)?

Not applicable

Other International Regulations

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)
Ethylbenzene	100-41-4	Not applicable	Not applicable	Not applicable	Not applicable
Benzene	71-43-2	Not applicable	Not applicable	Not applicable	Not applicable

16. Other Information

Prepared By	Health, Safety and Environmental Department Email: chem.techinfo@thermofisher.com www.thermofisher.com
Revision Date	22-Dec-2025
Print Date	22-Dec-2025
Revision Summary	Updated to the U.S. Department of Labor's Occupational Safety and Health Administration (OSHA) which published its Final Rule in the Federal Register revising the Hazard Communication Standard (HCS/HazCom), 29 CFR 1910.1200 (2024) (HCS §1910.1200, 2024), May 20, 2024, effective July 19, 2024.

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End of SDS

• SAFETY DATA SHEET

Version 6.9
Revision Date 11/06/2025
Print Date 11/07/2025

SECTION 1. IDENTIFICATION

1.1 Product identifiers

Product name : PCB No 28

Product Number : 35601

Brand : Sigma-Aldrich

Index-No. : 602-039-00-4

CAS-No. : 7012-37-5

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

Uses advised against : The product is being supplied under the TSCA R&D Exemption (40 CFR Section 720.36). It is the recipient's responsibility to comply with the requirements of the R&D exemption. The product may not be used for a non-exempt commercial purpose under TSCA unless appropriate consent is granted in writing by MilliporeSigma.

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765

Fax : +1 800 325-5052

1.4 Emergency telephone number

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-
527-3887 CHEMTREC (International) 24
Hours/day; 7 Days/week

SECTION 2. HAZARDS IDENTIFICATION

GHS classification in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200)

Hazards for the product as supplied

Specific target organ : Category 2
toxicity - repeated

Sigma-Aldrich - 35601

Page 1 of 13

exposure

Short-term (acute) aquatic hazard : Category 1

Long-term (chronic) aquatic hazard : Category 1

Other hazards

None known.

GHS label elements

Hazard pictograms :



Signal word : Warning

Hazard statements : H373 May cause damage to organs through prolonged or repeated exposure.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statements : **Prevention:**
P260 Do not breathe dust.
P273 Avoid release to the environment.
Response:
P314 Get medical advice/ attention if you feel unwell.
P391 Collect spillage.
Disposal:
P501 Dispose of contents/ container to an approved waste disposal plant.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Substance

CAS-No. : 7012-37-5

Components

Chemical name	CAS No./Unique ID	Concentration (% w/w)	Trade secret
2,4,4'-Trichlorobiphenyl	7012-37-5*	>= 90 - <= 100	-

* Indicates that the identifier is a CAS No.

Actual concentration is withheld as a trade secret

SECTION 4. FIRST AID MEASURES

General advice	: Show this safety data sheet to the doctor in attendance.
If inhaled	: After inhalation: fresh air. Call in physician.
In case of skin contact	: In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Consult a physician.
In case of eye contact	: After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses.
If swallowed	: After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.
Most important symptoms and effects, both acute and delayed	: The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11
Protection of first-aiders	: For personal protection see section 8.
Notes to physician	: No data available

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media	: Water Foam Carbon dioxide (CO ₂) Dry powder
Unsuitable extinguishing media	: For this substance/mixture no limitations of extinguishing agents are given.
Specific hazards during fire fighting	: Combustible. Development of hazardous combustion gases or vapours possible in the event of fire.
Hazardous combustion products	: Carbon oxides

Hydrogen chloride gas

Specific extinguishing methods	: No data available
Further information	: Suppress (knock down) gases/vapours/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.
Special protective equipment for fire-fighters	: Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	: Advice for non-emergency personnel: Avoid inhalation of dusts. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert. Advice for emergency responders: For personal protection see section 8.
Environmental precautions	: Do not let product enter drains.
Methods and materials for containment and cleaning up	: Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up dry. Dispose of properly. Clean up affected area. Avoid generation of dusts.

SECTION 7. HANDLING AND STORAGE

For precautions see section 2.2.

Advice on safe handling	: Work under hood. Do not inhale substance/mixture.
Further information on storage conditions	: Tightly closed. Dry.
Storage class	: 11, Combustible Solids
Recommended storage temperature	: Recommended storage temperature see product label.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Ingredients with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
2,4,4'-Trichlorobiphenyl	7012-37-5	TWA	0.001 mg/m ³	NIOSH REL

Engineering measures : No data available

Personal protective equipment

Respiratory protection : required when dusts are generated.

Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Recommended Filter type: : Filter type P2

The entrepreneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.

Hand protection

Material : Nitrile rubber
Break through time : 480 min
Glove thickness : 0.11 mm
Protective index : Full contact
Manufacturer : KCL 741 Dermatril® L

Material : Nitrile rubber
Break through time : 480 min
Glove thickness : 0.11 mm
Protective index : Splash contact
Manufacturer : KCL 741 Dermatril® L

Remarks : Handle with impervious gloves.
This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing

with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

- Eye protection : Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).
Safety glasses
- Skin and body protection : protective clothing
- Hygiene measures : Change contaminated clothing. Preventive skin protection recommended. Wash hands after working with substance.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

- Appearance : solid
- Color : No data available
- Odor : No data available
- Odor Threshold : No data available
pH : No data available
- Melting point/ range : 133 °F / 56 °C
- Boiling point/boiling range : No data available
- Flash point : > 212.00 °F / > 100.00 °C
- Evaporation rate : No data available
- Flammability (solid, gas) : No data available
- Flammability (liquids) : No data available
- Burning rate : No data available
- Upper explosion limit /
Upper flammability limit : No data available
- Lower explosion limit /
Lower flammability limit : No data available
- Vapor pressure : No data available

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Relative vapour density	: No data available
Relative density	: No data available
Density	: No data available
Solubility(ies)	
Water solubility	: insoluble
Partition coefficient: n-octanol/water	: No data available
Autoignition temperature	: No data available
Decomposition temperature	: No data available
Viscosity, dynamic	: No data available
Viscosity, kinematic	: No data available
Flow time	: No data available
Explosive properties	: Not classified as explosive.
Oxidizing properties	: none
Molecular weight	: 257.54 g/mol
Particle characteristics	
Particle size	: No data available

SECTION 10. STABILITY AND REACTIVITY

Reactivity	: The following applies in general to flammable organic substances and mixtures: in correspondingly fine distribution, when whirled up a dust explosion potential may generally be assumed.
Chemical stability	: The product is chemically stable under standard ambient conditions (room temperature) .
Possibility of hazardous reactions	: Violent reactions possible with: strong oxidising agents
Conditions to avoid	: no information available
Incompatible materials	: No data available

SECTION 11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

Oral: No data available

Inhalation: No data available

Dermal: No data available

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitization

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

IARC: 1 - Group 1: Carcinogenic to humans (2,4,4'-Trichlorobiphenyl)

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

May cause damage to organs through prolonged or repeated exposure.

Aspiration hazard

No data available

11.2 Additional Information

RTECS: DV8840000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Components:

2,4,4'-Trichlorobiphenyl:

Toxicity to fish : LC50 (Pimephales promelas (fathead minnow)): > 0.16 mg/l
Exposure time: 96.0 h

LC50 : 0.1 mg/l
Exposure time: 96 h

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): > 0.16 mg/l
Exposure time: 48 h

M-Factor (Acute aquatic toxicity) : 10

M-Factor (Chronic aquatic toxicity) : 10

Persistence and degradability

Components:

2,4,4'-Trichlorobiphenyl:

Biodegradability : Remarks: No data available

Bioaccumulative potential

No data available

Mobility in soil

No data available

Other adverse effects

No data available

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues : Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

SECTION 14. TRANSPORT INFORMATION

International Regulations

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IATA-DGR

UN/ID No. : UN 3432
Proper shipping name : Polychlorinated biphenyls, solid
Class : 9
Packing group : II
Labels : Class 9 - Miscellaneous dangerous substances and articles
Packing instruction (cargo : 956
aircraft)
Packing instruction : 956
(passenger aircraft)

IMDG-Code

UN number : UN 3432
Proper shipping name : POLYCHLORINATED BIPHENYLS, SOLID

Class : 9
Packing group : II
Labels : 9
EmS Code : F-A, S-A
Marine pollutant : yes

Transport in bulk according to IMO instruments

Not applicable for product as supplied.

National Regulations**49 CFR Road**

UN/ID/NA number : UN 3432
Proper shipping name : Polychlorinated biphenyls, solid

Class : 9
Packing group : II
Labels : Class 9 - Miscellaneous dangerous substances and articles
ERG Code : 171
Marine pollutant : yes

Poison Inhalation Hazard : No

Special precautions for user

The transport classification(s) provided herein are for informational purposes only, and solely based upon the properties of the unpackaged material as it is described within this Safety Data Sheet. Transportation classifications may vary by mode of transportation, package sizes, and variations in regional or country regulations.

SECTION 15. REGULATORY INFORMATION**CERCLA Reportable Quantity**

This material does not contain any components with a CERCLA RQ.

SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards : No SARA Hazards

SARA 313 : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

US State Regulations

Massachusetts Right To Know

No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know

2,4,4'-Trichlorobiphenyl 7012-37-5

Maine Chemicals of High Concern

Product does not contain any listed chemicals

Vermont Chemicals of High Concern

Product does not contain any listed chemicals

Washington Chemicals of High Concern

Product does not contain any listed chemicals

California Prop. 65

WARNING: This product can expose you to chemicals including 2,4,4'-Trichlorobiphenyl, which is/are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

The components of this product are reported in the following inventories:

TSCA : Product contains substance(s) not listed on TSCA inventory.

TSCA list

No substances are subject to a Significant New Use Rule.

The following substance(s) is/are subject to TSCA 12(b) export notification requirements:
2,4,4'-Trichlorobiphenyl 7012-37-5

SECTION 16. OTHER INFORMATION

Full text of other abbreviations

NIOSH REL : USA. NIOSH Recommended Exposure Limits
NIOSH REL / TWA : Time-weighted average concentration for up to a 10-

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AIIC - Australian Inventory of Industrial Chemicals; ASTM - American Society for the Testing of Materials; bw - Body weight; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DOT - Department of Transportation; DSL - Domestic Substances List (Canada); EC_x - Concentration associated with x% response; EHS - Extremely Hazardous Substance; EL_x - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErC_x - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonised System; GLP - Good Laboratory Practice; HMIS - Hazardous Materials Identification System; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC₅₀ - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organisation; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardisation; KECI - Korea Existing Chemicals Inventory; LC₅₀ - Lethal Concentration to 50 % of a test population; LD₅₀ - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; MSHA - Mine Safety and Health Administration; n.o.s. - Not Otherwise Specified; NFPA - National Fire Protection Association; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organisation for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; RCRA - Resource Conservation and Recovery Act; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RQ - Reportable Quantity; SADT - Self-Accelerating Decomposition Temperature; SARA - Superfund Amendments and Reauthorization Act; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TECI - Thailand Existing Chemicals Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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Revision Date : 11/06/2025

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in the document regarding the product remains unchanged and matches the product ordered.
For further information please contact mlsbranding@sial.com.

US / EN

SAFETY DATA SHEET

Creation Date 10-Dec-2009

Revision Date 20-Dec-2025

Revision Number 7

This safety data sheet was created pursuant to the requirements of: US OSHA Hazard Communication Standard 2024 (29 CFR 1910.1200)

1. Identification

Product Name Tetrachloroethylene

Cat No. : AC445690000; ACR445690010; AC445690025; AC445691000

CAS No 127-18-4
Synonyms Perchloroethylene

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: 001-800-227-6701 / **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 considered hazardous according to [US] OSHA (29 CFR 1910.1200, 2024)

Skin Corrosion/Irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2
Skin Sensitization	Category 1
Carcinogenicity	Category 1B
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Central nervous system (CNS).	

Label Elements

Signal Word
Danger

Hazard Statements

Causes skin irritation
Causes serious eye irritation
May cause an allergic skin reaction
May cause drowsiness or dizziness
May cause cancer

**Precautionary Statements****Prevention**

Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Wash face, hands and any exposed skin thoroughly after handling
Avoid breathing dust/fume/gas/mist/vapors/spray
Contaminated work clothing should not be allowed out of the workplace
Use only outdoors or in a well-ventilated area
Wear protective gloves/protective clothing/eye protection/face protection

Response

IF exposed or concerned: Get medical attention/advice

Inhalation

IF INHALED: Remove person to fresh air and keep comfortable for breathing

Skin

IF ON SKIN: Wash with plenty of soap and water

Take off contaminated clothing

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

Storage

Store locked up

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

Disposal

Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)

Toxic to aquatic life with long lasting effects

Hazards classified under paragraph (d)(1)(ii) of 1910.1200

No information available

WARNING. Cancer - <https://www.p65warnings.ca.gov/>.

3. Composition/information on Ingredients

Component	CAS No	Weight %
Tetrachloroethylene	127-18-4	<=100

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.
Most important symptoms and effects	None reasonably foreseeable. May cause allergic skin reaction. Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting: 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	Water spray, carbon dioxide (CO ₂), dry chemical, alcohol-resistant foam.
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. Containers may explode when heated.

Hazardous Combustion Products

Chlorine. Phosgene. Hydrogen chloride gas.

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
2

Flammability
0

Instability
0

Physical hazards
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. Avoid release to the environment. Collect spillage.

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. Do not get in eyes, on skin, or on clothing. Ensure adequate ventilation. Avoid ingestion and inhalation.
Storage.	Keep containers tightly closed in a dry, cool and well-ventilated place. Protect from sunlight.

Incompatible Materials. Strong acids. Strong oxidizing agents. Strong bases. Metals. Zinc. Amines. Aluminium.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH	Mexico OEL (TWA)
Tetrachloroethylene	TWA: 25 ppm STEL: 100 ppm	(Vacated) TWA: 25 ppm (Vacated) TWA: 170 mg/m ³ Ceiling: 200 ppm TWA: 100 ppm	IDLH: 150 ppm	TWA: 25 ppm STEL: 100 ppm

Legend

ACGIH - American Conference of Governmental Industrial Hygienists

OSHA - Occupational Safety and Health Administration

NIOSH: NIOSH - National Institute for Occupational Safety and Health

Engineering Measures

Use only under a chemical fume hood. 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.

Recommended Filter type:

Organic gases and vapours filter. Type A. Brown. conforming to EN14387.

Hygiene Measures

Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Appearance

Physical State

Liquid

Color

Colorless

Odor

Characteristic, sweet

Odor Threshold

No information available

Property

Values

Remarks

• Method

Melting Point/Range

-22 °C / -7.6 °F

Softening Point

No data available

Boiling Point/Range

120 - 122 °C / 248 - 251.6 °F

@ 760 mmHg

Flash Point

No information available

Method - No information available

Flammability (liquid)

No data available

Flammability (solid,gas)

Not applicable

Liquid

Explosion Limits

No data available

Autoignition Temperature

No data available

Decomposition Temperature

> 150°C

pH

No information available

Viscosity

0.89 mPa s at 20 °C

Water Solubility	0.15 g/L (20°C)	practically insoluble
Solubility in other solvents	No information available	
Partition Coefficient (n-octanol/water)		
Component	log Pow	
Tetrachloroethylene	2.53	
Vapor Pressure	18 mbar @ 20 °C	
Density / Specific Gravity	1.625 1.619	
Bulk Density	Not applicable	Liquid
Vapor Density	No data available	(Air = 1.0)
Particle characteristics	Not applicable (liquid)	
Other Information		
Molecular Formula	C ₂ Cl ₄	
Molecular Weight	165.83	
Evaporation Rate	6.0 (Ether = 1.0)	

10. Stability and reactivity

Reactive Hazard	None known, based on information available
Stability	Stable under normal conditions.
Conditions to Avoid	Incompatible products. Excess heat. Exposure to moist air or water.
Incompatible Materials	Strong acids, Strong oxidizing agents, Strong bases, Metals, Zinc, Amines, Aluminium
Hazardous Decomposition Products	Chlorine, Phosgene, Hydrogen chloride gas
Hazardous Polymerization	Hazardous polymerization does not occur.
Hazardous Reactions	None under normal processing.

11. Toxicological information

Information on expected route of exposure

Inhalation	May produce an allergic reaction.
Ingestion	May cause allergic reaction. May be harmful if swallowed.
Eyes	Avoid contact with eyes. Irritating to eyes. Sensitization.
Skin	Avoid contact with skin. May cause irritation. Repeated or prolonged skin contact may cause allergic reactions with susceptible persons.

Toxicology data for the components

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Tetrachloroethylene	LD50 = 2629 mg/kg (Rat)	LD50 > 10000 mg/kg (Rat)	LC50 = 27.8 mg/L (Rat) 4 h

Toxicologically Synergistic Products	No information available
(b) skin corrosion/irritation;	No data available
(c) serious eye damage/irritation;	No data available
(d) respiratory or skin sensitization;	
Respiratory	No data available

Skin

No data available

May cause sensitization by skin contact

(e) germ cell mutagenicity;

No data available

(f) carcinogenicity;

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

Component	CAS No	IARC	NTP	ACGIH	OSHA	Mexico
Tetrachloroethylene	127-18-4	Group 2A	Reasonably Anticipated	A3	X	A3

*IARC (International Agency for Research on Cancer)**IARC (International Agency for Research on Cancer)**Group 1 - Carcinogenic to Humans**Group 2A - Probably Carcinogenic to Humans**Group 2B - Possibly Carcinogenic to Humans**NTP: (National Toxicity Program)**Known - Known Carcinogen**Reasonably Anticipated - Reasonably Anticipated to be a Human Carcinogen**ACGIH: (American Conference of Governmental Industrial Hygienists)**A1 - Known Human Carcinogen**A2 - Suspected Human Carcinogen**A3 - Animal Carcinogen**ACGIH: (American Conference of Governmental Industrial Hygienists)**Mexico - Occupational Exposure Limits - Carcinogens**Mexico - Occupational Exposure Limits - Carcinogens**A1 - Confirmed Human Carcinogen**A2 - Suspected Human Carcinogen**A3 - Confirmed Animal Carcinogen**A4 - Not Classifiable as a Human Carcinogen**A5 - Not Suspected as a Human Carcinogen***(g) reproductive toxicity;**

No data available

(h) STOT-single exposure;

No data available

Results / Target organs

Central nervous system (CNS).

(i) STOT-repeated exposure;

No data available

Target Organs

None known.

(j) aspiration hazard;

Based on available data, the classification criteria are not met

Other Adverse Effects

Tumorigenic effects have been reported in experimental animals.

Symptoms / effects, both acute and delayed

Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting. 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.

Other Adverse Effects

Tumorigenic effects have been reported in experimental animals.

Endocrine Disrupting Properties

This product does not contain any known or suspected endocrine disruptors.

Component	EU - Endocrine Disruptors Candidate List	EU - Endocrine Disruptors - Evaluated Substances	Japan - Endocrine Disruptor Information
Tetrachloroethylene	Group II Chemical	Not applicable	Not applicable

12. Ecological information

Ecotoxicity

Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. The product contains following substances which are hazardous for the environment.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Tetrachloroethylene	EC50: > 500 mg/L, 96h (Pseudokirchneriella subcapitata)	LC50: 12.4 - 14.4 mg/L, 96h flow-through (Pimephales promelas) LC50: 8.6 - 13.5 mg/L, 96h static (Pimephales promelas) LC50: 11.0 - 15.0 mg/L, 96h static (Lepomis macrochirus) LC50: 4.73 - 5.27 mg/L, 96h flow-through (Oncorhynchus mykiss)	EC50 = 100 mg/L 24 h EC50 = 112 mg/L 24 h EC50 = 120.0 mg/L 30 min	EC50: 6.1 - 9.0 mg/L, 48h Static (Daphnia magna)

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

Bioaccumulation/ Accumulation No information available.

Mobility . Is not likely mobile in the environment due its low water solubility. Will likely be mobile in the environment due to its volatility.

Component	log Pow
Tetrachloroethylene	2.53

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.

Component	RCRA - U Series Wastes	RCRA - P Series Wastes
Tetrachloroethylene - 127-18-4	U210	-

14. Transport information

DOT

UN-No UN1897
 Proper Shipping Name TETRACHLOROETHYLENE
 Hazard Class 6.1
 Packing Group III

TDG

UN-No UN1897
 Proper Shipping Name TETRACHLOROETHYLENE
 Hazard Class 6.1
 Packing Group III

IATA

UN-No UN1897
 Proper Shipping Name TETRACHLOROETHYLENE
 Hazard Class 6.1
 Packing Group III

IMDG/IMO

UN-No UN1897
 Proper Shipping Name TETRACHLOROETHYLENE
 Hazard Class 6.1
 Packing Group III

15. Regulatory Information

United States of America Inventory

Component	CAS No	TSCA	TSCA Inventory notification - Active-Inactive	TSCA - EPA Regulatory Flags
Tetrachloroethylene	127-18-4	X	ACTIVE	-

Legend:

TSCA US EPA (TSCA) - Toxic Substances Control Act, (40 CFR Part 710)

X - Listed

-' - Not Listed

TSCA - Per 40 CFR 751, Regulation of Certain Chemical Substances & Mixtures, Under TSCA Section 6(h) (PBT)

Not applicable

TSCA 12(b) - Notices of Export

Not applicable

Component	CAS No	TSCA 12(b) - Notices of Export
Tetrachloroethylene	127-18-4	Section 6

International Inventories

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

Component	CAS No	DSL	NDL	EINECS	PICCS	ENCS	ISHL	AICS	IECSC	KECL
Tetrachloroethylene	127-18-4	X	-	204-825-9	X	X	X	X	X	KE-33294

KECL - NIER number or KE number (<http://ncis.nier.go.kr/en/main.do>)**U.S. Federal Regulations****SARA 313**

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372.

Component	CAS No	Weight %	SARA 313 - Threshold Values %	SARA 313 - Reporting thresholds
Tetrachloroethylene	127-18-4	<=100	0.1 %	-

SARA 311/312 Hazard Categories

Should this product meet EPCRA 311/312 Tier reporting criteria at 40 CFR 370, refer to Section 2 of this SDS for appropriate classifications.

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Tetrachloroethylene	-	-	X	X

Clean Air Act

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Tetrachloroethylene	X		-

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) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355).

Component	Hazardous Substances	CERCLA Extremely	SARA Reportable Quantity
-----------	----------------------	------------------	--------------------------

	RQs	Hazardous Substances RQs	(RQ)
Tetrachloroethylene	100 lb	-	100 lb 45.4 kg

California Proposition 65 This product contains the following Proposition 65 chemicals.

Component	CAS No	California Prop. 65	Prop 65 NSRL	Category
Tetrachloroethylene	127-18-4	Carcinogen	14 µg/day	Carcinogen

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Tetrachloroethylene	X	X	X	X	X

U.S. Department of Transportation

Reportable Quantity (RQ): Y
 DOT Marine Pollutant Y
 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	CAS No	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)
Tetrachloroethylene	127-18-4	-	Use restricted. See entry 75. (see link for restriction details)	-

REACH links

<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)
Tetrachloroethylene	127-18-4	Listed	Not applicable	Not applicable	Not applicable

Contains component(s) that meet a 'definition' of per & poly fluoroalkyl substance (PFAS)?

Not applicable

Other International Regulations

Component	CAS No	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Major Accident	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Safety Report	Rotterdam Convention (PIC)	Basel Convention (Hazardous Waste)

		Notification	Requirements		
Tetrachloroethylene	127-18-4	Not applicable	Not applicable	Not applicable	Annex I - Y45

16. Other Information

Prepared By	Product stewardship (Regulatory Affairs) Thermo Fisher Scientific email - begel.sdsdesk@thermofisher.com
Creation Date	10-Dec-2009
Revision Date	20-Dec-2025
Print Date	20-Dec-2025
Revision Summary	Updated to the U.S. Department of Labor's Occupational Safety and Health Administration (OSHA) which published its Final Rule in the Federal Register revising the Hazard Communication Standard (HCS/HazCom), 29 CFR 1910.1200 (2024) (HCS §1910.1200, 2024), May 20, 2024, effective July 19, 2024.

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

End of SDS

SAFETY DATA SHEET

Creation Date 11-Jun-2009

Revision Date 19-Dec-2025

Revision Number 12

This safety data sheet was created pursuant to the requirements of: US OSHA Hazard Communication Standard 2024 (29 CFR 1910.1200)

1. Identification

Product Name Toluene

Cat No. : AC326980000; AC326980010; AC326980025; AC326981000; AC326982500

CAS No 108-88-3
Synonyms Tol; Methylbenzene

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: 001-800-227-6701 / **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 considered hazardous according to [US] OSHA (29 CFR 1910.1200, 2024)

Flammable liquids	Category 2
Skin Corrosion/Irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2
Reproductive Toxicity	Category 2
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Respiratory system, Central nervous system (CNS).	
Specific target organ toxicity - (repeated exposure)	Category 2
Target Organs - Kidney, Liver, spleen, Blood, Neurological effects, Eyes, Ears.	
Aspiration Toxicity	Category 1

Label Elements

Signal Word

Danger

Hazard Statements

Highly flammable liquid and vapor
May be fatal if swallowed and enters airways
Causes skin irritation
Causes serious eye irritation
May cause drowsiness or dizziness
Suspected of damaging the unborn child
May cause damage to organs through prolonged or repeated exposure

**Precautionary Statements****Prevention**

Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Wash face, hands and any exposed skin thoroughly after handling
Wear eye/face protection
Do not breathe dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking
Keep container tightly closed
Ground and bond container and receiving equipment
Use explosion-proof electrical/ventilating/lighting equipment
Keep cool
Wear protective gloves/protective clothing/eye protection/face protection
Take action to prevent static discharges
Use non-sparking tools

Response

IF exposed or concerned: Get medical attention/advice

Inhalation

IF INHALED: Remove person to fresh air and keep comfortable for breathing

Skin

If skin irritation occurs: Get medical advice/attention

IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower

Take off contaminated clothing and wash before reuse

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: Immediately call a POISON CENTER or doctor

Do NOT induce vomiting

Fire

In case of fire: Use CO₂, dry chemical, or foam to extinguish

Storage

Store locked up

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

Disposal

Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)

Harmful to aquatic life with long lasting effects

Hazards classified under paragraph (d)(1)(ii) of 1910.1200

No information available

WARNING. Reproductive Harm - <https://www.p65warnings.ca.gov/>.**3. Composition/information on Ingredients**

Component	CAS No	Weight %
Toluene	108-88-3	<=100

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. Risk of serious damage to the lungs (by aspiration).
Ingestion	Clean mouth with water and drink afterwards plenty of water. Do NOT induce vomiting. Call a physician or poison control center immediately. If vomiting occurs naturally, have victim lean forward.
Most important symptoms and effects	Difficulty in breathing. Causes central nervous system depression: Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting
Notes to Physician	Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media	Water spray, carbon dioxide (CO2), dry chemical, alcohol-resistant foam. Water mist may be used to cool closed containers.
Unsuitable Extinguishing Media	No information available
Flash Point	4 °C / 39.2 °F
Method -	No information available
Autoignition Temperature	535 °C / 995 °F
Explosion Limits	
Upper	7.1 vol %
Lower	1.1 vol %
Oxidizing Properties	Not oxidising
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical

Flammable. Containers may explode when heated. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back.

Hazardous Combustion ProductsCarbon monoxide (CO). Carbon dioxide (CO₂).**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.

NFPAHealth
3Flammability
3Instability
0Physical hazards
N/A**6. Accidental release measures****Personal Precautions**

Use personal protective equipment as required. Ensure adequate ventilation. Remove all sources of ignition. Take precautionary measures against static discharges.

Environmental Precautions

Do not flush into surface water or sanitary sewer system.

Methods for Containment and Clean Up

Soak up with inert absorbent material. Keep in suitable, closed containers for disposal. Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment.

7. Handling and Storage**Handling**

Wear personal protective equipment/face protection. Do not get in eyes, on skin, or on clothing. Avoid ingestion and inhalation. Ensure adequate ventilation. Keep away from open flames, hot surfaces and sources of ignition. Use only non-sparking tools. To avoid ignition of vapors by static electricity discharge, all metal parts of the equipment must be grounded. Take precautionary measures against static discharges.

Storage.

Keep containers tightly closed in a dry, cool and well-ventilated place. Flammables area. Keep away from heat, sparks and flame. Incompatible Materials. Strong oxidizing agents. Strong acids. Strong bases. Halogenated compounds.

8. Exposure controls / personal protection**Exposure Guidelines**

Component	ACGIH TLV	OSHA PEL	NIOSH	Mexico OEL (TWA)
Toluene	TWA: 20 ppm	(Vacated) TWA: 100 ppm (Vacated) TWA: 375 mg/m ³ Ceiling: 300 ppm (Vacated) STEL: 150 ppm (Vacated) STEL: 560 mg/m ³ TWA: 200 ppm	IDLH: 500 ppm REL = 100 ppm (TWA) REL = 375 mg/m ³ (TWA) STEL: 150 ppm STEL: 560 mg/m ³	TWA: 20 ppm

Legend

ACGIH - American Conference of Governmental Industrial Hygienists

OSHA - Occupational Safety and Health Administration

NIOSH: NIOSH - National Institute for Occupational Safety and Health

Engineering Measures

Ensure that eyewash stations and safety showers are close to the workstation location. Use explosion-proof electrical/ventilating/lighting equipment. Ensure adequate ventilation, especially in confined areas.

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.
Recommended Filter type:	Organic gases and vapours filter. Type A. Brown. conforming to EN14387.
Hygiene Measures	Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Appearance

Physical State	Liquid
Color	Colorless
Odor	aromatic
Odor Threshold	1.74 ppm
Property	Values
Melting Point/Range	-95 °C / -139 °F
Softening Point	No data available
Boiling Point/Range	111 °C / 231.8 °F
Flash Point	4 °C / 39.2 °F
Flammability (liquid)	Highly flammable
Flammability (solid,gas)	Not applicable
Explosion Limits	Lower 1.2 vol% Upper 7 vol%

Remarks

• Method

Autoignition Temperature	535 °C / 995 °F
Decomposition Temperature	No data available
pH	No information available
Viscosity	0.6 mPa.s @ 20 °C
Water Solubility	practically insoluble 0.5 g/L @ 20°C
Solubility in other solvents	No information available
Partition Coefficient (n-octanol/water)	
Component	log Pow
Toluene	2.73
Vapor Pressure	29 mbar @ 20 °C
Density / Specific Gravity	0.866
Bulk Density	Not applicable
Vapor Density	3.1
Particle characteristics	Not applicable (liquid)

@ 760 mmHg

Method - No information available
On basis of test data
Liquid

Liquid
(Air = 1.0)

Other Information

Molecular Formula	C7 H8
Molecular Weight	92.14
Explosive Properties	Not explosive Vapors may form explosive mixtures with air
Oxidizing Properties	Not oxidising
Evaporation Rate	2.4 (Butyl acetate = 1.0)

10. Stability and reactivity

Reactive Hazard	None known, based on information available
Stability	Stable under normal conditions.
Conditions to Avoid	Incompatible products. Excess heat. Keep away from open flames, hot surfaces and sources of ignition.
Incompatible Materials	Strong oxidizing agents, Strong acids, Strong bases, Halogenated compounds

Hazardous Decomposition Products Carbon monoxide (CO), Carbon dioxide (CO₂)

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Information on expected route of exposure

Inhalation Irritating to respiratory system. May be harmful if inhaled. May cause drowsiness and dizziness.

Ingestion Aspiration hazard if swallowed - can enter lungs and cause damage. May be harmful if swallowed. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea. Harmful if swallowed. Potential for aspiration if swallowed.

Eyes Irritating to eyes.

Skin Irritating to skin. Can be absorbed through skin. May be harmful in contact with skin.

Toxicology data for the components

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Toluene	> 5000 mg/kg (Rat)	12000 mg/kg (Rabbit)	26700 ppm (Rat) 1 h

Toxicologically Synergistic Products No information available

(b) skin corrosion/irritation; Category 2
Test method OECD 404
Test species rabbit
Observational endpoint Irritating to skin

(c) serious eye damage/irritation; Based on available data, the classification criteria are not met

(d) respiratory or skin sensitization;
Respiratory Based on available data, the classification criteria are not met
Skin Based on available data, the classification criteria are not met

(e) germ cell mutagenicity; Based on available data, the classification criteria are not met
 Not mutagenic in AMES Test

(f) carcinogenicity; Based on available data, the classification criteria are not met
 The table below indicates whether each agency has listed any ingredient as a carcinogen

Component	CAS No	IARC	NTP	ACGIH	OSHA	Mexico
Toluene	108-88-3	Not listed	Not listed	Not listed	Not listed	Not listed

(g) reproductive toxicity; Category 2

Reproductive Effects Experiments have shown reproductive toxicity effects on laboratory animals.
Developmental Effects Developmental effects have occurred in experimental animals.
Teratogenicity Possible risk of harm to the unborn child.

(h) STOT-single exposure; Category 3
Results / Target organs Central nervous system (CNS).

(i) STOT-repeated exposure; Category 2

Target Organs

Liver, Kidney, Central nervous system (CNS), Blood, spleen, Neuropsychological effects, Eyes, Ears.

(j) aspiration hazard; Category 1

Symptoms / effects, both acute and delayed Causes central nervous system depression. Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting.

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

Endocrine Disrupting Properties This product does not contain any known or suspected endocrine disruptors.

12. Ecological information

Ecotoxicity

The product contains following substances which are hazardous for the environment. Contains a substance which is: Toxic to aquatic organisms.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Toluene	EC50: = 12.5 mg/L, 72h static (Pseudokirchneriella subcapitata) EC50: > 433 mg/L, 96h (Pseudokirchneriella subcapitata)	50-70 mg/L LC50 96 h 5-7 mg/L LC50 96 h 15-19 mg/L LC50 96 h 28 mg/L LC50 96 h 12 mg/L LC50 96 h	EC50 = 19.7 mg/L 30 min	EC50: = 11.5 mg/L, 48h (Daphnia magna) EC50: 5.46 - 9.83 mg/L, 48h Static (Daphnia magna)

Persistence and Degradability Persistence is unlikely

Bioaccumulation/ Accumulation No information available.

Mobility Is not likely mobile in the environment due its low water solubility.

Component	log Pow
Toluene	2.73

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.

Component	RCRA - U Series Wastes	RCRA - P Series Wastes
Toluene - 108-88-3	U220	-

14. Transport information

DOT

UN-No UN1294
 Proper Shipping Name TOLUENE
 Hazard Class 3
 Packing Group II

TDG

UN-No UN1294
 Proper Shipping Name TOLUENE
 Hazard Class 3
 Packing Group II

IATA

UN-No UN1294

Proper Shipping Name TOLUENE
 Hazard Class 3
 Packing Group II

IMDG/IMO

UN-No UN1294
 Proper Shipping Name TOLUENE
 Hazard Class 3
 Packing Group II

15. Regulatory Information

United States of America Inventory

Component	CAS No	TSCA	TSCA Inventory notification - Active-Inactive	TSCA - EPA Regulatory Flags
Toluene	108-88-3	X	ACTIVE	-

Legend:

TSCA US EPA (TSCA) - Toxic Substances Control Act, (40 CFR Part 710)

X - Listed

'-' - Not Listed

**TSCA - Per 40 CFR 751, Regulation of Certain Chemical
 Substances & Mixtures, Under TSCA Section 6(h) (PBT)**

Not applicable

TSCA 12(b) - Notices of Export

Not applicable

International Inventories

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

Component	CAS No	DSL	NDL	EINECS	PICCS	ENCS	ISHL	AICS	IECSC	KECL
Toluene	108-88-3	X	-	203-625-9	X	X	X	X	X	KE-33936

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

U.S. Federal Regulations**SARA 313**

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372.

Component	CAS No	Weight %	SARA 313 - Threshold Values %	SARA 313 - Reporting thresholds
Toluene	108-88-3	<=100	1.0 %	-

SARA 311/312 Hazard Categories

Should this product meet EPCRA 311/312 Tier reporting criteria at 40 CFR 370, refer to Section 2 of this SDS for appropriate classifications.

CWA (Clean Water Act)

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

Clean Air Act

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Toluene	X		-

OSHA - Occupational Safety and

Not applicable

Health Administration

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) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355).

Component	Hazardous Substances RQs	CERCLA Extremely Hazardous Substances RQs	SARA Reportable Quantity (RQ)
Toluene	1000 lb	-	1000 lb 454 kg

California Proposition 65

This product contains the following Proposition 65 chemicals.

Component	CAS No	California Prop. 65	Prop 65 NSRL	Category
Toluene	108-88-3	Developmental	-	Developmental

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Toluene	X	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**

Serious risk, Grade 3

Authorisation/Restrictions according to EU REACH

Component	CAS No	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)
Toluene	108-88-3	-	Use restricted. See entry 48. (see link for restriction details) Use restricted. See entry 75. (see link for restriction details)	-

REACH links<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)
Toluene	108-88-3	Listed	Not applicable	Not applicable	Not applicable

Contains component(s) that meet a 'definition' of per & poly fluoroalkyl substance (PFAS)?
Not applicable

Other International Regulations

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)
Toluene	108-88-3	Not applicable	Not applicable	Not applicable	Annex I - Y42

16. Other Information

Prepared By	Product stewardship (Regulatory Affairs) Thermo Fisher Scientific email - begel.sdsdesk@thermofisher.com
Creation Date	11-Jun-2009
Revision Date	19-Dec-2025
Print Date	19-Dec-2025
Revision Summary	Updated to the U.S. Department of Labor’s Occupational Safety and Health Administration (OSHA) which published its Final Rule in the Federal Register revising the Hazard Communication Standard (HCS/HazCom), 29 CFR 1910.1200 (2024) (HCS §1910.1200, 2024), May 20, 2024, effective July 19, 2024.

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

End of SDS

SAFETY DATA SHEET

Creation Date 03-Feb-2010

Revision Date 18-Dec-2025

Revision Number 4

This safety data sheet was created pursuant to the requirements of: US OSHA Hazard Communication Standard 2024 (29 CFR 1910.1200)

1. Identification

Product Name Trichloroethylene

Cat No. : T340-4; T341-4; T341-20; T341-500; T403-4

CAS No 79-01-6
Synonyms Trichloroethene (Stabilized/Technical/Electronic/Certified ACS)

Recommended Use Laboratory chemicals.
Uses advised against .

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

CHEMTREC®, Inside the USA: 800-424-9300
CHEMTREC®, Outside the USA: 001-703-527-3887

2. Hazard(s) identification

Classification

This chemical is considered hazardous according to [US] OSHA (29 CFR 1910.1200, 2024)

Skin Corrosion/Irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2
Skin Sensitization	Category 1
Germ Cell Mutagenicity	Category 2
Carcinogenicity	Category 1A
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Central nervous system (CNS).	
Specific target organ toxicity - (repeated exposure)	Category 2
Target Organs - Kidney, Liver, Heart, spleen, Blood.	

Label Elements

Signal Word

Danger

Hazard Statements

Causes skin irritation

Causes serious eye irritation

May cause an allergic skin reaction

May cause drowsiness or dizziness

Suspected of causing genetic defects

May cause cancer

May cause damage to organs through prolonged or repeated exposure

**Precautionary Statements****Prevention**

Obtain special instructions before use

Do not handle until all safety precautions have been read and understood

Wash face, hands and any exposed skin thoroughly after handling

Contaminated work clothing should not be allowed out of the workplace

Do not breathe dust/fume/gas/mist/vapors/spray

Use only outdoors or in a well-ventilated area

Wear protective gloves/protective clothing/eye protection/face protection

Response

IF exposed or concerned: Get medical attention/advice

Inhalation

IF INHALED: Remove person to fresh air and keep comfortable for breathing

Skin

IF ON SKIN: Wash with plenty of soap and water

Take off contaminated clothing

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

Storage

Store locked up

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

Disposal

Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)

Harmful to aquatic life with long lasting effects

Hazards classified under paragraph (d)(1)(ii) of 1910.1200

No information available

WARNING. Cancer and Reproductive Harm - <https://www.p65warnings.ca.gov/>.

3. Composition/information on Ingredients

Component	CAS No	Weight %
Trichloroethylene	79-01-6	<=100

4. First-aid measures

General Advice	Show this safety data sheet to the doctor in attendance. Immediate medical attention is required.
Eye Contact	In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
Skin Contact	Wash off immediately with plenty of water for at least 15 minutes. Immediate medical attention is required.
Inhalation	Remove to fresh air. If not breathing, give artificial respiration. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Immediate medical attention is required.
Ingestion	Do NOT induce vomiting. Call a physician or poison control center immediately.
Most important symptoms and effects	May cause allergic skin reaction. Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting: 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	Water spray, carbon dioxide (CO ₂), dry chemical, alcohol-resistant foam.
Unsuitable Extinguishing Media	No information available
Flash Point	No information available
Method -	No information available
Autoignition Temperature	410 °C / 770 °F
Explosion Limits	
Upper	44.8 vol %
Lower	8 vol %
Oxidizing Properties	Not oxidising
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. Containers may explode when heated. Keep product and empty container away from heat and sources of ignition.

Hazardous Combustion Products

Chlorine. Phosgene. Carbon monoxide (CO). Carbon dioxide (CO₂). Hydrogen chloride gas.

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

NFPA

Health
2

Flammability
1

Instability
0

Physical hazards
N/A

6. Accidental release measures

Personal Precautions	Ensure adequate ventilation. Use personal protective equipment as required. Keep people away from and upwind of spill/leak. Evacuate personnel to safe areas.
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Environmental Precautions Should not be released into the environment. Do not flush into surface water or sanitary sewer system.

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. Do not get in eyes, on skin, or on clothing. Use only under a chemical fume hood. Do not breathe mist/vapors/spray. Do not ingest. If swallowed then seek immediate medical assistance.

Storage. Keep containers tightly closed in a dry, cool and well-ventilated place. Protect from light. Do not store in aluminum containers. Incompatible Materials. Strong oxidizing agents. Strong bases. Amines. Alkali metals. Metals. .

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH	Mexico OEL (TWA)
Trichloroethylene	TWA: 10 ppm STEL: 25 ppm	(Vacated) TWA: 50 ppm (Vacated) TWA: 270 mg/m ³ Ceiling: 200 ppm (Vacated) STEL: 200 ppm (Vacated) STEL: 1080 mg/m ³ TWA: 100 ppm	IDLH: 1000 ppm	TWA: 10 ppm STEL: 25 ppm

Legend

ACGIH - American Conference of Governmental Industrial Hygienists

OSHA - Occupational Safety and Health Administration

NIOSH: NIOSH - National Institute for Occupational Safety and Health

Engineering Measures Use only under a chemical fume hood. 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.

Recommended Filter type: Organic gases and vapours filter. Type A. Brown. conforming to EN14387.

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

9. Physical and chemical properties

Appearance

Physical State

Color

Liquid
Colorless

Odor	Characteristic		
Odor Threshold	No information available		
Property	Values	Remarks	• Method
Melting Point/Range	-85 °C / -121 °F		
Softening Point	No data available		
Boiling Point/Range	87 °C / 188.6 °F	Literature reference	
Flash Point	No information available	Method -	No information available
Flammability (liquid)	No data available		
Flammability (solid,gas)	Not applicable	Liquid	
Explosion Limits	Lower 8,0 vol % Upper 44.8 vol %	Literature reference	
Autoignition Temperature	410 °C / 770 °F	DIN 51794	
Decomposition Temperature	> 120°C		
pH	No information available		
Viscosity	0.55 mPa.s (25°C)	Based on available literature	
Water Solubility	Insoluble		
Solubility in other solvents	No information available		
Partition Coefficient (n-octanol/water)			
Component	log Pow		
Trichloroethylene	2.4		
Vapor Pressure	77.3 mbar @ 20 °C		
Density / Specific Gravity	1.460		
Bulk Density	Not applicable	Liquid	
Vapor Density	4.5 (Air = 1.0)	Literature reference	
Particle characteristics	Not applicable (liquid)		
Other Information			
Molecular Formula	C2 H Cl3		
Molecular Weight	131.39		
Explosive Properties	Not explosive explosive air/vapour mixtures possible		
Oxidizing Properties	Not oxidising		
Evaporation Rate	0.69 (Carbon Tetrachloride = 1.0)		

10. Stability and reactivity

Reactive Hazard	None known, based on information available
Stability	Light sensitive.
Conditions to Avoid	Incompatible products. Excess heat. Exposure to light. Exposure to moist air or water.
Incompatible Materials	Strong oxidizing agents, Strong bases, Amines, Alkali metals, Metals,
Hazardous Decomposition Products	Chlorine, Phosgene, Carbon monoxide (CO), Carbon dioxide (CO ₂), Hydrogen chloride gas
Hazardous Polymerization	Hazardous polymerization does not occur.
Hazardous Reactions	None under normal processing.

11. Toxicological information

Information on expected route of exposure

Inhalation	INHALATION MAY CAUSE CENTRAL NERVOUS SYSTEM EFFECTS. May cause irritation of respiratory tract. May be harmful if inhaled.
Ingestion	Aspiration hazard. May be harmful if swallowed. May cause central nervous system effects. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.
Eyes	Irritating to eyes.
Skin	Irritating to skin. May be harmful in contact with skin.

Toxicology data for the components

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Trichloroethylene	LD50 = 4920 mg/kg (Rat)	LD50 = 29000 mg/kg (Rabbit)	LC50 = 26 mg/L (Rat) 4 h

Toxicologically Synergistic Products No information available

(b) skin corrosion/irritation; Category 2
Test method OECD 404
Test species rabbit
Observational endpoint Irritating

(c) serious eye damage/irritation; Category 2

(d) respiratory or skin sensitization;
Respiratory Based on available data, the classification criteria are not met
Skin Category 1

Component	Test method	Test species	Study result
Trichloroethylene 79-01-6 (<=100)	OECD Test Guideline 429	mouse	Sensitization

May cause sensitization by skin contact

(e) germ cell mutagenicity; Category 2
 Mutagenic effects have occurred in humans

(f) carcinogenicity; Category 1B
 The table below indicates whether each agency has listed any ingredient as a carcinogen

Component	CAS No	IARC	NTP	ACGIH	OSHA	Mexico
Trichloroethylene	79-01-6	Group 1	Known	A2	X	A2

IARC (International Agency for Research on Cancer)

IARC (International Agency for Research on Cancer)

Group 1 - Carcinogenic to Humans

Group 2A - Probably Carcinogenic to Humans

Group 2B - Possibly Carcinogenic to Humans

NTP: (National Toxicity Program)

NTP: (National Toxicity Program)

Known - Known Carcinogen

Reasonably Anticipated - Reasonably Anticipated to be a Human Carcinogen

ACGIH: (American Conference of Governmental Industrial Hygienists)

A1 - Known Human Carcinogen

A2 - Suspected Human Carcinogen

A3 - Animal Carcinogen

ACGIH: (American Conference of Governmental Industrial Hygienists)

(g) reproductive toxicity; Based on available data, the classification criteria are not met

(h) STOT-single exposure; Category 3
Results / Target organs Central nervous system (CNS).

(i) STOT-repeated exposure; Based on available data, the classification criteria are not met
Target Organs None known.

(j) aspiration hazard; Based on available data, the classification criteria are not met

Symptoms / effects, both acute and delayed Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting. 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.

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

Endocrine Disrupting Properties This product does not contain any known or suspected endocrine disruptors.

12. Ecological information

Ecotoxicity

Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment. Do not empty into drains. The product contains following substances which are hazardous for the environment. Contains a substance which is: Harmful to aquatic organisms. Toxic to aquatic organisms.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Trichloroethylene	EC50: = 450 mg/L, 96h (Desmodesmus subspicatus) EC50: = 175 mg/L, 96h (Pseudokirchneriella subcapitata)	LC50: 31.4 - 71.8 mg/L, 96h flow-through (Pimephales promelas) LC50: 39 - 54 mg/L, 96h static (Lepomis macrochirus)	EC50 = 0.81 mg/L 24 h EC50 = 115 mg/L 10 min EC50 = 190 mg/L 15 min EC50 = 235 mg/L 24 h EC50 = 410 mg/L 24 h EC50 = 975 mg/L 5 min	EC50: = 2.2 mg/L, 48h (Daphnia magna)

Persistence and Degradability Persistence is unlikely based on information available.

Bioaccumulation/ Accumulation No information available.

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

Component	log Pow
Trichloroethylene	2.4

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.

Component	RCRA - U Series Wastes	RCRA - P Series Wastes
Trichloroethylene - 79-01-6	U228	-

14. Transport information

DOT

UN-No UN1710
 Proper Shipping Name TRICHLOROETHYLENE
 Hazard Class 6.1
 Packing Group III

TDG

UN-No UN1710
 Proper Shipping Name TRICHLOROETHYLENE
 Hazard Class 6.1
 Packing Group III

IATA

UN-No UN1710
 Proper Shipping Name TRICHLOROETHYLENE
 Hazard Class 6.1

Packing Group	III
IMDG/IMO	
UN-No	UN1710
Proper Shipping Name	TRICHLOROETHYLENE
Hazard Class	6.1
Packing Group	III

15. Regulatory Information

United States of America Inventory

Component	CAS No	TSCA	TSCA Inventory notification - Active-Inactive	TSCA - EPA Regulatory Flags
Trichloroethylene	79-01-6	X	ACTIVE	R,S

Legend:

TSCA US EPA (TSCA) - Toxic Substances Control Act, (40 CFR Part 710)

X - Listed

'-' - Not Listed

R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.

TSCA - Per 40 CFR 751, Regulation of Certain Chemical Substances & Mixtures, Under TSCA Section 6(h) (PBT) Not applicable

TSCA 12(b) - Notices of Export

Component	CAS No	TSCA 12(b) - Notices of Export
Trichloroethylene	79-01-6	Section 5(a)(2) Section 6

International Inventories

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

Component	CAS No	DSL	NDL	EINECS	PICCS	ENCS	ISHL	AICS	IECSC	KECL
Trichloroethylene	79-01-6	X	-	201-167-4	X	X	X	X	X	X

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

U.S. Federal Regulations

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372.

Component	CAS No	Weight %	SARA 313 - Threshold Values %	SARA 313 - Reporting thresholds
Trichloroethylene	79-01-6	<=100	0.1 %	-

SARA 311/312 Hazard Categories

Should this product meet EPCRA 311/312 Tier reporting criteria at 40 CFR 370, refer to Section 2 of this SDS for appropriate classifications.

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Trichloroethylene	X	100 lb	X	X

Clean Air Act

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Trichloroethylene	X		-

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) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355).

Component	Hazardous Substances RQs	CERCLA Extremely Hazardous Substances RQs	SARA Reportable Quantity (RQ)
Trichloroethylene	100 lb	-	100 lb 45.4 kg

California Proposition 65

This product contains the following Proposition 65 chemicals.

Component	CAS No	California Prop. 65	Prop 65 NSRL	Category
Trichloroethylene	79-01-6	Carcinogen Developmental Male Reproductive	14 µg/day 50 µg/day	Developmental Carcinogen

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Trichloroethylene	X	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	CAS No	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)
Trichloroethylene	79-01-6	Carcinogenic Category 1B, Article 57 Application date: October 21, 2014 Sunset date: April 21, 2016 Exemption - None	Use restricted. See entry 28. (see link for restriction details) Use restricted. See entry 75. (see link for restriction details)	SVHC Candidate list - 201-167-4 - Carcinogenic, Article 57a

After the sunset date the use of this substance requires either an authorization or can only be used for exempted uses, e.g. use in scientific research and development which includes routine analytics or use as intermediate.

REACH links

<https://echa.europa.eu/authorisation-list>
<https://echa.europa.eu/substances-restricted-under-reach>
<https://echa.europa.eu/candidate-list-table>

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)
Trichloroethylene	79-01-6	Listed	Not applicable	Not applicable	Not applicable

Contains component(s) that meet a 'definition' of per & poly fluoroalkyl substance (PFAS)?

Not applicable

Other International Regulations

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)
Trichloroethylene	79-01-6	Not applicable	Not applicable	Not applicable	Annex I - Y45

16. Other Information

Prepared By

Product stewardship (Regulatory Affairs)
Thermo Fisher Scientific
email - begel.sdsdesk@thermofisher.com

Creation Date

03-Feb-2010

Revision Date

18-Dec-2025

Print Date

18-Dec-2025

Revision Summary

Updated to the U.S. Department of Labor's Occupational Safety and Health Administration (OSHA) which published its Final Rule in the Federal Register revising the Hazard Communication Standard (HCS/HazCom), 29 CFR 1910.1200 (2024) (HCS §1910.1200, 2024), May 20, 2024, effective July 19, 2024.

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

End of SDS

SAFETY DATA SHEET

Version 8.8
Revision Date 08/23/2023
Print Date 01/23/2026

SECTION 1: Identification of the substance/mixture and of the company/undertaking**1.1 Product identifiers**

Product name : Vinyl chloride

Product Number : 387622
Brand : Aldrich
Index-No. : 602-023-00-7
CAS-No. : 75-01-4

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-
527-3887 CHEMTREC (International) 24
Hours/day; 7 Days/week

SECTION 2: Hazards identification**2.1 Classification of the substance or mixture****GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)**

Flammable gases (Category 1), H220
Gases under pressure (Liquefied gas), H280
Carcinogenicity (Category 1A), H350

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal Word

Danger

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Hazard statement(s)	
H220	Extremely flammable gas.
H280	Contains gas under pressure; may explode if heated.
H350	May cause cancer.
Precautionary statement(s)	
P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P210	Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P377	Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
P381	Eliminate all ignition sources if safe to do so.
P405	Store locked up.
P410 + P403	Protect from sunlight. Store in a well-ventilated place.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

May form explosive peroxides.

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms : Chloroethylene

Formula : C_2H_3Cl
Molecular weight : 62.50 g/mol
CAS-No. : 75-01-4
EC-No. : 200-831-0
Index-No. : 602-023-00-7

Component	Classification	Concentration
Vinyl chloride		
	Flam. Gas 1; Press. Gas Liquefied gas; Carc. 1A; H220, H280, H350	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice

Show this material safety data sheet to the doctor in attendance.

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If inhaled

After inhalation: fresh air. Call in physician.

In case of skin contact

In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Consult a physician.

In case of eye contact

After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses.

If swallowed

After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures**5.1 Extinguishing media****Suitable extinguishing media**

Water Foam Carbon dioxide (CO₂) Dry powder

Unsuitable extinguishing media

For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture

Carbon oxides

Hydrogen chloride gas

Combustible.

Pay attention to flashback.

Development of hazardous combustion gases or vapours possible in the event of fire.

5.3 Advice for firefighters

Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 Further information

Remove container from danger zone and cool with water. Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures**6.1 Personal precautions, protective equipment and emergency procedures**

Advice for non-emergency personnel: Do not breathe gas. Avoid substance contact.

Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.

For personal protection see section 8.

6.2 Environmental precautions

Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Stop flow of gas, move leaking cylinder to open air if without risk.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling

Work under hood. Do not inhale substance/mixture. Avoid generation of vapours/aerosols.

Advice on protection against fire and explosion

Keep away from open flames, hot surfaces and sources of ignition.

Hygiene measures

Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions

Tightly closed. Keep locked up or in an area accessible only to qualified or authorized persons. Keep away from combustible materials and sources of ignition.

Contents under pressure. Light sensitive.

Storage class

Storage class (TRGS 510): 2A: Gases

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Vinyl chloride	75-01-4	TWA	1 ppm	USA. Table Z-1-A Limits for Air Contaminants (1989 vacated values)
		TWA	1 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Liver damage Lung cancer Confirmed human carcinogen		

		STEL	5 ppm	USA. Table Z-1-A Limits for Air Contaminants (1989 vacated values)
		TWA	1 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		STEL	5 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		See 1910.1017		
		Potential Occupational Carcinogen See Appendix A		

8.2 Exposure controls

Appropriate engineering controls

Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

Personal protective equipment

Eye/face protection

Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Body Protection

Flame retardant antistatic protective clothing.

Respiratory protection

Recommended Filter type: Filter type ABEK

The entrepreneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer.

These measures have to be properly documented.

required when vapours/mists are generated. Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure

Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

- | | |
|---------------------------------|---|
| a) Appearance | Form: Liquefied gas
Color: colorless |
| b) Odor | odorless |
| c) Odor Threshold | Not applicable |
| d) pH | No data available |
| e) Melting point/freezing point | Melting point/range: -153.8 °C (-244.8 °F) - lit. |

f)	Initial boiling point and boiling range	-13.4 °C 7.9 °F - lit.
g)	Flash point	-62 °C (-80 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 29.3 %(V) Lower explosion limit: 3.8 %(V)
k)	Vapor pressure	No data available
l)	Vapor density	No data available
m)	Density	0.911 g/cm ³ at 25 °C (77 °F) - lit.
	Relative density	No data available
n)	Water solubility	9.15 g/l at 20 °C (68 °F)
o)	Partition coefficient: n-octanol/water	log Pow: 1.58 at 22 °C (72 °F) - Bioaccumulation is not expected.
p)	Autoignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	none

9.2 Other safety information

No data available

SECTION 10: Stability and reactivity

10.1 Reactivity

No data available

10.2 Chemical stability

The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions

Violent reactions possible with:
Strong oxidizing agents

10.4 Conditions to avoid

no information available

10.5 Incompatible materials

No data available

10.6 Hazardous decomposition products

In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

Oral: No data available

LC50 Inhalation - Rat - 2 h - 390 mg/l - gas

Remarks: (ECHA)

Dermal: No data available

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitization

No data available

Germ cell mutagenicity

Test Type: In vitro mammalian cell gene mutation test

Test system: Chinese hamster lung cells

Metabolic activation: without metabolic activation

Result: negative

Remarks: (ECHA)

Test Type: Ames test

Test system: Salmonella typhimurium

Metabolic activation: with and without metabolic activation

Method: OECD Test Guideline 471

Result: positive

Test Type: dominant lethal test

Species: Mouse

Application Route: inhalation (gas)

Result: negative

Remarks: (ECHA)

Test Type: Micronucleus test

Species: Mouse

Application Route: inhalation (gas)

Method: OECD Test Guideline 474

Result: positive

Carcinogenicity

May cause cancer. Positive evidence from human epidemiological studies.

IARC: 1 - Group 1: Carcinogenic to humans (Vinyl chloride)

NTP: Known - Known to be human carcinogen (Vinyl chloride)

OSHA: OSHA specifically regulated carcinogen (Vinyl chloride)

Reproductive toxicity

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

11.2 Additional Information

Repeated dose toxicity - Rat - male and female - Oral - 13 Weeks - NOAEL (No observed adverse effect level) - 30 mg/kg

RTECS: KU9625000

burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Central nervous system -

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish semi-static test LC50 - Danio rerio (zebra fish) - 210 mg/l - 96 h
(OECD Test Guideline 203)

Toxicity to bacteria Remarks: (ECHA)
(Vinyl chloride)

12.2 Persistence and degradability

Biodegradability aerobic - Exposure time 28 d
Result: 16 % - Not readily biodegradable.
(OECD Test Guideline 301D)

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties

No data available

12.7 Other adverse effects

No data available

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SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself. Pressurised gas bottle: dispose of only in empty condition! See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

SECTION 14: Transport information

DOT (US)

UN number: 1086 Class: 2.1
Proper shipping name: Vinyl chloride, stabilized
Reportable Quantity (RQ): 1 lbs
Reportable Quantity (RQ): 1 lbs
Poison Inhalation Hazard: No

IMDG

UN number: 1086 Class: 2.1
Proper shipping name: VINYL CHLORIDE, STABILIZED

EMS-No: F-D, S-U

IATA

UN number: 1086 Class: 2.1
Proper shipping name: Vinyl chloride, stabilized
IATA Passenger: Not permitted for transport

SECTION 15: Regulatory information

SARA 302 Components

This material does not contain any components with a section 302 EHS TPQ.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Vinyl chloride	75-01-4	2007-07-01

SARA 311/312 Hazards

Fire Hazard, Sudden Release of Pressure Hazard, Acute Health Hazard, Chronic Health Hazard

Reportable Quantity : D043 lbs

Massachusetts Right To Know Components

Vinyl chloride	CAS-No. 75-01-4	Revision Date 2007-07-01
Phenol	108-95-2	2007-07-01
hydroquinone	123-31-9	2007-03-01

Pennsylvania Right To Know Components

Vinyl chloride	CAS-No. 75-01-4	Revision Date 2007-07-01
Phenol	108-95-2	2007-07-01

California Prop. 65 Components

, which is/are known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov . Vinyl chloride	CAS-No. 75-01-4	Revision Date 2007-09-28
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SECTION 16: Other information

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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Version: 8.8

Revision Date: 08/23/2023

Print Date: 01/23/2026

ATTACHMENT D: AIR MONITORING SPECIFICATIONS

Permissible Exposure Limit (PEL)

What it is: An enforceable legal limit in the United States for workplace exposure to a chemical substance or physical agent.

- Enforceability: Legally enforceable by OSHA. Violation of a PEL is a violation of federal law.
- Purpose: To ensure a place of employment is free from recognized hazards.

Threshold Limit Value (TLV)

What it is: A recommended exposure limit set by the American Conference of Governmental Industrial Hygienists (ACGIH) based on scientific data.

- Enforceability: Not a legal standard. It is a guideline, not a requirement.
- Purpose: To provide a recommendation for what the upper exposure limits should be to protect most workers.

Immediately Dangerous to Life (IDLH):

What it is: An IDLH condition is any atmosphere that could cause death or permanent adverse health effects, or prevent escape from the environment.

- Enforceability: Legally enforceable by OSHA.
- Purpose: IDLH values are used to guide the selection of appropriate respiratory protection for workers entering potentially hazardous areas.

Chemical	PEL (ppm)	TLV (ppm)	IDLH (ppm)
1,2-dichloroethane *	50	10	50
Benzene	1	0.02	500
Benzo(a)pyrene	0.2	NA	80
Ethylbenzene	100	20	800
Naphthalene	10	10	250
Tetrachloroethylene	100	25	150
Toluene	200	20	500
Total Xylenes	100	100	900
Trichloroethylene	100	10	1000
Vinyl Chloride	1	1	NA
Polychlorinated biphenyls	0.5 mg/m ³	0.001 mg/m ³	5 mg/m ³

*Note requires the use of an eV bulb >11.05

**ATTACHMENT E: FORM U PARAMETERS AND ANALYTICAL
METHODS**

FORM "U"**PARAMETERS AND ANALYTICAL METHODS****TCLP ANALYSIS**

Parameter: (mg/l)	* Analytical Methods:
TCLP Metals	
Arsenic	SW-846-1311/SW-846-6010
Barium	SW-846-1311/SW-846-6010
Cadmium	SW-846-1311/SW-846-6010
Chromium	SW-846-1311/SW-846-6010
Lead	SW-846-1311/SW-846-6010
Mercury	SW-846-1311/SW-846-7470
Selenium	SW-846-1311/SW-846-7740
Silver	SW-846-1311/SW-846-6010
Additional TCLP Metals	
Copper	SW-846-1311/SW-846-6010
Nickel	SW-846-1311/SW-846-6010
Zinc	SW-846-1311/SW-846-6010
TCLP Volatile Organics	
Benzene	SW-846-1311/SW-846-8260
Carbon Tetrachloride	SW-846-1311/SW-846-8260
Chlorobenzene	SW-846-1311/SW-846-8260
Chloroform	SW-846-1311/SW-846-8260
1,2-Dichloroethane	SW-846-1311/SW-846-8260
1,1-Dichloroethylene	SW-846-1311/SW-846-8260
Methyl Ethyl Ketone	SW-846-1311/SW-846-8260
Tetrachloroethylene	SW-846-1311/SW-846-8260
Trichloroethylene	SW-846-1311/SW-846-8260
Vinyl Chloride	SW-846-1311/SW-846-8260
TCLP Semi-Volatiles (Base Neutrals)	
1,4-Dichlorobenzene	SW-846-1311/SW-846-8270
Hexachlorobenzene	SW-846-1311/SW-846-8270
Hexachlorobutadiene	SW-846-1311/SW-846-8270
Hexachloroethane	SW-846-1311/SW-846-8270
Nitrobenzene	SW-846-1311/SW-846-8270
Pyridine	SW-846-1311/SW-846-8270
2,4-Dinitrotoluene	SW-846-1311/SW-846-8270
TCLP Semi-Volatiles (Acid Compounds)	
o-Cresol	SW-846-1311/SW-846-8270
m-Cresol	SW-846-1311/SW-846-8270
p-Cresol	SW-846-1311/SW-846-8270
Cresol, Total	SW-846-1311/SW-846-8270
Pentachlorophenol	SW-846-1311/SW-846-8270
2,4,5-Trichlorophenol	SW-846-1311/SW-846-8270
2,4,6-Trichlorophenol	SW-846-1311/SW-846-8270
TCLP Pesticides	
Chlordane	SW-846-1311/SW-846-8080
Endrin	SW-846-1311/SW-846-8080
Heptachlor	SW-846-1311/SW-846-8080
Lindane	SW-846-1311/SW-846-8080
Methoxychlor	SW-846-1311/SW-846-8080
Toxaphene	SW-846-1311/SW-846-8080
TCLP Herbicides	
2,4-D	SW-846-1311/SW-846-8080
2,4,5-TP	SW-846-1311/SW-846-8080
2,4-Dinitrotoluene	SW-846-1311/SW-846-8080

FORM "U"

PARAMETERS AND ANALYTICAL METHODS

TOTAL ANALYSIS

Parameter:	* Analytical Methods:
General, (mg/kg)	
PH	SW-846-9045
Ignitability	SW-846-C7
Reactive Sulfide	SW-846-C7
Reactive Cyanide	SW-846-C7
Total Cyanide	SW-4500-CNE
Free Liquids	SW-846-9095
PCB's	SW-846-8080
Total; Volatile Solids	SM-2540.E
Total Oil and Grease or TPH	SW-846-9071, EPA-418.1 or API-GC/FID
Total Solids	SM-2540.B
ASTM Water Leaching Analysis, (mg/l)	
COD	ASTM-D3987-85/EPA-410.4
Total Solids	ASTM-D3987-85/SM-2540.4
Oil and Grease or TPH	ASTM-D3987-85/SW-846-9070, EPA-418.1 or API-GC/FID
Ammonia-Nitrogen	ASTM-D3987-85/EPA-354.1

(*) - Analytical Methods stated are only suggested methods, other methods may be utilized.
All laboratory reports should indicate the reference document, method no. for each test performed and result reported.

EXIHBIT 1: AREAS OF CONCERN

LEGEND

JMC Sharon Facility Property Boundary

JMC Sharon Facility Current Building Outline

JMC Sharon Facility Former Building Outline

Acid Plume Area

Other Areas of Concern

LNAPL Area

DNAPL Area

N

12562.50125

Feet

TITLE

AREAS OF CONCERN

DATE1/24/08

FIGURE3

DRAWN BYALH

APPROVED BYGSK

CLIENTJOHN MANEELY COMPANY

PROJECT NO.1263.01.13

The Payne Firm, Inc.
Environmental Consultants
Cincinnati / Cleveland / Chicago

REFERENCE

Mercer County Regional Planning Commission, Orthophotograph (2004);
State Plane Coordinates from Kurtanich Engineers & Associates, Inc.,
Hermitage, Pennsylvania (NAD83); Parcel Boundaries from Mercer
County Engineer (2006)

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