Appendix A

GSI Site-Specific Health and Safety Plan

Former JH Baxter & Co. Facility, Eugene, Oregon

October 2023

Prepared by

GSI Water Solutions, Inc.

Site-Specific
Health and Safety Plan

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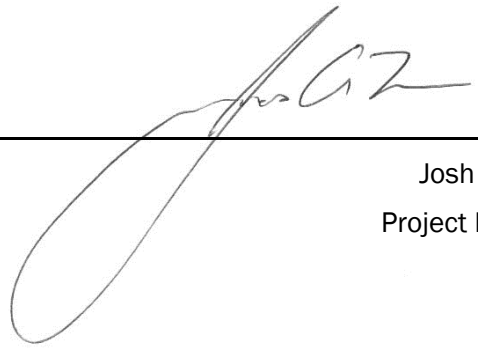

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Abbreviations and Acronyms

AED	automated external defibrillator
AHA	activity hazard analysis
Baxter	JH Baxter & Co.
CFR	Code of Federal Regulations
CPR	cardiopulmonary resuscitation
CRZ	Contamination Reduction Zone
D/F	dioxins/furans
EPA	U.S. Environmental Protection Agency
EZ	Exclusion Zone
F	Fahrenheit
FD	Field Director
GFCI	ground fault circuit interrupter
HAZWOPER	Hazardous Waste Operations and Emergency Response
HASP	Health and Safety Plan
ID	identification
LOTO	lockout/tagout
mph	miles per hour
NRC	National Response Center
OSHA	Occupational Safety and Health Administration
PCP	pentachlorophenol
PE	Professional Engineer
PFD	personal flotation device
PM	Project Manager
PPE	personal protective equipment
SAP	sampling and analysis plan
SDS	safety data sheet

Site	JH Baxter & Co. Facility and nearby offsite areas
SSHO	Site Safety and Health Officer
SZ	Support Zone
USCG	U.S. Coast Guard

SECTION 1: **Emergency Action Plan**

1.1 Emergency Services and Contacts

In case of emergencies, call 911.

Always use an ambulance to go to the closest hospital for life-threatening injuries.

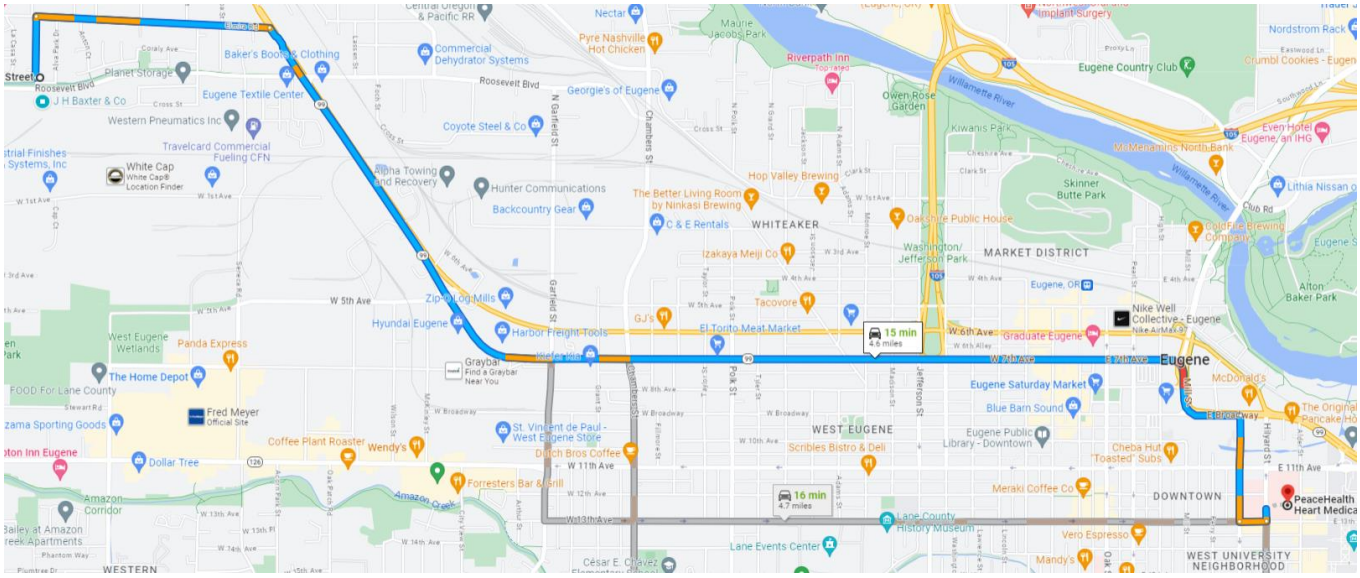
Table 1. Emergency Contacts

Emergency Service or Contact	Name	Phone Number
Local Police	City of Eugene Police Department	911 emergency 541-682-5111 (non-emergency)
Local Ambulance	Eugene Springfield Fire Department	911 emergency
Local Fire Department	Eugene Springfield Fire Department	911 emergency 541-682-7100 (non-emergency)
Local Hospital	PeaceHealth Sacred Heart Medical Center University District 1255 Hilyard Street Eugene, OR 97401	458-209-5555 (emergency)
GSI Water Solutions, Inc. (GSI) Health and Safety Coordinator	Kathy Roush	Office: 971-200-8527 Cell: 919-605-6644
Incident Intervention (WorkCare)	WorkCare	888-449-7787
Poison Control Center	—	1-800-222-1222
Oregon Emergency Response System *(to report a hazardous spill to the state agency)*	—	911 emergency 1-800-452-0311
National Response Center *(to report a hazardous spill)*	—	1-800-424-8802
State Reporting Agency *(Oregon Occupational Safety and Health)*	—	1-800-321-6742 (Oregon)
GSI Project Manager	Josh Bale	Office: 971-200-8502 Cell: 530-276-4188
GSI Field Director	Chris Martin	Cell: 503-432-5979
Client Contact	Don Hanson	Office: 541-687-7349

1.2 Hospital Location and Directions Map

Sacred Heart University Medical Center is the closest emergency service location. Direction to the hospital from Baxter Street:

1. Head north on Baxter Street towards Elmira Rd (0.2 miles)
2. Turn right onto Elmira Rd. Go 0.7 miles.
3. Turn right onto Oregon Highway 99 South (West 7th Ave. to Mill St. to E. Broadway to Patterson St.). Go 3.7 miles
4. Turn left onto E. 13th Ave. Go 400 feet.
5. Turn left onto Hilyard Street.



1.3 Emergency Supplies and Equipment List

Table 2. Safety and Other Equipment Locations

Equipment	Location and Notes
First Aid Kit[1]	Inside work vehicle
Fire Extinguisher	Inside work vehicle
Mobile Phones	On workers
Traffic Cones	Will be used as needed and supplied by contractor
Walkie Talkies	N/A
Water or Other Fluid Replenishment	Inside work vehicle
Eye Wash	In work vehicle
Chemical Spill Kit	N/A for GSI. Contractor will supply.

SECTION 2: **Organizational Structure**

This site-specific Health and Safety Plan (HASP) has been developed for the nearby offsite areas (Site) to the JH Baxter & Co. Facility and in accordance with (Occupational Safety and Health Administration [OSHA] 29 Code of Federal Regulations [CFR] 1910 and 1926), and the GSI Health and Safety Policy. It covers potential field hazards associated with the tasks necessary to complete the Scope of Work for all site support activities, including site sampling, surveying, technical field support to the client, field reconnaissance, and soil removal action activities.

Site Name and Address

Project Name	JH Baxter & Co. Facility and Offsite Areas	**Project Number**	02060.011
Date	June 2022	**Revision Number**	1

2.1 Project Team Organization and Authorities

Table 3. Project Roles and Responsibilities

Name	Role	Responsibility
Josh Bale	Project Manager (PM)	The GSI PM has overall responsibility for the delivery of the project and management of all members of the team, including external advisors and subcontractors. The PM and Field Director are the points of contact for the client and regulatory agencies. The GSI PM is responsible for field operations and ensures the implementation of the HASP requirements and procedures in the field.
Chris Martin	Field Director (FD)	The GSI FD has responsibility and authority to direct all work operations. The FD will work closely with the PM, and is a point of contact for the client and regulatory agencies. The FD will coordinate safety and health functions with the Site Safety and Health Officer (SSHO), has the authority to oversee and monitor the performance of the SSHO, and bears ultimate responsibility for the proper implementation of this HASP.
TBD	Site Safety and Health Officer (SSHO)	The GSI SSHO has full responsibility and authority to develop and implement this HASP and to verify compliance. The SSHO is onsite or readily accessible to the site during all work operations and has the authority to halt site work if unsafe conditions are observed or suspected.
TBD	Field Staff	GSI's staff will be responsible for complying with this HASP, using the proper personal protective equipment (PPE), reporting unsafe acts and conditions, and following the work and safety and health instructions of the PM, SSHO, FD, and site-specific HASP and protocols.
Subcontractors (as needed)	Field Activities	Subcontractors will be responsible for their own HASPs.

2.2 Stop Work Authority

All employees at the Site regardless of position may stop work at the Site if that employee feels that activities are not being carried out in a safe manner. Employees exercising stop work authority shall have no repercussions to them from GSI or client employees. Work will not continue on the questionable item until the stop work event has been resolved to the satisfaction of the involved employee. All stop work events shall be recorded on a tracking log by the SSHO. Any incidents (including exposures and spills) or near misses must be reported using the Near Miss or Incident Report Forms (Attachments 1 and 2).

2.3 Limitations

This HASP was prepared exclusively for the JH Baxter & Co project by GSI. The quality of information contained herein is consistent with the level of effort involved in GSI services and based on (1) information available at the time of preparation, (2) data supplied by outside sources, and (3) the assumptions, conditions, and qualifications set forth in this HASP. This HASP is intended to be used by GSI personnel for site sampling, surveying, technical field support to the client, and field reconnaissance only, to the terms and conditions of its contract with GSI. Any other use of, or reliance on, this HASP by any third party is at that party's sole risk.

The information contained herein is relevant to site conditions as known at the time of the HASP development. In the event that changes in the nature, usage, or layout of the property or nearby properties are made, the information contained in this HASP may not be valid. If additional information becomes available, it should be provided to GSI so the HASP can be modified as necessary.

2.4 Approvals and Modifications

Josh Bale or designated representative is responsible for the approval of this plan and any future modifications after preparation.

Table 4. Version Control

Section Revised	Page #	Description of Changes	Author	Date Issued	Reviewed by
Throughout	N/A	Update for additional scope	C. Martin	10/10/2023	J. Bale

SECTION 3: **Site Description and Scope of Work**

3.1 Site Description

The JH Baxter & Co. (Baxter) former wood treating facility is located on 31.5 acres at 85 Baxter Street in northwest Eugene, Oregon, Township 17S, Range 4W, Section 27, Lane County. The Baxter facility (facility) is located at a latitude of 44.062133 and longitude of -123.151536. Operations at the facility ended on January 31, 2022.

In 2020 and 2021, Baxter began investigating the extent of offsite soil contamination in the surrounding area to update their understanding of offsite surface soil contamination. Sampling activities included investigating adjacent drainage ditches, residential properties, and background samples as required in the ROD (DEQ, 2019b). Contaminants of interest included total metals (arsenic, chromium, copper, and zinc), PAHs, PCP, and dioxins/furans (D/Fs). Elevated D/Fs contamination was identified in soil samples collected from residential yards immediately north of the Facility. The TCDD TEQ values in the 2021 samples were highest in yards within areas where air deposition modeling completed by the Lane Regional Air Protection Agency predicted predominant summer wind direction and deposition areas from the Facility (GSI, 2020). Some residential yards and other areas sampled exceed DEQ's acceptable risk level in residential soil for TCDD TEQs, which is 4.7 pg/g. Some residential yards exceed 40 pg/g, which may present increased health risks to children younger than 6 years of age.

In January 2022, Baxter notified DEQ it would not be able to implement cleanup at the residential yards in a timely manner, and suspended wood treatment activities at its facility. DEQ subsequently declared the Facility an Orphan Site to enable utilization of the Industrial Orphan Site Account to complete the RAs at the offsite residential yards.

Under the DEQ Orphan Site program, additional sampling was completed in 2022 to investigate shallow soil in offsite residential yards north of the Facility. This Addendum to the Work Plan describes anticipated 2023 soil sampling intended to delineate the extent, depth, and magnitude of soil D/F contamination up to 3 feet below ground surface in residential yards identified by Baxter's and DEQ's previous sampling activities.

3.2 Scope of Work

This HASP covers offsite subsurface soil investigation activities and oversight of contractors implementing the removal action and associated support activities.

3.3 Locations of Nearest Facilities

Table 5. Locations of Nearest Facilities

Facility	Notes
Telephone	Employees should keep fully charged cell phones onsite. It is recommended that a car charger or fully charged power block be available.
Water Source	Employees will be provided access to clean drinking water. The SSHO will ensure that sufficient water supply is maintained.
Restroom	Varies. Will be identified in the field before starting work.
Personal Hygiene	Hand wash stations, hand washing water and soap, and/or hand wipes will be supplied at all times. Personnel must not eat food, drink, or smoke around working areas.

3.4 Site Access

3.4.1 Baxter Facility Access

The Scope of Work does not include entering the former Baxter facility.

3.4.2 Property Access

DEQ has obtained access agreements with the residential property owners to perform the offsite investigation and removal action on select properties. All property access will be coordinated through DEQ.

SECTION 4: **Safe Work Practices**

4.1 Accident Prevention

The SSHO and all site employees will inspect the work area and/or Site daily to identify and correct any unsafe conditions. GSI field personnel and subcontractors should inspect work area thoroughly before leaving the Site. Adherence to the safe work practices and procedures outlined in this HASP will assist with accident prevention.

Access will be limited to all controlled areas via the prescribed administrative (certifications) and engineering (barricades) controls, as described above. All site staff and visitors will note arrival and departure times on a field log maintained by the SSHO.

4.2 Personal Conduct

- Unauthorized personnel are not allowed on the Site.
- A high standard of personal hygiene will be observed. Smoking, eating, drinking, chewing gum or tobacco, taking medication, and applying cosmetics will not be permitted within the Exclusion Zone or Contamination Reduction Zone (Section 6.3).
- Personnel under the obvious influence of alcohol or controlled substances are not allowed at the Site; those taking medications that could impact ability to safely perform work must notify the SSHO before beginning work.
- All project area personnel will familiarize themselves with these practices and the emergency procedures during daily tailgate and pre-work safety meetings.
- No “horseplay” or unsafe actions or activities will be allowed.
- GSI employees who are passengers or drivers of vehicles will wear their seat belts any time the vehicle is in motion.
- Cell phone use while driving is not permitted.

4.3 Equipment and Activities

- All unsafe conditions will be corrected immediately. All unsafe conditions not in the scope of the project will be reported to the SSHO and the condition corrected.
- Do not fuel engines while the vehicle is running.
- Install adequate site roads, signs, lights, and devices, where applicable.
- Store tools in clean, secure areas so they will not be damaged, lost, or stolen.
- All equipment, tools, and property will be secured, as needed, at the end of each day.

4.4 Vehicular Use

On public roads, adhere to traffic regulations and speed limits. Where possible, move the vehicle to be close to the sampling location or work area. Inspect the area for access, soft ground, and obstacles that may damage the vehicle. If possible, drive in and drive out of the location, rather than reversing. If you need to reverse, use a spotter to guide you. Use wheel chocks when parked on steep slopes. Before exiting a vehicle, shift into park, set the parking/emergency brake, and shut off the engine. Never leave a running vehicle UNATTENDED.

4.5 Working Near Traffic

Use caution and be aware when working on public roads or rights-of-way. Always check for traffic before crossing streets, being mindful of corners or parked cars impacting street visibility. In areas with traffic, use

cones to demarcate the work area and prevent foot or vehicular traffic from entering the work area. Always wear high-visibility clothing and use a work light during dawn/dusk and otherwise dark or overcast conditions.

4.6 Slips/Trips/Falls

Good housekeeping practices should be utilized at all times to minimize trip hazards and falls. Extra caution should be taken when work cannot be avoided on unstable surfaces, uneven terrain, steep grades, and when working on elevated surfaces. Fall protection must be provided when working on heights of 6 feet or more. Refer to OSHA fall protection requirements for varying heights and conditions. Refer to the GSI Information on Slips, Trips, and Falls fact sheet for further information (Attachment 3).

4.7 Blood-borne Pathogens

First aid responders have the potential to be exposed to blood-borne pathogens. The potential for exposure to blood-borne pathogens outside of emergency response is not anticipated. While rendering first aid where exposure to bodily fluids or blood may occur, responders will wear, at a minimum, latex or nitrile gloves and a face shield or safety glasses. GSI employees are not required to administer first aid. GSI employees are required to immediately assess any emergency situation and seek professional assistance as appropriate.

4.8 Subsurface Utilities

Check for the location of underground services before beginning ground-penetrating work or ensure contractor has confirmed utility locations. OSHA regulations require the estimated location of utility installations (sewer, telephone, fuel, electric, water lines or any other underground installations that reasonably may be expected to be encountered during excavation work) will be determined before opening an excavation.

Use a service locator and the following cues to assist in identifying possible underground services: (1) signs of patched or missing of pavement; (2) service boxes, pits, and manholes as they may indicate the presence or alignment of services; and (3) note services coming into or out of the ground, like power lines and downspouts. When possible, shut off utilities that are in the area while drilling is taking place. Consider less intrusive boring methods for shallow soil, such as using vac-truck/air-knife or hand-auguring to a given depth below surface for physical confirmation of absence/presence of utilities. Ensure upland drilling complies with the client facility's intrusive work requirements, when policy exists.

4.9 Machinery/Mechanical Equipment/Heavy Equipment

Stand clear of machinery when in operation and be familiar with emergency stop devices, if applicable. No loose clothing to be worn and all long hair (hair extending below the shoulders) to be tied back. If safety vests are worn, they must be fastened at the front. Stay clear of hoisting operations (drill rod attachment and detachment). Be aware of all pinch points and provide guarding where possible. Be aware that heavy equipment activity may change daily or hourly, with differing potential hazards that need to be identified and addressed. Maintain eye contact with operator and wait for clearance before entering active work zone.

4.10 Overhead Hazards

Look up to determine location of hazard(s). If overhead hazards exist, change the location of the work to be performed where possible, otherwise, secure the overhead hazard(s) (e.g., de-energize live electrical lines). Stand clear of drill rig and facility operations. Do not walk under a raised load or a load supported by a winch. Stand uphill from drilling activities (if possible) as falling drill strings may roll.

4.11 Manually Lifting Hazards

Assess the load to be lifted, loaded, pushed, or pulled. Solicit help if the load cannot be safely moved by one person or if handling the load is too awkward. Lift with knees and hold load close to body. Make sure footing is firm, path is clear, and avoid twisting. Use same techniques when setting load down.

4.12 Sharp Objects

Sharp objects may be broadly defined and are specific to each project site and work area. Sharp objects may include, but is not limited to, nails, exposed metal edges, metal shards, exposed rebar, broken glass, and sharps. Employees should look for and scan the work area for the presence of sharp objects to avoid contact (such as stepping or sitting on them) and potential injury. Remove or protect other workers from exposure to hazard, where possible and safe to perform. Particular care should be taken in areas where debris is present. If sharps are present, steel-shanked boots should be considered where it provides increased worker protection. Leather gloves should be worn at all times when moving or coming into contact with materials that pose a cut or puncture risk.

4.13 Noise Reduction

Site activities in proximity to welding, construction, and heavy equipment often expose workers to excessive noise. It is anticipated that situations may arise when noise levels may exceed the OSHA Action Level of 85 decibels (A-weighted scale) in an 8-hour time-weighted average. An example of this possibility is working in close proximity to the subcontractor during drilling or trenching activities at the Site. If excessive noise levels occur, earplugs with appropriate the Noise Reduction Ratings will be issued to all personnel and a system of hand signals understood by all will be implemented (see Table 10). Refer to Preventing Hearing Loss Caused by Chemical (Ototoxicity) and Noise Exposure (Attachment 4).

4.14 Sanitation

Potable drinking water will be supplied in tightly closed containers and will be clearly marked for its intended use. If vehicles are available for use by field crews, restrooms and a field washing area with potable water will be available within a reasonable distance from the Site. If such facilities are not located within a reasonable distance, portable facilities will be installed for use by field employees.

4.15 Illumination

When fieldwork is to be conducted before dawn or after dusk, or light conditions are less than 5 footcandles, illumination in all work areas and access pathways to those areas will be maintained with facility lighting, temporary light plants, equipment-mounted lighting systems, or similar, such that illumination at 5 footcandles or greater is provided.

4.16 Weather Conditions

Weather is always a potential safety factor in performing work in outdoor environments. To ensure worker safety, the following minimum safety rules will be implemented. Modification of work limitations due to weather can only be approved by the SSHO or FD. Work will cease if precipitation (snow, rain, freezing rain) is severe enough to impair safe movement/travel; lightning is in the immediate area; or excessive winds, flooding, or other conditions are determined by the FD. See below for further information.

4.16.1 Lightning

The 30-30 rule is a common rule used for lightning safety and is defined as follows: If lighting is seen, count to 30 seconds. If thunder is heard within 30 seconds (assumes lighting is within 30 miles), workers will shelter in place. For uplands, shelter in buildings or vehicles. For on-water work, shelter within the cabs of barges or tugs. Sheltering in place will end 30 minutes after the last lighting is seen with thunder occurring within 30 seconds. Weather apps such as Spark can also be used to determine whether lightning is within 30 miles of work area. Refer to Lightning Safety When Working Outdoors (Attachment 5).

4.16.2 High Winds

Work will be stopped when sustained winds of more than 15 miles per hour (mph) and/or gusts of over 25 mph occur, unless prior approval is provided by the SSHO.

4.16.3 Ultraviolet Exposure

Wear appropriate clothing, hats, and sunscreen to prevent sunburn and ultraviolet light exposure.

4.16.4 Heat Stress/Heat Stroke

Drink plenty of fluids (not caffeine), wear clothing appropriate for the weather conditions. Monitor workers for signs of heat stress. May use a wet bulb thermometer in high-humidity conditions to verify heat index. Remember that humidity on the water may be higher than weather station reports. Refer to Protecting Workers from the Effects of Heat (Attachment 6).

4.16.4.1 Training

The SSHO is responsible for implementing the Thermal Stress Prevention Program, monitoring work area heat conditions and worker physiological parameters, and for ensuring that employees are trained to recognize the signs and symptoms of heat stress illnesses or injury and what to do if these occur.

4.16.4.2 Program Implementation Criteria

Work activities will be limited, reduced, or halted when humidity is greater than 80 percent and temperatures are greater than 90°F, or when temperatures are greater than 100°F, regardless of humidity. Above 85°F, a cooling shelter (location out of direct sunlight) shall be provided, and additional rest cycles and personnel monitoring must be considered. Final direction on work and work support will be provided by the SSHO. Refer to Protecting Workers from the Effects of Heat (Attachment 6).

4.16.4.3 Heat Stress Management

Work practices and exposure controls are used to reduce the risk of elevating an employee's core body temperature. These work practices and exposure controls include the following:

- Defining and adjusting employee work/rest intervals
- Monitoring for physiological signs of heat stress
- Providing cool liquids
- Establishing and implementing acclimatization schedules
- Using warm weather cooling garments

4.16.4.4 Employee Work/Rest Intervals

Work/rest intervals are based on PPE, employee work loads, environmental conditions (temperature, humidity, air movement), and the results of physiological monitoring. Work/rest intervals are determined by the SSHO and communicated to employees. Work/rest intervals are adjusted throughout the work shift as needed and communicated to each employee at the conclusion of an applicable rest period, prior to re-entry into the work zone.

4.16.4.5 Monitoring

Physiological monitoring is conducted to alert employees and their supervisors to potential heat stress illness. Initial monitoring is conducted and documented at the beginning of the work shift, prior to entry into the work zone, by the HHSOP, when required. Additional physiological monitoring is performed at the beginning and end of each rest cycle. Re-entry and re-adjustment of the work/rest cycle are determined based on the state and federal guidelines. Personal monitoring may include measuring the heart rate, recovery heart rate, oral or ear canal temperature, or percent water loss.

Physical signs and symptoms of heat stress are discussed with employees at the start of the project and reviewed, as necessary. Employees monitor each other's actions, speech, and appearance for signs and symptoms of heat-related illnesses. Symptoms of heat-related illnesses are described in the OSHA Fact Sheet, Protecting Workers from the Effects of Heat (Attachment 6) and the Heat Stress Quick Card (Attachment 7). Employees exhibiting signs or symptoms of heat exhaustion should be moved to shade or air conditioning, given cold water, and monitored by another employee. Heat stroke is a life-threatening emergency. If you suspect heat stroke, emergency services should be called immediately.

4.16.4.6 Liquid Replacement Program

Since dehydration is a primary cause of heat illness, employees should ensure regular hydration is performed ahead of and during workdays with elevated temperature conditions described in Section 13.15.4.2, Program Implementation Criteria. A liquid replacement regime is not based on thirst. Employees need enough liquid and electrolytes to maintain their normal body weight throughout the day. Some sports drinks may exacerbate problems for some employees with certain medical conditions. Carbonated beverages are not recommended as a primary beverage for replacing body fluid because many contain caffeine, and the gas makes them difficult to drink in large quantities.

4.16.4.7 Acclimatization Program

Acclimatization increases physical tolerance to warm climates by improving the circulatory system and balance of salt in the body. Employees that are newly hired, have not worked in a comparable environment during the previous week, or have been away from this Site (vacation or sickness) for the same period of time should ensure they are properly acclimated prior to excessive exertion. Employees need time to become acclimatized—usually about seven days. Acclimatization may start to decline in as little as four days. Alcohol or other drugs may affect the body's ability for acclimatization.

4.16.5 Cold Stress/Hypothermia

Drink plenty of fluids (not caffeine), wear clothing appropriate for the weather conditions, wear multiple layers. Avoid cotton clothing when possible. Monitor workers for signs of cold stress. Refer to the OHSA Cold Stress Quick Card (Attachment 8).

Freezing temperatures as defined as <35° F, as some areas freeze at higher air temperatures. Check local weather for wind chill conditions ("real-feel" conditions). Work will be performed below freezing temperatures only after evaluation of site conditions, worker gear and clothing, and upon approval by the field lead. If work

occurs in conditions of below-freezing temperatures, salt or ice melt should be used on likely slip surfaces or barge decks and extreme care must be taken to prevent slips, trips, and falls.

4.17 Hazardous Insects/Plants/Animals

Site hazards may include bees/wasps/hornets, snakes, spiders, and ticks. Avoid contact or seek medical attention, if necessary. Wear insect repellent, as appropriate and spray for wasps or hornets prior to tree and ground disturbing activities, as necessary.

4.18 Electrical Hazards

Electrical equipment should be inspected to ensure it is in safe working order before use. Equipment should be grounded and operated under dry conditions. Where portable electric tools and appliances can be used (where there is no potential for flammable or explosive conditions), they will be equipped only with three-wire grounded power and extension cords to prevent electrical shock. Use of a ground fault circuit interrupter (GFCI) is required to prevent electrical shock.

4.19 Unknown Chemical Exposure

Work will be stopped if visual or olfactory observations indicate unanticipated conditions and re-assess PPE before proceeding.

4.20 Hot Work

No hot work shall be performed onsite unless approved by DEQ.

4.21 Trenches/Vaults/Confined Spaces

OSHA defines a confined space as (1) being large enough for an employee to enter and perform work (2) has limited or restricted means for entry or exit; and (3) not designed for continuous occupancy. This describes many kinds of areas a worker may encounter on a daily basis, such as vaults or trenches.

It is against GSI policy for employees to enter confined spaces. No GSI personnel shall enter a confined space or trench for any reason without prior approval and completion of an OSHA-compliant confined space entry training.

SECTION 5: **Training Program**

All GSI employees are required to have the following training to be on site. Copies of training certificates and training records will be kept at GSI's Portland Office.

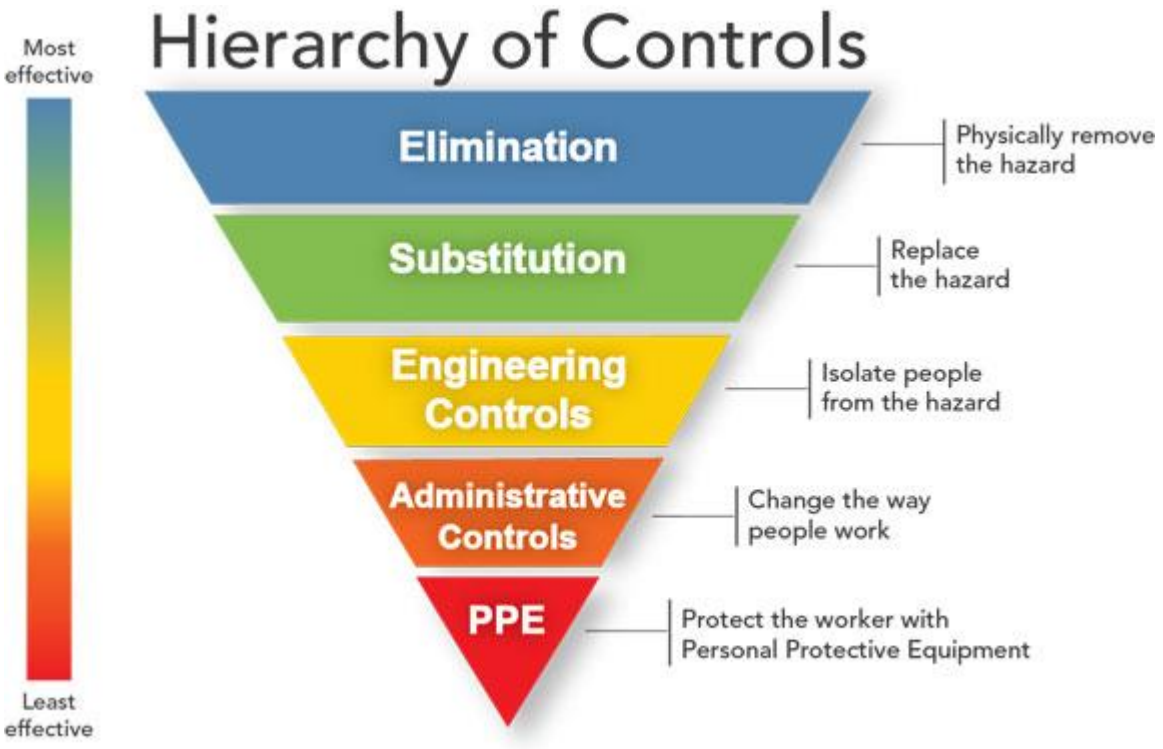
Table 6. Training Requirements

Type of Current Certificate	Yes	No	Trained GSI Employees
HAZWOPER 40-Hour	X		Required for all GSI field personnel working on HAZWOPER projects.
HAZWOPER Annual 8-Hour Refresher	X		Required for all GSI field personnel working on HAZWOPER projects (after having the 40-hour certification for one year).
HAZWOPER Supervisor Training	GSI Employee-Specific		Supervisors will have completed the above and an additional 8 hours of OSHA Management and Supervisory Training. The SSHO and FD will have this training.
First Aid/Cardiopulmonary Resuscitation (CPR)/Automated External Defibrillator (AED)	X		Required for all GSI field personnel. First aid/CPR/AED training is provided to allow employees to voluntarily administer first aid or medical assistance to family, friends, or coworkers as Good Samaritans. GSI employees are not required to administer first aid. GSI employees are required to immediately assess any emergency situation and seek professional assistance as appropriate.

SECTION 6: **Site Controls**

6.1 Hierarchy of Controls

Best practices for safe working environments include implementing a hierarchy of controls that, when used together, can provide redundant and/or complementary layers of protection for workers. Controls at the top of the hierarchy, such as elimination of the hazard, are potentially more effective and protective than controls at the bottom (see below).



In some cases, using controls closer to the top of the hierarchy may reduce the intensity of the controls at the bottom, thus reducing the possibility of corollary risks. For example, eliminating an exposure risk may reduce the requirement for a Tyvek[1] coverall—the use of which requires monitoring for thermal stress.

Because elimination or substitution of hazards may not be feasible at the Site, engineering controls (such as barriers and additional ventilation) may be needed to reduce exposure. Thermal control measures are an example of administrative control over how a task is done. PPE, while most common, is the least effective control in some cases and should be the LAST OPTION for minimizing exposure to hazards.

6.2 Management of Change

This HASP is intended to be site-specific and therefore responsive to actual site conditions, contract requirements, regulatory requirements, hazards, scope of work, and related conditions. For any number of reasons, it may be necessary to re-assess and revise plans. GSI detects changing, unrecognized, or new conditions through a number of key processes, including site monitoring, employee observations, and site inspections. Routine changes in conditions are addressed through hazard analysis and revised plans.

[1] Tyvek is a registered trademark of Dupont.

6.3 Work Zones

Work zones are defined below. In the case of limited space, the Contamination Reduction Zone (CRZ) and Exclusion Zone (EZ) may be combined. Work zones will be defined and labeled once work areas have been confirmed.

All project area visitors (except OSHA inspectors) must receive prior approval from the FD and DEQ, and may do so only for the purposes of observing project area conditions or operations. Residents may not enter the exclusion zones for any reason until contaminated soil is removed.

6.3.1 Support Zone (SZ)

The SZ will be located away from the contaminated area. Vehicles, emergency equipment, the telephone and break area, and any nonessential personnel will be located in this area. SZ areas for the Site include the Baxter main office and parking area next to the main office. If an evacuation of the facility is required, comply with the Baxter evaluation policy and ensure workers are upwind from the facility. Actual locations will be defined in the field by the client and SSHO.

6.3.2 Contamination Reduction Zone (CRZ)

Decontamination lines will be established for personnel and sampling equipment in the CRZ. Personnel and equipment will pass from the EZ through the CRZ to the SZ. Coolers in this zone will be protected from contamination and decontaminated before leaving the Site.

6.3.3 Exclusion Zone (EZ)

The EZ is defined around intrusive activities or located in the immediate hazard area. The EZ is often identified by cones, hazard tape, or other means to notify unauthorized individuals of the presence of potential hazards. Access should be restricted to field sampling crews and necessary equipment operators.

6.4 Traffic and Vehicle Control

On public roads, adhere to traffic regulations and speed limits. Within the boundaries of client facilities, comply with site requirements for motor vehicles. In general, do not take work vehicles beyond the Site entrance parking areas unless required and pre-approved by the Facility Operations Manager. Inspect parking areas for access, soft ground, and obstacles that may damage the vehicle. If possible, drive in and drive out of the location, rather than reversing. If you need to reverse, use a spotter to guide you. Use wheel chocks when parked on steep slopes.

6.5 Barriers and Signs

Barricades, traffic cones, and/or marking or caution tape will be erected at a safe distance from sampling and work area locations near roadways, excavations, pits, hazardous areas, driller working areas, tree clearing operations, and moving equipment to prevent unauthorized access to work areas from vehicular and pedestrian traffic. Barriers will be appropriate for the level of work activity and anticipated traffic. Signage or work boundary delineation will be installed, as necessary.

6.6 Potential Chemical Hazards and Controls

D/F have been identified in shallow soil in the area surrounding the former Baxter facility. The following table describes potential exposure routes and required controls to eliminate exposures.

Table 7. Potential Chemical Hazards

Chemicals Identified Offsite	Exposure Routes	Controls
D/F	Skin contact with contaminated materials and ingestion of materials from hand-to-mouth contact due to inadequate personal hygiene	All required PPE as specified in the following sections will be worn, and personal hygiene will be carefully monitored.
Decontamination Chemicals	**Exposure Route**	**Controls**
Liquinox	Skin contact with contaminated materials and ingestion of materials from hand-to-mouth contact due to inadequate personal hygiene	All required PPE as specified in the following sections will be worn, and personal hygiene will be carefully monitored

SECTION 7: **Medical Monitoring**

GSI employees anticipated to spend more than 29 days at Hazardous Waste Operations and Emergency Response (HAZWOPER) sites or required to wear a respirator are enrolled in GSI's Medical Monitoring Program. Use of air purifying respirators is not anticipated and, if required, field personnel must be enrolled in GSI's Medical Monitoring Program.

7.1 Periodic Comprehensive Exam

All personnel requiring access to controlled work areas will have completed a baseline medical examination and a periodic (usually annual) medical examination before assignment, in accordance with the OSHA 29 CFR 1910.120(f). The exam must be performed by an Occupational Health Physician, who will provide written clearance for hazardous waste site work and for respirator usage. Protocols for the baseline, periodic, and exit exams must be at least as stringent as those defined in the GSI's Medical Monitoring Program.

7.2 Medical Clearance Record Keeping

Medical clearance documents are on file at GSI's office located in Portland, Oregon. To ensure confidentiality, results of the medical exams or treatment records are maintained at the medical care provider's clinical offices.

7.3 Exposure Monitoring

No specific personnel exposure monitoring is required at this time. This HASP will be modified, as needed to discuss exposure monitoring.

SECTION 8: **Personal Protective Equipment**

8.1 Levels of Protection

Initial levels of protection for the Site may vary depending on the task. All personnel entering controlled work zones initially will be required to wear the U.S. Environmental Protection Agency (EPA)/OSHA Level of Protection as specified in this plan in Table 8.

Protection may be upgraded or downgraded depending on monitoring data (compared with action levels) and site conditions, as determined by the SSHO. Table 8 and the following sections outline the minimum guidelines for each level of protection that is assigned or potentially assigned.

Table 8. PPE to be Used

PPE[1]	Required for Sampling Work
Steel-toed boots (leather or neoprene safety, slip- and chemical-resistant, waterproof)	X
Gloves (leather, nitrile)	X (nitrile for sampling)
Eye/face protection (safety glasses, goggles, or face shield)	X (anytime in the vicinity of heavy equipment)
Hard hat	X (anytime in the vicinity of heavy equipment)
Splash protection (polyvinyl chloride bibs/aprons, or Tyvek coverall)	
Hearing protection	X (when decibel levels exceed 82 decibels)
High-visibility vest	X
Long sleeves required	

Note

[1]During sampling activities, field staff will wear nitrile gloves and any sampling-specific PPE appropriate for the expected contaminants that may be encountered or as needed for specialty sampling. When selecting PPE, field staff will consider potential exposure routes associated with the contaminant (e.g., inhalation, ingestion, skin contact).

8.2 Chemical Splashing

Care should be taken during sample collection activities to prevent liquids from splashing onto skin, clothing, and face. Sampling equipment should be handled carefully (e.g., placed, opened, moved) to prevent splashing. If splashing occurs, the area should be rinsed with clean water and dried, when possible. Safety glasses should be worn during sampling activities and during any activities with splash potential. Consider goggles or face shields and aprons where hazardous liquids are used, if applicable.

8.3 PPE Failure/Chemical Exposure

In the event of PPE failure, the worker and/or buddy will cease work, perform personal decontamination procedures (Section 9), and exit to the SZ/CRZ. Refer to the SDS (Attachment 9) and Section 1 if emergency medical response is needed. If chemicals contact the eyes, irrigate for 15 minutes and consult a physician.

8.4 PPE Inspection, Storage, and Maintenance

Reusable PPE will be decontaminated, inspected, and maintained, as necessary, after each use. Personal equipment (e.g., hard hat, steel-toed boots) will be properly stored by the employee/subcontractor. The SSHO will periodically inventory the disposable and reusable PPE at the Site and will replenish stocks in a timely manner.

SECTION 9: Decontamination and Disposal Procedures

Procedures for the decontamination of sampling tools and other related equipment as well as heavy equipment are specified in site-specific plans for activities. Table 9 below covers personnel decontamination. Note that separate areas should be established for personnel, sampling, and heavy equipment decontamination.

9.1 Personnel Decontamination Procedures

Field personnel will wash hands and face after removing PPE.

Table 9. Equipment and Procedures for Personnel Decontamination

Equipment	Decontamination Solution	Procedures	
		Intermediate	Final
▪ Long-handled, soft-bristled brushes ▪ Galvanized steel wash tubs or equivalent ▪ Pump-activated sprayer ▪ Garbage cans with plastic liners and drums with liners ▪ Plastic sheeting ▪ Paper towels ▪ Duct tape	▪ Alconox ▪ Tap water for rinsing	1. Dispose of or wash outer boots and gloves with Alconox solution. 2. Rinse outer boots and gloves. 3. Remove outer gloves. 4. Enter CRZ for sample management. 5. Return to EZ wearing new or cleaned outer gloves.	1. Segregate equipment drop (for instruments and equipment requiring special decontamination; see the SAP). 2. Dispose of or wash outer boots and gloves with Alconox solution. 3. Rinse outer boots and gloves. 4. Remove and dispose of outer boots. 5. Remove and dispose of outer gloves (if not cleaned to “like new” condition). 6. Remove and dispose of coverall. 7. Remove and dispose of inner gloves in designated receptacle. 8. Field wash for personal hygiene. 9. Exit to SZ.

Note
Intermediate decontamination is for periodic exits from the EZ during sample transport and management or for short breaks. Final decontamination is performed before eating, when taking cool down breaks, and when exiting the Site.

9.2 Equipment Decontamination

All equipment that will potentially contact contaminated soil will be decontaminated before and after sampling events according to procedures specified in the SAP or Removal Action Work Plan. Heavy equipment in direct contact with soil and/or groundwater, such as the drill rig augers, equipment tracks, and excavator buckets, will be decontaminated by the subcontractor.

9.3 Emergency Decontamination

In the event of an accident or incident where work must cease and staff must exit the EZ, emergency decontamination should be performed to the greatest extent feasible. In an emergency, the primary concern is to prevent the loss of life or severe injury. If immediate medical attention is required to save a life, decontamination should be delayed until the victim is stabilized. If the decontamination can be performed without interfering with essential life-saving techniques or first aid, or if a worker has been contaminated with an extremely toxic or corrosive material that could cause severe illness or loss of life, decontamination must be performed immediately. If an emergency resulting from a heat-related illness develops, protective equipment should be removed from the victim as carefully and as soon as possible.

Any time emergency decontamination methods must be used, an incident report (see Attachment 1) must be completed by the SSHO and submitted to GSI's Safety Committee.

9.4 Disposal Procedures

Soils and wastes generated from sampling events will be characterized in advance to determine appropriate disposal procedures. Waste PPE, including used nitrile gloves, will be contained in garbage bags and disposed with common waste as described in the Work Plan ([SAP] Section 5.7).

SECTION 10: **Spill and/or Discharge of Hazardous Materials**

10.1 Training

Responses to incidental releases or spills of hazardous substances that can be absorbed, neutralized, or otherwise controlled at the time of release by employees in the immediate release area are not considered to be emergency responses under 29 CFR 1910.120(l) and do not require additional specialized training.

10.2 Spill Control and Response

There is a potential for incidental spillage/leakage of hazardous materials, if present. Store these materials properly and maintain the appropriate spill response equipment in the area where the materials are used/stored. In case of incidental spills or leaks, follow these steps:

1. Notify the SSHO as soon as possible.
2. Select appropriate PPE and response equipment.
3. Contain the spill to the extent possible.
4. Neutralize or solidify the liquid per the SDS.
5. Transfer the material to an appropriate compatible container.
6. Document with an incident report (see Attachment 1).
7. The PM or FD will notify the client.

10.3 Discharge Control and Response

In the event of an uncontrollable discharge of hazardous material from an existing client structure (e.g., impoundment or tank), the FD will immediately contact the client to coordinate implementation of the client's Emergency Response Plan. GSI personnel shall not assist in emergency response activities, but will evacuate to the upland SZ or the emergency evaluation point (see Site Map).

10.4 Spill Response Reporting

Although spills in reportable quantities are not anticipated, field personnel will be instructed on the requirements and procedures for reporting to state emergency response agencies and the National Response Center (NRC) (contact information is in Table 1 on Page 1 of this HASP). Spills will be reported immediately after the safety of onsite personnel has been secured. Potentially reportable spills include any amount of oil/diesel/gas spilled in water, or more than 42 gallons of oil spilled on land. When reporting to the NRC, include the following information:

1. Your name and company
2. Your telephone number
3. Type of incident and the materials involved
4. Location/time of incident and background/how the incident occurred
5. On-scene contact and how to reach them
6. Severity of incident—threat to people, property, or the environment
7. Actions taken, such as containment and/or evacuation
8. Responsible party and telephone number

10.5 Evacuation Procedures

Expeditious evacuation routes to the SZ will be established daily for all work area locations. Evacuation notification will be **one long blast on a canned siren, vehicle horn, or direct verbal communication**. Emergency drills should be performed periodically. Any additions to evacuation procedures require an update to this HASP.

In the unlikely event that an evacuation is necessary, all personnel will immediately proceed to the uplands SZ or the emergency evaluation point for over-water work, decontaminating to the extent possible for personal safety, based on the emergency. The SSHO or FD then should begin the Project Area security and control measures.

SECTION 11: **Communications**

11.1 Kick-Off Meeting

A Project Kick-off Meeting will be conducted prior to the start of any project work.

11.2 Daily Tailgate Safety Meetings

Tailgate safety meetings will be conducted by the SSHO (or FD if SSHO not present) each morning before work begins or before the following:

- A change of work tasks or conditions
- When new employees join the crew
- If site conditions change unexpectedly or when a specific task or location poses a safety hazard
- To review proper use of PPE

Topics of discussion will include work tasks and designated PPE, emergency procedures, evacuation routes, instruction in the use of safety equipment (as required), prior safety problems, and similar topics. These meetings must be documented in the field notebook or the Tailgate Safety Meeting Checklist.

11.3 Buddy System

The "buddy system" will be used during field activities involving potential exposure to hazardous or toxic materials, for near-water work, and during any work within the EZ. Each person will observe his/her buddy for symptoms of chemical exposure, cold stress/hypothermia, or heat stress, and will assess any emergency situation and seek professional assistance as appropriate. A cell phone will be maintained at the Site for emergency use.

11.4 Emergency Communications

Table 10 presents emergency hand and horn signals that will be used, as necessary, where verbal communication is limited.

Table 10. Emergency Signals

Hand and Horn Signal	Meaning
Thumbs up	OK; understand
Thumbs down	No; negative
Grasping buddy's wrist	Leave Site now
Hands on top of head	Need assistance
Horn - one long blast	Evacuate Site
Horn - two short blasts	All clear; return to Site

SECTION 12: **Safety Planning and Observation**

12.1 Activity Hazard Identification and Analysis

The activity hazard analysis (AHA) focuses on the relationship between the worker, the task, the tools, and the work environment. Once those relationships have been identified, project controls are implemented to eliminate or reduce job hazards to an acceptable risk level.

The AHA begins with an assessment of the environment in which the work will be performed and the tasks to be conducted. Tasks are reviewed or observed to identify hazards. Hazard identification is the product of a root cause analysis combined with a risk analysis. GSI's AHA examines the problems that could occur and assesses the likelihood that the problem will occur. The AHAs for the planned upcoming efforts will be attached to this HASP.

12.2 Behavior-Based Safety

The purpose of GSI's behavior-based safety observation procedure is to build our safety culture by exercising a process of making observations, reinforcing exemplary behaviors, and correcting unsafe conditions and at-risk behaviors based on root-cause analysis.

12.3 Near-Miss Reporting

All "near-miss" incidents (incidents with high likelihood of resulting in injury, illness, significant spill, or property damage), even in the absence of a resultant incident, should be reported to GSI management using the form in Attachment 2. This provides safety tracking metrics to improve site safety in the future.

SECTION 13: **Accident Reporting and Record Keeping**

13.1 In Case of Emergency Injury or Illness

IN CASE OF EMERGENCY: CALL 911 AS SOON AS POSSIBLE

13.2 In Case of Non-Emergency Injury or Illness

At the onset of a non-emergency employee work-related injury or illness, GSI employees should first notify the supervisor on duty, then notify WorkCare at (888) 449-7787. WorkCare will advise the employee on the appropriate care necessary for the particular injury/health incident. If necessary, WorkCare will determine the need for evaluation and care at the time of need with input from you. If needed, WorkCare will refer the patient to a designated occupational health clinic for evaluation and care.

GSI management will be contacted by WorkCare following the initial report. The employee is required to report (to the SSHO) all work-related and all non-work-related injuries that may affect his/her ability to safely perform their job.

After the initial reporting, the SSHO or other designated GSI employee will immediately contact the PM, FD, SSHO, or GSI Safety Committee to conduct an investigation jointly with the FD. The SSHO or PM will complete the incident report (Attachment 1). These completed reports must be transmitted to the Safety Committee within 24 hours of an occurrence; a PDF file is acceptable. The Safety Committee will submit the appropriate reports to GSI's Human Resources Manager (for Workers' Compensation), and OSHA (as applicable).

13.3 Subcontractor Accident Reporting

The foreman or field supervisor of subcontracting crews will investigate and complete an injury/illness report (similar in content to the GSI report) in accordance with their internal company policy. This report must be transmitted to GSI within 24 hours.

In case of environmental incidents, property damage, power disruption, or mandated work shutdowns, an incident report (Attachment 1) will be prepared by the SSHO or FD. Any damage, loss, or theft of GSI property (items/tools/equipment) will be reported to the PM or FD.

SECTION 14: **GSI Safety Committee Members and Contact Information**

Table 11. GSI Safety Committee Members

Person	Role	Contact Information
Kathy Roush	Chairperson (Employee Representative) and Management Representative	Work: 971.200.8527 Cell: 919.605.6644
Josh Bale	Project Manager and Employee Representative	Work: 971.200.8535 Cell: 773.817.4229
Molly Monroe	Recorder	Work: 541.257.9002 Cell: 541.230.0578
Paige Blagg	Employee Representative	Work: 971.200.8507 Cell: 805.234.8832
Katie Lippard	Employee Representative	Cell: 919.632.5872
Katie Mauritz	Employee Representative	Work: 503.239.8799 Cell: 971.645.2514
Matt Thomas	Employee Representative	Work: 971.200.8537 Cell: 423.987.4716

SECTION 15: **Signatures**

I have read, understand and agree to abide by the requirements presented in this health and safety plan (HASP). I understand that I have the absolute right to stop work if I recognize an unsafe condition affecting my work until corrected.

Name Printed	Signature	Date

ATTACHMENT 1

Employee Incident Report Form

ATTACHMENT 2

Near-Miss Report Form

ATTACHMENT 3

Information on Slips, Trips, and Falls

ATTACHMENT 4

OSHA Bulletin: Preventing Hearing Loss Caused by Chemical (Ototoxicity) and Noise Exposure

ATTACHMENT 5

OSHA Fact Sheet: Lightning Safety When Working Outdoors

ATTACHMENT 6

OSHA Fact Sheet: Protecting Workers from the Effects of Heat

ATTACHMENT 7

OSHA Quick Card: Protecting Workers from Heat Stress

ATTACHMENT 8

OSHA Quick Card: Protecting Workers from Cold Stress

ATTACHMENT 9

Safety Data Sheets

ATTACHMENT 10

Baxter Activity Hazard Analyses

ATTACHMENT 11

Modifications to HASP

ATTACHMENTS

ATTACHMENT 1

Incident Report Form

Incident Report

Use this form to document information about an accident or incident. Fill out an investigation report as soon as possible. Note: this form is for use within your company. It is not intended to replace DCBS Form 801: *Worker's and Employer's Report of Occupational Injury or Disease*.

Employee(s) name(s): .....

Time & date of accident/incident: .....

Job title(s) and department(s): .....

Supervisor or lead person: .....

Witnesses: .....

Brief description of the accident or incident: .....

.....

Body part affected: .....

Did the injured employee(s) contact WorkCare? ( ) Yes ( ) No

Did WorkCare recommend the employee seek medical attention? ( ) Yes ( ) No

Did the injured employee(s) see a doctor? ( ) Yes ( ) No

If yes, did you file an employer's portion of a worker's compensation form? ( ) Yes ( ) No

Did the injured employee(s) go home during their work shift? ( ) Yes ( ) No

If yes, list the date and time injured employee(s) left job(s): .....

Supervisor's Comments: .....

.....

What could have been done to prevent this accident/incident? .....

.....

Have the unsafe conditions been corrected? ( ) Yes ( ) No

If yes, what has been done? .....

If no, what needs to be done? .....

Employer or Supervisor's signature:

Date:

Additional comments/notes: .....

.....

ATTACHMENT 2

Near-Miss Report Form

GSI Water Solutions, Inc.
NEAR-MISS REPORT

1. Name of Employee Involved	**2. Date of Near-Miss**	**3. Time of Near-Miss**

4. Location/Site of Near-Miss Event

5. Other witnesses present at time of near-miss

6. Length of time employed by GSI	**7. Employment Category**
☐ < 6 months ☐ 6 months – 1 year ☐ 1 – 2 years ☐ 2 – 5 years ☐ Greater than 5 years	☐ Regular, Full-Time ☐ Regular, Part-Time ☐ Temporary/Seasonal Employee ☐ Non-Employee
8. Familiarity with Activities related to Near-Miss	**9. Phase of Work Day when Near-Miss Occurred**
☐ First Time performing ☐ Observed but never performed ☐ Limited to some familiarity ☐ Regularly perform	☐ Performing Duties during Standard Hours ☐ During meal/rest period ☐ Prior to Starting or At End of Work Day ☐ Working Overtime/Long hours

10. Describe the near-miss:

Description of Event: What was employee doing just before and at the time of the near-miss?

11. What happened or what work conditions contributed to the near miss (e.g., Object/Equipment/Substance)

12. Outcome of near-miss:

13. Task and Activity at Time of Near-Miss:

General type of task:_____

Specific activity:_____

Employee was working:

☐ Alone ☐ With crew or fellow worker ☐ Other: _____

14. Was proper Ergonomic support utilized? Explain

15. Supervision at time of accident

☐ Unsupervised ☐ Supervised

☐ Limited Supervision

16. Factors that contributed to near-miss – Please check all that apply

Hazard

- ☐ Not recognized/identified
- ☐ Identified, but not addressed
- ☐ Inadequately addressed

Work Procedures

- ☐ None developed
- ☐ Not followed
- ☐ Partially followed
- ☐ Not understood
- ☐ Not appropriate
- ☐ Not communicated
- ☐ Other

Training & Certification

- ☐ Insufficient training
- ☐ Circumstances not covered
- ☐ Ineffective training
- ☐ Worker not authorized
- ☐ Outdated Training

Communication

- ☐ Breakdown in verbal communication
- ☐ Breakdown in written communication
- ☐ Confusion after communication
- ☐ Other_____

Other

- ☐ Weather/temperature
- ☐ Extended work hours
- ☐ Worker fatigue
- ☐ Physical overexertion
- ☐ Work in elevated area
- ☐ Chemical Use
- ☐ Biological agent
- ☐ Radiation
- ☐ Electricity
- ☐ Mechanical
- ☐ Animals

Facilities/Equipment

- ☐ Personal protective equipment
- ☐ Faulty equipment
- ☐ Poor/inadequate maintenance
- ☐ Inappropriate use
- ☐ Missing guards
- ☐ Obsolete/antiquated
- ☐ Inadequate design
- ☐ Ergonomic factors
- ☐ Equipment failure
- ☐ Trip hazard
- ☐ Slip hazard
- ☐ Struck by
- ☐ Other_____

Additional Comments:

ATTACHMENT 3

Information on Slips, Trips, and Falls

To protect workers from falls, OSHA issued a final rule on Walking-Working Surfaces and Personal Fall Protection Systems on November 17, 2016. According to OSHA "fall hazards from heights and on working surfaces are one of the leading causes of serious workplace injuries and deaths, and the new rule more closely aligns general industry requirements with those in construction."

The rule updates and clarifies the walking-working surface standards, and adds clear training and inspection requirements.

In addition, all employees need to be aware of how to prevent slips, trips, and falls by following good housekeeping procedures and safe practices when they work on or around scaffolds, ladders, unprotected ledges or platforms, rooftops, open shafts, trapdoors, poles, towers, bridges, trestles, pits, or open tanks.

Below is information from OSHA, and although it doesn't pertain to GSI's line of work, you may find yourself in a situation in which knowing about this rule might be helpful.

Please read this the OSHA information and the summary from J.J. Keller so you are aware of the Walking-Working Standards and Slips-Trips-Falls.

The final rule will allow employers to select a fall protection system that works best for them from a range of accepted options that OSHA has permitted in construction since 1994, including:

- *Guardrail Systems*
- *Safety Net Systems*
- *Personal Fall Arrest Systems*
- *Positioning Systems*
- *Travel Restraint Systems*
- *Ladder Safety Systems*

One of the most significant changes will be to fixed and portable ladders and the safety requirements surrounding them. Cages and wells will no longer be acceptable forms of fall protection on fixed ladders higher than 24 feet, although employers will have a generous timeframe – up to 20 years in some cases – to phase in ladder safety systems or personal fall arrest systems (PFAS).

Alignment with Construction Standards

Because many employers perform activities that fall under both general industry and construction standards, the new final rule eases compliance by bringing many of the general industry standards in line with current construction standards.

More specifically, construction standards (29 CFR part 1926) are referred to in the following parts of the new Walking-Working Surfaces standard (29 CFR part 1910, subpart D):

- ***27(a) Scaffolds –*** *Scaffolds used in general industry must meet the requirements in construction 29 CFR part 1926, subpart L (Scaffolds).*

- ***28(b)(1)(ii) Unprotected sides and edges*** *– When the employer can demonstrate that it is not feasible or creates a greater hazard to use guardrail, safety net, or personal fall protection systems on residential roofs, the employer must develop and implement a fall protection plan that meets the requirements of construction 29 CFR 1926.502(k) and training that meets the requirements of 29 CFR 1926.503(a) and (c).*
- ***28(b)(12) Scaffolds and rope descent systems –*** *The employer must ensure: (i) Each employee on a scaffold is protected from falling in accordance 29 CFR part 1926, subpart L; and (ii) Each employee using a rope descent system 4 feet (1.2 m) or more above a lower level is protected from falling by a personal fall arrest system.*
- ***29(b) Guardrail systems Note to paragraph (b) of this section:*** *The criteria and practices requirement for guardrail systems on scaffolds are contained in 29 CFR part 1926, subpart L.*
- ***29(c) Safety net systems –*** *The employer must ensure each safety net system meets the requirements in 29 CFR part 1926, subpart M.*

Slips, Trips, and Falls and Walking Working Surface
An Overview provided by J.J. Keller

Overview

Slips, trips, and falls account for many industry accidents, and are responsible for 10 percent of all accidental deaths. They are also the fourth leading cause of fatalities (following motor vehicles, homicides, and being struck by objects or equipment).

Slips

Slips can be caused by wet surfaces, spills, or weather hazards such as ice or snow. Slips are more likely to occur when you hurry or run, wear the wrong kind of shoes, or don't pay attention to where you're walking.

You can help avoid slips by following these safety precautions:

- Practice safe walking skills. Take short steps on slippery surfaces to keep your center of balance under you, and point your feet slightly outward.
- Clean up or report spills right away. Even minor spills can be dangerous.
- Don't let grease accumulate at your work place.
- Be extra cautious on smooth surfaces such as newly waxed floors. Also be careful walking on loose carpeting.

Trips

Trips occur whenever your foot hits an object and you are moving with enough momentum to be thrown off balance. You can help avoid trips when you:

Make sure you can see where you are walking. Don't carry loads that you cannot see over.

Keep walking and working areas well lit, especially at night.

Keep the workplace clean and tidy. Store materials and supplies in the appropriate storage areas.

Properly maintain walking areas, and alert appropriate authorities regarding potential maintenance-related hazards.

Arrange furniture and office equipment so that it doesn't interfere with walkways or pedestrian traffic in your area.

Falls

To avoid falls consider the following measures:

- Don't jump off landings or loading docks. Use the stairs.
- Repair or replace stairs or handrails that are loose or broken.
- Keep passageways and aisles clear of clutter and well lit.
- Wear shoes with appropriate non-slip soles.

Hazards involved with using walking-working surfaces

The main hazards involved with walking and working surfaces include slips, trips, and falls. Stairways are taken for granted, and so become a source for accidents in the workplace.

What must my employer do?

Your employer is responsible for providing a safe working environment. That includes reducing or eliminating hazards in walking and working areas by doing the following:

Keep all employment, passageway, storerooms, and service rooms clean, orderly, and sanitary.

Maintain floors in clean, dry condition. If wet processes are used, drainage will be maintained. Gratings, mats, or raised platforms must be provided.

Keep floors, working places, and passageways free from protruding nails, splinters, or loose boards.

Keep aisles and passageways clear and in good repair with no obstructions that could create hazards.

Appropriately mark permanent aisles and passageways.

Maintain proper aisle width so passage or egress is not limited.

Provide covers and/or guardrails to protect employees from open pits, vats, tanks, ditches, and other hazards.

Follow load rating limits for all floors or roofs.

Maintain adequate lighting in areas to illuminate walking surfaces.

Provide handrails as required.

For GSI Field Work *(added in June 2019):*

Slips/Trips/Falls

Maintain good housekeeping standards and avoid leaving items on the ground where they could present a trip hazard. Set up adequate staging areas for all equipment needed. Inspect work area and level ground surface where possible.

Unstable/Uneven Terrain/Steep Grades/Elevated Surfaces

If there is a potential for falls because of unstable, steep surface, the buddy system and additional safety precautions should be developed and discussed with the GSI Health and Safety Coordinator. Before field work, perform reconnaissance and develop a plan for safe ingress and egress. Wear sturdy work boots.

ATTACHMENT 4

OSHA Bulletin: Preventing Hearing Loss Caused by Chemical (Ototoxicity) and Noise Exposure

Preventing Hearing Loss Caused by Chemical (Ototoxicity) and Noise Exposure

Safety and Health Information Bulletin

SHIB 03-08-2018
DHHS (NIOSH) Publication No. 2018-124

Introduction

Millions of workers are exposed to noise in the workplace every day and when uncontrolled, noise exposure may cause permanent hearing loss. Research demonstrates exposure to certain chemicals, called ototoxicants, may cause hearing loss or balance problems, regardless of noise exposure. Substances including certain pesticides, solvents, and pharmaceuticals that contain ototoxicants can negatively affect how the ear functions, causing hearing loss, and/or affect balance.

Source/Copyright: OSHA

The risk of hearing loss is increased when workers are exposed to these chemicals while working around elevated noise levels. This combination often results in hearing loss that can be temporary or permanent, depending on the level of noise, the dose of the chemical, and the duration of the exposure. This hearing impairment affects many occupations and industries, from machinists to firefighters.

Effects on Hearing

Harmful exposure to ototoxicants may occur through inhalation, ingestion, or skin absorption. Health effects caused by ototoxic chemicals vary based on exposure frequency, intensity, duration, workplace exposure to other hazards, and individual factors such as age. Effects may be temporary or permanent, can affect hearing sensitivity and result in a standard threshold shift. Since chemicals can affect central portions of the auditory system (e.g., nerves or nuclei in the central nervous system, the pathways to the brain or in the brain itself), not only do sounds need to be louder to be detected, but also they lose clarity. Specifically, speech discrimination dysfunction, the ability to hear voices separately from background noise, may occur and involve:

- Compressed loudness: sound distortion.
- Frequency resolution: the inability to differentiate two sounds with similar frequency.
- Temporal resolution: the inability to detect time gaps between sounds.
- Spatial resolution: the inability to localize sound.

Speech discrimination dysfunction can also make working in noisy environments difficult and increase the risk of workplace injuries due to an inability to hear co-workers, environmental sounds and warning signals.

There is growing concern among occupational health and safety professionals that ototoxicant-induced hearing loss may go unrecognized since the measure for hearing loss does not indicate the cause. For example, audiometric tests are powerful tools that show hearing impairments (i.e., threshold shifts); however, they do not differentiate between noise and ototoxic causes.

Combined exposure: health effects below the noise PEL

OSHA standards require employers to maintain exposure to the specific substance at or below the PEL. However, synergistic effects from the combined ototoxicant and noise exposure could result in hearing loss when exposures are below the PEL.

Hearing loss can be even greater with exposure to both ototoxic chemicals and noise than exposure to either noise or the ototoxic chemical alone.[1] Many ototoxic substances have a greater-than-additive (e.g., synergistic) effect on hearing loss with noise exposure and in particular with impulse noise.[2] Several studies have suggested that some ototoxic chemicals, such as certain solvents, might exacerbate noise-induced hearing loss even though the noise level is below OSHA's Permissible Exposure Limit (PEL).[3]

What are ototoxic chemicals and substances that contain ototoxicants?

Ototoxic chemicals are classified as neurotoxicants, cochleotoxicants, or vestibulotoxicants based on the part of the ear they damage, and they can reach the inner ear through the blood stream and cause injury to inner parts of the ear and connected neural pathways.[4] Neurotoxicants are ototoxic when they damage the nerve fibers that interfere with hearing and balance. Cochleotoxicants mainly affect the cochlear hair cells, which are the sensory receptors, and can impair the ability to hear. Vestibulotoxicants affect the hair cells on the spatial orientation and balance organs.[5] The research on ototoxicants and their interactions with noise is limited. The dose-response, lowest observed effect level (LOEL) and no observed effect level (NOEL) have been identified in animal experiments for only a few substances.[6]

The following table includes examples of ototoxic chemicals grouped by substance class.[7]

Substance Class	Chemicals
Pharmaceuticals ***Ototoxicity at therapeutic doses is limited***	Aminoglycosidic antibiotics (e.g. streptomycin, gentamycin) and some other antibiotics (e.g. tetracyclines), Loop diuretics* (e.g. furosemide, ethacrynic acid) Certain analgesics* and antipyretics* (salicylates, quinine, chloroquine) Certain antineoplastic agents (e.g. cisplatin, carboplatin, bleomycin).
Solvents	Carbon disulfide, n-hexane, toluene, p-xylene, ethylbenzene, n-propylbenzene, styrene and methylstyrene, trichloroethylene.
Asphyxiants	Carbon monoxide, hydrogen cyanide and its salts, tobacco smoke
Nitriles	3-Butenenitrile, cis-2-pentenenitrile, acrylonitrile, cis-crotononitrile, 3,3'-iminodipropionitrile.
Metals and Compounds	Mercury compounds, germanium dioxide, organic tin compounds, lead.

Table: Selected Ototoxicants

The table does not identify all known toxicants and, in addition, there is limited evidence that supports the ototoxicity of other chemicals including cadmium, arsenic, bromates, halogenated hydrocarbons, insecticides, alkylic compounds, and manganese.

The exposure threshold for ototoxicity varies for each chemical based on its compound family, properties, exposure route, exposure concentration and duration, synergy with noise, and noise exposure, along with an individual's risk factors.

Which industries are more likely to have ototoxicants?

Industries that use potential ototoxicants include manufacturing, mining, utilities, construction, and agriculture. Manufacturing industry subsectors may include:

- Fabricated metal
- Machinery
- Leather and Allied Product
- Textile and Apparel
- Petroleum
- Paper
- Chemical (including Paint)
- Furniture and Related Product
- Transportation Equipment (e.g. Ship and Boat Building)
- Electrical Equipment, Appliance and Component (e.g., Batteries)
- Solar Cell

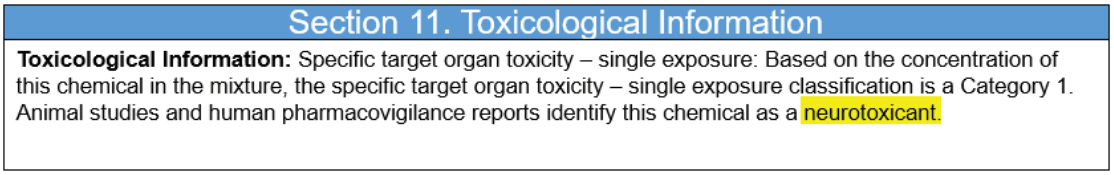
Occupational activities that often have high noise exposure and could add synergistic effects when combined with ototoxicant exposure (i.e., occurring in the above industries) may include:

- Printing
- Painting
- Construction
- Manufacturing occupations in the subsectors listed above
- Firefighting
- Weapons firing
- Pesticide spraying

When specific ototoxicity information is not available, information on the chemical's general toxicity, nephrotoxicity, and neurotoxicity may provide clues about the potential ototoxicity. Most chemicals that are known to affect the auditory system are also neurotoxic and/or nephrotoxic. Information on whether a chemical produces reactive free radicals could also give some clues about the agent's potential ototoxicity.

Prevention

The first step in preventing exposure to ototoxicants is to know if they are in the workplace. One way to identify ototoxicants in the workplace is by reviewing Safety Data Sheets (SDS) for ototoxic substances and/or chemicals, and ototoxic health hazards associated with ingredients in the product. For example, Figure 1 shows an SDS where ototoxicants may be in a product.


Section 11. Toxicological Information

Toxicological Information: Specific target organ toxicity – single exposure: Based on the concentration of this chemical in the mixture, the specific target organ toxicity – single exposure classification is a Category 1. Animal studies and human pharmacovigilance reports identify this chemical as a neurotoxicant.

Figure 1: Check the SDS.

Source/Copyright: OSHA

Employers must provide health and safety information as well as training to workers exposed to hazardous materials, including ototoxic chemicals (see OSHA's hazard communication standard at 29 CFR 1910.1200). The training must be in a language and vocabulary that the worker understands. Additionally, complaints from workers about hearing loss should include investigating SDSs for ototoxicants.

Controlling Exposure

Replacing a hazardous chemical with a less toxic chemical is an effective way to reduce exposure when ototoxicants are identified in the workplace.

If eliminating ototoxicants from the workplace is not possible, using engineering controls, such as isolation and enclosures to control exposure to ototoxicants and noise, may reduce risk for adverse health effects. Ventilation is also a recommended control method for ototoxicants.

Some administrative controls to consider include eliminating unnecessary tasks that cause noise or ototoxicant exposure, or operating noisy equipment when workers are not near.

Personal Protective Equipment (PPE)

Employers must assess and determine the appropriate PPE according to the general requirements in 29 CFR 1910.132, the respiratory protection requirements in 29 CFR 1910.134, and the hand protection requirements in 29 CFR 1910.138.

Since many ototoxic substances can be absorbed through the skin, chemical-protective gloves, arm sleeves, aprons and other appropriate clothing can assist in reducing dermal exposure.

OSHA's occupational noise exposure standard at 29 CFR 1910.95 only requires audiometric testing at the noise action level (i.e., an 85-decibel 8-hour time-weighted average). However, wearing hearing protection and using audiometric testing to detect early signs of hearing loss, even in workers exposed below the action level and ototoxic chemicals below the PEL, may prevent hearing loss from their synergistic effects.

Information on Hearing Loss Prevention programs and their effectiveness is available online from the National Institute for Occupational Safety and Health (NIOSH) at www.cdc.gov/niosh/topics/noise/preventhearingloss/hearlosspreventprograms.html.

Additional Information

OSHA can provide compliance assistance through a variety of programs, including technical assistance about effective safety and health programs, workplace consultations, and training and education. OSHA's On-Site Consultation Program offers free, confidential occupational safety and health services to small and medium-sized businesses in all states and several territories across the country, with priority given to high-hazard worksites. On-Site consultation services are separate from enforcement and do not result in penalties or citations. To locate the OSHA On-Site Consultation Program nearest you, visit www.osha.gov/consultation.

Workers' Rights

Workers have the right to:

- Working conditions that do not pose a risk of serious harm.
- Receive information and training (in a language and vocabulary the worker understands) about workplace hazards, methods to prevent them, and the OSHA standards that apply to their workplace.

- Review records of work-related injuries and illnesses.
- File a complaint asking OSHA to inspect their workplace if they believe there is a serious hazard or that their employer is not following OSHA's rules. OSHA will keep all identities confidential.
- Exercise their rights under the law without retaliation, including reporting an injury or raising health and safety concerns with their employer or OSHA. If a worker has been retaliated against for using their rights, they must file a complaint with OSHA as soon as possible, but no later than 30 days.

For additional information, see OSHA's Workers page.

Contact OSHA

Under the Act, employers are responsible for providing safe and healthful workplaces for their employees. OSHA's role is to ensure these conditions for America's working men and women by setting and enforcing standards, and providing training, education and assistance. For more information, visit www.osha.gov or call OSHA at 1-800-321- OSHA (6742), TTY 1-877-889-5627.

Contact NIOSH

To receive documents or more information about occupational safety and health topics, please contact NIOSH at 1-800-CDC-INFO (1-800-232-4636), TTY 1-888-232-6348, email: cdcinfo@cdc.gov or visit the NIOSH website at: www.cdc.gov/niosh.

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[1] European Agency for Safety and Health at Work. Combined Exposure to Noise and Ototoxic Substances. 2009. p 27.

[2] Campo P., Venet T., Thomas A., Cour C., Brochard C., Cosnier F. Neuropharmacological and cochleotoxic effects of styrene. Consequences on noise exposures. Neurotoxicol Teratol. 2014 Jul-Aug; 44:113-20.

[3] Occupational Safety and Health Administration. OSHA Technical Manual. Appendix D-3.

[4] European Agency for Safety and Health at Work. Combined Exposure to Noise and Ototoxic Substances. 2009. p 9.

[5] Johnson, A.C. and T.C. Morata. Occupational exposure to chemicals and hearing impairment, in Arbete och Hälsa, The Nordic Expert Group, Editor. 2010: Gothenburg. p. 1. Available at http://hdl.handle.net/2077/23240

[6] European Agency for Safety and Health at Work. Combined Exposure to Noise and Ototoxic Substances. 2009. p 17.

[7] Morata T.C., Dunn D.E., Sieber W.K. Occupational exposure to noise and ototoxic organic solvents. Archives of Environmental Health, 1994; 49(5):359-365.

ATTACHMENT 5

OSHA Fact Sheet: Lightning Safety When Working Outdoors

FactSheet

Lightning Safety When Working Outdoors

Lightning strikes can severely injure or kill workers whose jobs involve working outdoors. Lightning is often overlooked as an occupational hazard, but employers need awareness about lightning hazards to ensure their workers' safety. This fact sheet provides employers and workers at outdoor worksites with lightning safety recommendations from the Occupational Safety and Health Administration (OSHA) and the National Oceanic and Atmospheric Administration (NOAA).

Introduction

Lightning is a dangerous natural force. Annually in the United States, cloud-to-ground lightning occurs 20 to 25 million times and over 300 people are struck by lightning. During the past 30 years, about 50 people, on average, have been killed by lightning strikes every year, and many more suffer permanent disabilities.

Precautions should be taken to prevent worker exposure to lightning. Employers should recognize lightning as an occupational hazard. Supervisors and workers at outdoor worksites should take lightning safety seriously.

Workers whose jobs involve working outdoors in open spaces, on or near tall objects, or near explosives or conductive materials (e.g., metal) have significant exposure to lightning risks. Worker activities at higher risk for lightning hazards include:

- Logging
- Explosives handling or storage
- Heavy equipment operation
- Roofing
- Construction (e.g., scaffolding)
- Building maintenance
- Power utility field repair
- Steel erection/telecommunications
- Farming and field labor
- Plumbing and pipe fitting
- Lawn services/landscaping
- Airport ground personnel operations
- Pool and beach lifeguarding

Photo: NOAA

Figure 1: Lightning strikes tall tree.

Reducing Lightning Hazards When Working Outdoors

Employers, supervisors, and workers should understand lightning risks, characteristics, and precautions to minimize workplace hazards. Lightning is unpredictable and can strike outside the heaviest rainfall areas or even up to 10 miles from any rainfall.

Many lightning victims are caught outside during a storm because they did not act promptly to get to a safe place, **or they go back outside too soon after a storm has passed**. If signs of approaching thunderstorms occur, workers should not begin any task they cannot quickly stop. Proper planning and safe practices can easily increase lightning safety when working outdoors.

When thunder roars, go indoors!

If you hear thunder, even a distant rumble, get to a safe place immediately.

Thunderstorms always include lightning. Any thunder you hear is caused by lightning!

NOAA advises that nowhere outside is safe when thunderstorms are in your area.

OSHA and NOAA recommend that employers and supervisors follow these lightning safety best practices for workers whose jobs involve working outdoors:

Check NOAA Weather Reports: Prior to beginning any outdoor work, employers and supervisors should check NOAA weather reports (weather.gov) and radio forecasts for all weather hazards. OSHA recommends that employers consider rescheduling jobs to avoid workers being caught outside in hazardous weather conditions. When working outdoors, supervisors and workers should continuously monitor weather conditions. Watch for darkening clouds and increasing wind speeds, which can indicate developing thunderstorms. Pay close attention to local television, radio, and Internet weather reports, forecasts, and emergency notifications regarding thunderstorm activity and severe weather.

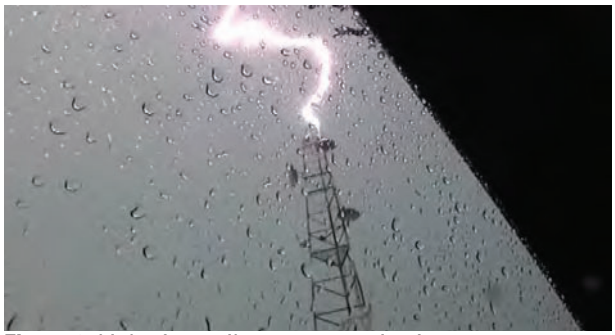

Photo: NOAA

Figure 2: Lightning strikes a communications tower.

Seek Shelter in Buildings: Employers and supervisors should know and tell workers which buildings to go to after hearing thunder or seeing lightning. NOAA recommends seeking out fully enclosed buildings with electrical wiring and plumbing. Remain in the shelter for at least **30 minutes** after hearing the last sound of thunder.

Vehicles as Shelter: If safe building structures are not accessible, employers should guide workers to hard-topped metal vehicles with rolled up windows. Remain in the vehicle for at least **30 minutes** after hearing the last sound of thunder.

Phone Safety: After hearing thunder, do not use corded phones, except in an emergency. Cell phones and cordless phones may be used safely.

Emergency Action Plan

Employers should have a written Emergency Action Plan (EAP), as outlined in 29 CFR 1910.38 or 29 CFR 1926.35. The EAP should include a written lightning safety protocol for outdoor workers. This lightning safety protocol should:

- Inform supervisors and workers to take action after hearing thunder, seeing lightning, or perceiving any other warning signs of approaching thunderstorms.
- Indicate how workers are notified about lightning safety warnings.
- Identify locations and requirements for safe shelters.
- Indicate response times necessary for all workers to reach safe shelters.
- Specify approaches for determining when to suspend outdoor work activities, and when to resume outdoor work activities.
- Account for the time required to evacuate customers and members of the public, and the time needed for workers to reach safety.

Employers should also post information about lightning safety at outdoor worksites. All employees should be trained on how to follow the EAP, including the lightning safety procedures.

Photo: NOAA

Figure 3: Cranes are especially vulnerable to lightning.

What is lightning?

Lightning is a giant spark of electricity in the atmosphere between clouds or between a cloud and the ground.

Lightning can occur:

- Between the cloud and the ground (cloud-to-ground lightning)
- Within and between thunderstorm clouds (intra- and inter-cloud lightning)

For more information, see: www.nssl.noaa.gov/education/svrwx101/lightning/faq

Lightning Safety Training

Employers should adequately train all workers on lightning safety. Training should be provided for each outdoor worksite, so that supervisors and workers know in advance where a worksite's safe shelters are and the time it takes to reach them. Employers should train supervisors and workers to provide lightning safety warnings in sufficient time for everyone to reach a worksite's safe shelters and take other appropriate precautions.

Lightning Warning Systems

An employer's EAP may include lightning warning or detection systems, which can provide advance warning of lightning hazards. However, no systems can detect the "first strike," detect all lightning, or predict lightning strikes. NOAA recommends that employers first rely on NOAA weather reports, including NOAA Weather Radio All Hazards: www.nws.noaa.gov/nwr.

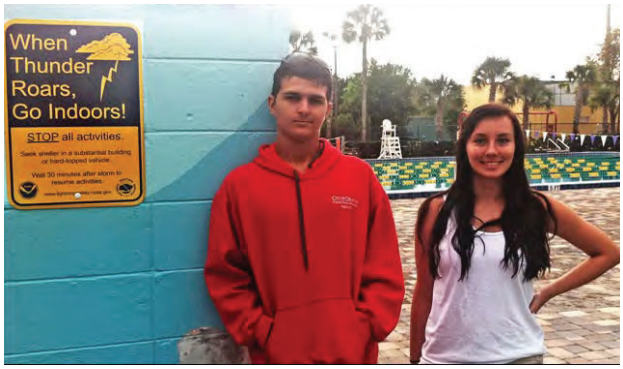

Photo: NOAA

Figure 4: Preparedness reduces lightning risks.

(For NOAA toolkits for organizations and large venues see: www.lightningsafety.noaa.gov/toolkits.shtml)

Commercial lightning detection and notification services are available to monitor for lightning activity. These notification services can send alerts when lightning activity develops or moves to within a certain range of a work site. In addition, these commercial systems can provide mapped locations of lightning strikes from an approaching storm. However, these systems cannot predict the first lightning strike. Consequently, it is important to watch the sky for storms developing overhead or nearby and get to a safe place prior to the first lightning strike.

Portable and hand-held lightning detectors function by detecting the electromagnetic signal from a nearby lightning strike and then processing the signal to estimate the distance to the lightning strike. These devices typically do not detect all strikes, cannot predict the first strike, cannot provide the location of a strike, and are less accurate than the commercial detection and notification systems. In some cases, simply listening for thunder or watching the sky may be a better indication of a developing or nearby storm.

For situations which require advance notice of thunderstorms, NOAA recommends monitoring forecasts and radar observations from either commercial weather services or NOAA to stay informed of changing weather conditions.

If Caught Outside in a Thunderstorm

If you find yourself caught outside during a thunderstorm, there may be nothing you can do to prevent being struck by lightning. There simply is no safe place outside in a thunderstorm. This is why it is very important to get to a safe place at the first signs of a thunderstorm. If you are caught outside follow NOAA's recommendations to decrease the risk of being struck.

- Lightning is likely to strike the tallest objects in a given area—you should not be the tallest object.
- Avoid isolated tall trees, hilltops, utility poles, cell phone towers, cranes, large equipment, ladders, scaffolding, or rooftops.
- Avoid open areas, such as fields. Never lie flat on the ground.
- Retreat to dense areas of smaller trees that are surrounded by larger trees, or retreat to low-lying areas (e.g., valleys, ditches) but watch for flooding.
- Avoid water, and immediately get out of and away from bodies of water (e.g., pools, lakes).

Water does not attract lightning, but it is an excellent conductor of electricity. For boating safety see NOAA PA 200252.

- Avoid wiring, plumbing, and fencing. Lightning can travel long distances through metal, which is an excellent conductor of electricity. Stay away from all metal objects, equipment, and surfaces that can conduct electricity.
- Do not shelter in sheds, pavilions, tents, or covered porches as they do not provide adequate protection from lightning.
- Seek fully-enclosed, substantial buildings with wiring and plumbing. In modern buildings, the *interior* wiring and plumbing will act as an earth ground. A building is a safe shelter as long as you are not in contact with anything that can conduct electricity (e.g., electrical equipment or cords, plumbing fixtures, corded phones). Do not lean against concrete walls or floors (which may have metal bars inside).

OSHA Standards

Under the General Duty Clause, Section 5(a)(1) of the *Occupational Safety and Health Act of 1970* (OSH Act), employers are required to provide their employees with a place of employment that "is free from recognizable hazards that are causing or likely to cause death or serious harm to employees." The courts have interpreted OSHA's general duty clause to mean that an employer has a legal obligation to provide a workplace free of conditions or activities that either the employer or industry recognizes as hazardous and that cause, or are likely to cause, death or serious physical harm to employees when there is a feasible method to abate the hazard. This includes lightning hazards that can cause death or serious bodily harm.

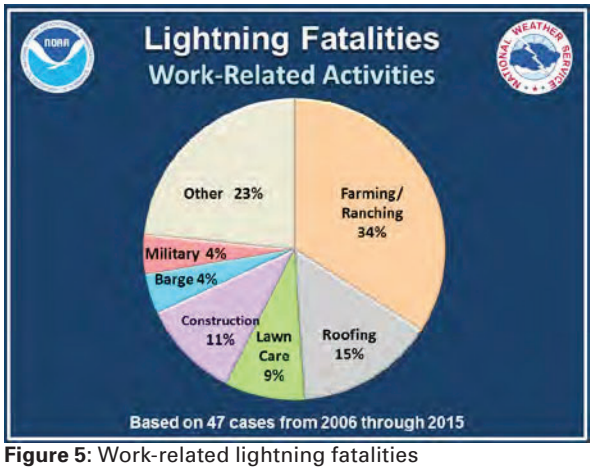

Figure 5: Work-related lightning fatalities

During storms or high winds, OSHA prohibits:

- work on or from scaffolds (29 CFR 1926.451(f)(12));
- crane hoists (29 CFR 1926.1431(k)(8)); and
- work on top of walls (29 CFR 1926.854(c)).

In these situations, scaffold work may continue only if a qualified person determines it is safe and personal fall protection or wind screens are provided. Crane hoists may continue only if a qualified person determines it is safe.

Helpful Resources

- NOAA Lightning Safety on the Job, www.lightningsafety.noaa.gov/job.shtml
- National Fire Protection Association (NFPA):
- *NFPA 780: Standard for the Installation of Lightning Protection Systems*, 2014 Edition, www.nfpa.org/codes-and-standards/document-information-pages?mode=code&code=780
- National Lightning Safety Institute, lightningsafety.com
- National Aeronautics and Space Administration (NASA), Global Hydrology Resource Center, Lightning and Atmospheric Electricity Research, thunder.msfc.nasa.gov
- Transportation Research Board of the National Academies,a*Protecting Airport Personnel from*
- *Lightning Strikes,* onlinepubs.trb.org/onlinepubs/acrp/acrp_iop_004.pdf

Contact NOAA

For information on lightning safety, or to obtain data, educational and outreach materials, and posters, visit NOAA's lightning safety website: www.lightningsafety.noaa.gov or the wrn program at noaa.gov/wrn. Contact NOAA at wrn.feedback@noaa.gov. Examples of data available from NOAA are provided below.

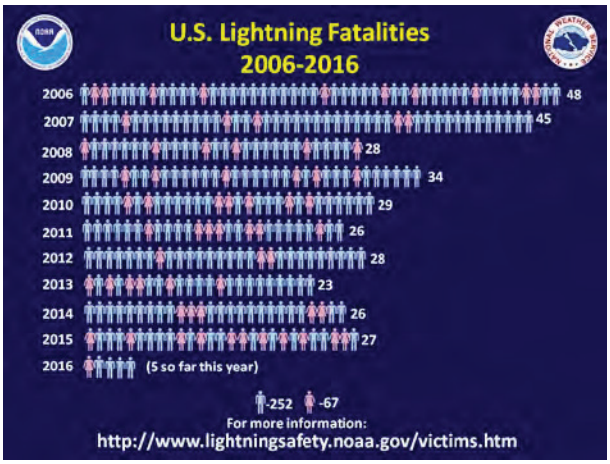

Figure 6: Annual lightning fatalities

Contact OSHA

For more information, to report an emergency, fatality, inpatient hospitalization, amputation, or loss of an eye, or to file a confidential compliant, or to request OSHA's free On-site Consultation Program services for small and medium-sized businesses, contact your nearest OSHA office, visit www.osha.gov, or call OSHA at 1-800-321-OSHA (6742), TTY 1-877-889-5627.

Workers' Rights

Workers have the right to:

- Working conditions that do not pose a risk of serious harm.
- Receive information and training (in a language and vocabulary the worker understands) about workplace hazards, methods to prevent them, and the OSHA standards that apply to their workplace.
- Review records of work-related injuries and illnesses.
- File a complaint asking OSHA to inspect their workplace if they believe there is a serious hazard or that their employer is not following OSHA's rules. OSHA will keep all identities confidential.
- Exercise their rights under the law without retaliation, including reporting an injury or raising health and safety concerns with their employer or OSHA. If a worker has been retaliated against for using their rights, they must file a complaint with OSHA as soon as possible, but no later than 30 days.

For more information, see OSHA's Workers page.

U.S. Department of Labor

Occupational Safety and Health Administration

OSHA - DTSEM FS-3863 05/2016

ATTACHMENT 6

OSHA Fact Sheet: Protecting Workers from the Effects of Heat

OSHA® FactSheet

Protecting Workers from the Effects of Heat

At times, workers may be required to work in hot environments for long periods. When the human body is unable to maintain a normal temperature, heat illnesses can occur and may result in death. It is also important to consider that hot work environments may exist indoors. This fact sheet provides information to employers on measures they should take to prevent worker illnesses and death caused by heat stress.

What is Heat Illness?

The following are illnesses that may result from exposure to heat in the workplace.

Heat Stroke is the most serious heat-related health problem. Heat stroke occurs when the body's temperature regulating system fails and body temperature rises to critical levels (greater than 104°F). ***This is a medical emergency that may result in death!*** The signs of heat stroke are confusion, loss of consciousness, and seizures. Workers experiencing heat stroke have a very high body temperature and may stop sweating. If a worker shows signs of possible heat stroke, ***get medical help immediately***, and call 911. Until medical help arrives, move the worker to a shady, cool area and remove as much clothing as possible. Wet the worker with cool water and circulate the air to speed cooling. Place cold wet cloths, wet towels or ice all over the body or soak the worker's clothing with cold water.

Occupational Factors that May Contribute to Heat Illness

- High temperature and humidity
- Low fluid consumption
- Direct sun exposure (with no shade) or extreme heat
- Limited air movement (no breeze or wind)
- Physical exertion
- Use of bulky protective clothing and equipment

Heat Exhaustion is the next most serious heat-related health problem. The signs and symptoms of heat exhaustion are headache, nausea, dizziness, weakness, irritability, confusion, thirst, heavy sweating and a body temperature greater than 100.4°F. Workers with heat exhaustion should be removed from the hot area and given liquids to drink. Cool the worker with cold compresses to the head, neck, and face or have the worker wash his or her head, face and neck with cold water. Encourage frequent sips of cool water. Workers with signs or symptoms of heat exhaustion should be taken to a clinic or emergency room for medical evaluation and treatment. Make sure that someone stays with the worker until help arrives. If symptoms worsen, call 911 and get help immediately.

Heat Cramps are muscle pains usually caused by the loss of body salts and fluid during sweating. Workers with heat cramps should replace fluid loss by drinking water and/or carbohydrate-electrolyte replacement liquids (e.g., sports drinks) every 15 to 20 minutes.

Heat Rash is the most common problem in hot work environments. Heat rash is caused by sweating and looks like a red cluster of pimples or small blisters. Heat rash may appear on the neck, upper chest, groin, under the breasts and elbow creases. The best treatment for heat rash is to provide a cooler, less humid work environment. The rash area should be kept dry. Powder may be applied to increase comfort. Ointments and creams should ***not*** be used on a heat rash. Anything that makes the skin warm or moist may make the rash worse.

Prevention Made Simple: Program Elements

Heat Illness Prevention Program key elements include:

- A Person Designated to Oversee the Heat Illness Prevention Program
- Hazard Identification
- Water. Rest. Shade Message
- Acclimatization
- Modified Work Schedules
- Training
- Monitoring for Signs and Symptoms
- Emergency Planning and Response

Designate a Person to Oversee the Heat Stress Program

Identify someone trained in the hazards, physiological responses to heat, and controls. This person can develop, implement and manage the program.

Hazard Identification

Hazard identification involves recognizing heat hazards and the risk of heat illness due to high temperature, humidity, sun and other thermal exposures, work demands, clothing or PPE and personal risk factors.

Identification tools include: OSHA's Heat Smartphone App; a Wet Bulb Globe Thermometer (WBGT) which is a measure of heat stress in direct sunlight that takes into account temperature, humidity, wind speed, sun and cloud cover; and the National Weather Service Heat Index. Exposure to full sun can increase heat index values up to 15°F.

Water.Rest.Shade

Ensure that cool drinking water is available and easily accessible. (Note: Certain beverages, such as caffeine and alcohol can lead to dehydration.)

Encourage workers to drink a liter of water over one hour, which is about one cup every fifteen minutes.

Provide or ensure that fully shaded or air-conditioned areas are available for resting and cooling down.

Acclimatization

Acclimatization is a physical change that allows the body to build tolerance to working in the heat. It occurs by gradually increasing workloads and exposure and taking frequent breaks for water and rest in the shade. Full acclimatization may take up to 14 days or longer depending on factors relating to the individual, such as increased risk of heat illness due to certain medications or medical conditions, or the environment.

New workers and those returning from a prolonged absence should begin with 20% of the workload on the first day, increasing incrementally by no more than 20% each subsequent day.

During a rapid change leading to excessively hot weather or conditions such as a heat wave, even experienced workers should begin on the first day of work in excessive heat with 50% of the normal workload and time spent in the hot environment, 60% on the second day, 80% on day three, and 100% on the fourth day.

Modified Work Schedules

Altering work schedules may reduce workers' exposure to heat. For instance:

- Reschedule all non-essential outdoor work for days with a reduced heat index.
- Schedule the more physically demanding work during the cooler times of day;
- Schedule less physically demanding work during warmer times of the day;
- Rotate workers and split shifts, and/or add extra workers.
- Work/Rest cycles, using established industry guidelines.
- Stop work if essential control methods are inadequate or unavailable when the risk of heat illness is very high.

Keep in mind that very early starting times may result in increased fatigue. Also, early morning hours tend to have higher humidity levels.

Training

Provide training in a language and manner workers understand, including information on health effects of heat, the symptoms of heat illness, how and when to respond to symptoms, and how to prevent heat illness.

Monitoring for Heat Illness Symptoms

Establish a system to monitor and report the signs and symptoms listed on the previous page to improve early detection and action. Using a buddy system will assist supervisors when watching for signs of heat illness.

Emergency Planning and Response

Have an emergency plan in place and communicate it to supervisors and workers. Emergency plan considerations include:

- What to do when someone is showing signs of heat illness. This can make the difference between life and death.
- How to contact emergency help.
- How long it will take for emergency help to arrive and training workers on appropriate first-aid measures until help arrives.
- Consider seeking advice from a healthcare professional in preparing a plan.

Engineering Controls Specific to Indoor Workplaces

Indoor workplaces may be cooled by using air conditioning or increased ventilation, assuming that cooler air is available from the outside. Other methods to reduce indoor temperature include: providing reflective shields to redirect radiant heat, insulating hot surfaces, and decreasing water vapor pressure, e.g., by sealing steam leaks and keeping floors dry. The use of fans to increase the air speed over the worker will improve heat exchange between the skin surface and the air, unless the air temperature is higher than the skin temperature. However, increasing air speeds above 300 ft. per min. may actually have a warming effect. Industrial hygiene personnel can assess the degree of heat stress caused by the work environment and make recommendations for reducing heat exposure.

Additional information

For more information on this and other issues affecting workers or heat stress, visit: www.osha.gov/heat; www.cdc.gov/niosh/topics/heatstress; and www.noaa.gov/features/earthobs_0508/heat.html.

Workers have the right to working conditions that do not pose a risk of serious harm, to receive information and training about workplace hazards and how to prevent them, and to file a complaint with OSHA to inspect their workplace without fear of retaliation.

For more information about workers' rights, see OSHA's workers page at www.osha.gov/workers.html.

This is one in a series of informational fact sheets highlighting OSHA programs, policies or standards. It does not impose any new compliance requirements. For a comprehensive list of compliance requirements of OSHA standards or regulations, refer to Title 29 of the Code of Federal Regulations. This information will be made available to sensory-impaired individuals upon request. The voice phone is (202) 693-1999; teletypewriter (TTY) number: (877) 889-5627.

For assistance, contact us. We can help. It's confidential.

OSHA® Occupational Safety and Health Administration

www.osha.gov (800) 321-OSHA (6742)

U.S. Department of Labor

DTSEM FS-3743 08/2014

ATTACHMENT 7

OSHA Quick Card: Protecting Workers from Heat Stress

OSHA® QUICK CARD™

Protecting Workers from Heat Stress

Heat Illness

Exposure to heat can cause illness and death. The most serious heat illness is heat stroke. Other heat illnesses, such as heat exhaustion, heat cramps and heat rash, should also be avoided.

There are precautions that can be taken any time temperatures are high and the job involves physical work.

Risk Factors for Heat Illness

- High temperature and humidity, direct sun exposure, no breeze or wind
- Heavy physical labor
- No recent exposure to hot workplaces
- Low liquid intake
- Waterproof clothing

Symptoms of Heat Exhaustion

- Headache, dizziness, or fainting
- Weakness and wet skin
- Irritability or confusion
- Thirst, nausea, or vomiting

Symptoms of Heat Stroke

- May be confused, unable to think clearly, pass out, collapse, or have seizures (fits)
- May stop sweating

To Prevent Heat Illness:

- Establish a complete heat illness prevention program.
- Provide training about the hazards leading to heat stress and how to prevent them.
- Provide a lot of cool water to workers close to the work area. At least one pint of water per hour is needed.

U.S. Department of Labor

For more information:

OSHA® Occupational Safety and Health Administration

www.osha.gov (800) 321-OSHA (6742)

OSHA 3154-06R 2017

OSHA® QUICK CARD™

- Modify work schedules and arrange frequent rest periods with water breaks in shaded or air-conditioned areas.
- Gradually increase workloads and allow more frequent breaks for workers new to the heat or those that have been away from work to adapt to working in the heat (acclimatization).
- Designate a responsible person to monitor conditions and protect workers who are at risk of heat stress.
- Consider protective clothing that provides cooling.

How to Protect Workers

- Know signs/symptoms of heat illnesses; monitor yourself; use a buddy system.
- Block out direct sun and other heat sources.
- Drink plenty of fluids. Drink often and BEFORE you are thirsty. Drink water every 15 minutes.
- Avoid beverages containing alcohol or caffeine.
- Wear lightweight, light colored, loose-fitting clothes.

What to Do When a Worker is Ill from the Heat

- Call a supervisor for help. If the supervisor is not available, call 911.
- Have someone stay with the worker until help arrives.
- Move the worker to a cooler/shaded area.
- Remove outer clothing.
- Fan and mist the worker with water; apply ice (ice bags or ice towels).
- Provide cool drinking water, if able to drink.

IF THE WORKER IS NOT ALERT or seems confused, this may be a heat stroke. CALL 911 IMMEDIATELY and apply ice as soon as possible.

U.S. Department of Labor

For more information:

OSHA® Occupational Safety and Health Administration

www.osha.gov (800) 321-OSHA (6742)

ATTACHMENT 8

OSHA Quick Card: Protecting Workers from Cold Stress

OSHA® QUICK CARD™

Protecting Workers from Cold Stress

Cold temperatures and increased wind speed (wind chill) cause heat to leave the body more quickly, putting workers at risk of cold stress. Anyone working in the cold may be at risk, e.g., workers in freezers, outdoor agriculture and construction.

Common Types of Cold Stress

Hypothermia

- Normal body temperature (98.6°F) drops to 95°F or less.
- **Mild Symptoms:** alert but shivering.
- **Moderate to Severe Symptoms:** shivering stops; confusion; slurred speech; heart rate/breathing slow; loss of consciousness; death.

Frostbite

- Body tissues freeze, e.g., hands and feet. Can occur at temperatures above freezing, due to wind chill. May result in amputation.
- **Symptoms:** numbness, reddened skin develops gray/white patches, feels firm/hard, and may blister.

Trench Foot (also known as Immersion Foot)

- Non-freezing injury to the foot, caused by lengthy exposure to wet and cold environment. Can occur at air temperature as high as 60°F, if feet are constantly wet.
- **Symptoms:** redness, swelling, numbness, and blisters.

Risk Factors

- Dressing improperly, wet clothing/skin, and exhaustion.

For Prevention, Your Employer Should:

- Train you on cold stress hazards and prevention.
- Provide engineering controls, e.g., radiant heaters.
- Gradually introduce workers to the cold; monitor workers; schedule breaks in warm areas.

For more information:

OSHA® Occupational Safety and Health Administration
U.S. Department of Labor
www.osha.gov (800) 321-OSHA (6742)

OSHA 3156-02R 2014

WORKPLACE SOLUTIONS

From the National Institute for Occupational Safety and Health

Preventing Cold-related Illness, Injury, and Death among Workers

Summary

Workers, both indoors and outdoors, in services, transportation, agriculture, construction, and other industries may be exposed to environmental cold stress that can lead to thermal discomfort and in some cases even severe injuries, illnesses, or death. The National Institute for Occupational Safety and Health (NIOSH) recommends that employers implement a cold-related illness and injury prevention program that includes preventive measures such as using engineering controls, establishing work/rest schedules, training workers about the hazards of working in cold environments, and providing appropriate cold-weather gear.

Description of Exposure

Workers who work in cold environments may be at risk of cold stress. Exposure to cold can be an uncomfortable and potentially dangerous situation. Health emergencies can occur in people who work outdoors or in an area that is purposefully kept cold, poorly insulated, or without heat. People who have previously experienced frostbite, sedentary workers, and those with poor circulation may be especially susceptible. For indoor workers, work in cold, damp conditions can be uncomfortable and may lead to declining work performance (i.e., a decline in cognitive function and dexterity) or result in cold-related illness or injury. Cold-related conditions can also worsen musculoskeletal injuries and vascular disorders. For outdoor workers, what constitutes cold stress can vary across different areas of the country. In regions where workers are unaccustomed to winter weather, near freezing temperatures are considered factors for cold stress. Whenever outdoor temperatures drop substantially and wind speed increases, heat leaves the body more rapidly. According to the American Conference of Governmental Industrial Hygienists (ACGIH®) Threshold Limit Values (TLV®), workers should be protected from exposure to cold so that the deep core temperature does not fall below 96.8°F (36°C) and to prevent frostbite to body extremities [ACGIH 2019]. Serious health problems can occur when the body is unable to stay warm enough.

Photo by MarianVejcik/Getty Images

Cold-related Illnesses and Injuries

Cold-related illnesses and injuries include chilblains, trench foot, frostbite, and hypothermia.

Chilblains. Chilblains are the painful inflammation of small blood vessels in the skin that occur in response to repeated exposure to cold but nonfreezing temperatures. Small blood vessels in the skin may become permanently damaged by cold temperatures, resulting in redness and itching during additional exposures. Symptoms of chilblains include redness, itching, possible blistering, inflammation, and possible ulceration in severe cases.

Centers for Disease Control and Prevention
National Institute for Occupational Safety and Health

Trench Foot. Trench foot is an injury of the feet after prolonged exposure to wet and cold-related conditions. Trench foot occurs because wet feet lose heat faster than dry feet. To prevent heat loss, the body constricts blood vessels in the feet, and then the skin tissue begins to die. Symptoms of trench foot include reddening of the skin, numbness, leg cramps, swelling, tingling pain, blisters or ulcers, bleeding under the skin, and gangrene (e.g., foot turns purple, blue, or gray).

Frostbite. Frostbite is an injury caused by freezing of the skin and deeper tissues, resulting in the loss of feeling and color in the affected areas. Frostbite can permanently damage body tissues, and severe cases can lead to amputation. Examples of risk factors for frostbite include contact with metal or water, dehydration, diabetes, smoking, alcohol abuse, sedating or judgment impairing medications, and prior history of frostbite. Symptoms of frostbite include numbness; tingling or stinging; aching; and bluish or pale, waxy skin. During treatment of frostbite and trench foot, avoid rubbing or putting pressure on affected areas, since that can damage tissue.

Hypothermia. When exposed to cold temperatures, the body loses heat faster than it can be produced. Prolonged exposure to cold causes internal body temperature to drop, resulting in a condition called hypothermia. Hypothermia affects brain function, making the victim unable to think clearly or move well (i.e., they may be unable to protect themselves from hazards, or experience slips, trips, and falls). This makes hypothermia particularly dangerous because a person may not recognize the symptoms and will be unable to make life-preserving decisions. Symptoms of hypothermia can depend on how long a person has been exposed to cold temperatures and individual variability.

Hypothermia Symptoms and First Aid

Early symptoms include shivering, fatigue, loss of coordination, confusion, and/or disorientation.

Late symptoms include no shivering, blue skin, dilated pupils, slowed pulse and breathing, and/or loss of consciousness.

If hypothermia is suspected, medical assistance should be requested immediately (e.g., call 911). Begin first aid by:

1. moving the worker to a warm room or vehicle,
2. removing wet clothing,
3. covering their body with loose, dry blankets, clothing, or towels (may use skin-to-skin contact or warm bottles or hot packs in armpits, sides of chest, and groin to increase body's temperature), and
4. providing warm, non-alcoholic beverages if the worker is conscious.

If the worker has no pulse, cardiopulmonary resuscitation (CPR) should be provided and continued during the warming attempts, until the person responds or medical aid becomes available. Chest compressions should not be performed for patients who manifest an organized rhythm on a cardiac monitor (e.g., automated external defibrillator [AED]), even if they have no palpable pulses and no other signs of life. The worker should be handled very gently and kept horizontal, because when cold, the heart is prone to ventricular fibrillation with any disturbance. Severely hypothermic patients have been known to survive neurologically intact after long periods (over an hour) in a state of "suspended animation" [State of Alaska DHSS 2014].

Photo by ilkercelik/Getty Images

Case Reports

Indoor Environment: Airline Catering Facility

In an airline catering facility cold room (approximately 40°F), meals were assembled at workstations in shifts lasting 3–8 hours [Ceballos et al. 2015; NIOSH 2014]. Because preparations sometimes required fine manual dexterity (e.g., thinly slicing fish, decorating with small garnishes), the workers preferred wearing thin gloves instead of thicker, better insulated gloves. The frozen food they handled caused their hands to become cold and numb. Drafts inside the cold room made some areas feel colder than others, and air velocities exceeded the recommended guidelines of 200 feet per minute (FPM) [ACGIH 2019]. In addition, the workers felt that their breaks were not long enough to warm up, or to change out of wet or sweat-dampened clothing. An evaluation of the cold room concluded that thermal comfort concerns perceived by workers might have resulted from workstation air drafts, insufficient use of personal protective equipment (e.g., better insulated gloves) due to dexterity concerns, work practices, and lack of knowledge about good health and safety practices. In an evaluation of a second airline catering facility where the temperature was approximately 40°F, workers reported that they

felt discomfort working in cold temperatures, particularly in the freezer or coolers [NIOSH 2015]. The reported findings suggest that language was a barrier to effective training and communication regarding workplace safety and health because employees came from 18 countries.

Outdoor Environment: Long Haul Driving Along Highway

In the winter of 2009, a 56-year-old male truck driver went to the emergency room seeking care [Alaska Trauma Registry]. He had come to Alaska after a long haul drive through Canada. Along his route, he had stopped to change a fuel filter. He accidentally splashed diesel fuel on his gloves, which froze to his hands as he worked outside along the highway. After arriving at his destination, he had to spend a night at the hospital receiving treatment for his frostbitten hands.

Outdoor Environment: Sheep Ranch

At 3:00 p.m., a 58-year-old woman (who was wearing tennis shoes, blue jeans, sweater, jacket, and gloves) and her husband left their sheep ranch headquarters to round up their animals and bring them in for protection from a major snow storm that was developing [NIOSH 1990]. The woman separated from her husband to chase down a second flock of sheep. Shortly afterward, a high wind arose and created whiteout conditions in the area. The husband was unable to locate the woman and returned to the ranch to obtain additional help. At 10:00 p.m., the sheriff's department, local volunteer fire department, emergency medical service, and search and rescue units became involved in the search. The search continued until 3:00 a.m., when it was decided to wait for daylight. At 7:45 a.m., the body of the woman was found. Autopsy results showed she had died from hypothermia.

Recommendations

Whether in an indoor or outdoor environment where cold stress conditions are possible, employers and workers should be aware of symptoms of cold-related illness and injury, not only in themselves but also in their coworkers, and be prepared to immediately notify their supervisor, provide first aid, and seek prompt medical assistance (e.g., call 911).

Prevention is the best way to avoid cold-related illness and injury. Employers and workers should follow the NIOSH recommendations below to reduce the risk of cold-related illness and injury.

All Cold Environments

Employers should:

- Train supervisors and workers to prevent, recognize, and treat cold-related illness and injury.
- Provide training in a language and vocabulary that the workers understand.
- Reduce workers' time spent in the cold environment.
- Reduce the physical demands of workers (e.g., use relief workers or rotate extra workers in and out of work for long, demanding jobs).
- Ensure access to warm areas and a place to change out of wet clothes.
- Encourage employees to take breaks to warm up when needed.
- Monitor workers in cold conditions and initiate a buddy system.
- Include a medical and environmental thermometer and chemical hot packs in first aid kits.
- Participate in joint management/employee safety committees.
- Provide appropriate cold weather gear such as hats, gloves, and boots for work in cold environments.
- Provide wind protective clothing based on air velocities.
- Provide prompt medical attention to workers who show signs of cold-related illness or injury.

Workers should:

- Take regular breaks to warm up.
- Monitor their physical condition and that of coworkers.
- Stay hydrated by drinking lots of water; warm beverages may help increase body temperature.
- Stay well nourished by snacking on high carbohydrate foods.
- Avoid touching cold metal or wet surfaces with bare skin.

Photo by sorn340/Getty Images

- Report signs and symptoms of cold-related illness and injury to supervisors and medical staff immediately.
- Participate in joint management/employee safety committees.
- Carry extra cold weather gear, such as a change of clothes, in case work clothing gets wet.
- Wear several layers of loose clothing for better insulation; take layers off if you begin to sweat and put them back on when you cool down. Inner layers should be wool or synthetic fabrics to wick away moisture; outer layers should be wind and water-resistant.
- Avoid wearing wet clothes.
- Protect the ears, face, hands, and feet by wearing hats, gloves, socks, and boots.

Indoor Environments

Employers should:

- Install equipment to reduce drafts and condensation.
- Provide warm water or dry air heaters outside cold rooms for workers to warm their hands.
- Minimize air velocity and not exceed 200 FPM.
- Perform preventative maintenance on a regular schedule and make repairs if heating systems are not working properly.
- Rotate employees to different tasks after every break.
- Minimize work requiring manual dexterity in cold rooms.
- Provide glove alternatives for workers inside cold rooms (e.g., glove liners or fingerless gloves to wear under plastic gloves).

Photo by wabeno/Getty Images

Outdoor Environments

Employers should:

- Create a plan for assessing and acting on workplace hazards posed by sudden weather changes, such as dropping temperatures or increasing wind speeds.
- Schedule normal maintenance and repairs in cold areas for warmer months when possible.
- Schedule cold jobs for the warmer part of the day.
- Ensure that workers traveling through or working in remote areas have appropriate cold-weather survival equipment (e.g., emergency communications equipment such as a personal locator beacon or satellite phone).

Acknowledgments

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For More Information

Information about ***Cold Stress*** can be found on the following website:

https://www.cdc.gov/niosh/topics/coldstress/

1-800-CDC-INFO (1-800-232-4636)
TTY: 1-888-232-6348
CDC/NIOSH INFO: cdc.gov/info | cdc.gov/niosh
Monthly *NIOSH eNews*: https://www.cdc.gov/niosh/eNews.

Mention of any company or product does not constitute endorsement by NIOSH. In addition, citations to websites external to NIOSH do not constitute NIOSH endorsement of the sponsoring organizations or their programs or products. Furthermore, NIOSH is not responsible for the content of these websites.

As part of the Centers for Disease Control and Prevention, NIOSH is the federal agency responsible for conducting research and making recommendations to prevent work-related illness and injuries. All ***Workplace Solutions*** are based on research studies that show how worker exposures to hazardous agents or activities can be significantly reduced.

DOI: https://doi.org/10.26616/NIOSHPUB2019113
DHHS (NIOSH) Publication No. 2019-113

September 2019

OSHA® QUICK CARD™

How to Protect Yourself and Others

- Know the symptoms; monitor yourself and co-workers.
- Drink warm, sweetened fluids (no alcohol).
- Dress properly:
  - Layers of loose-fitting, insulating clothes
  - Insulated jacket, gloves, and a hat (waterproof, if necessary)
  - Insulated and waterproof boots

What to Do When a Worker Suffers from Cold Stress

For Hypothermia:

- Call 911 immediately in an emergency.
- To prevent further heat loss:
  - Move the worker to a warm place.
  - Change to dry clothes.
  - Cover the body (including the head and neck) with blankets, and with something to block the cold (e.g., tarp, garbage bag). Do **not** cover the face.
- If medical help is more than 30 minutes away:
  - Give warm, sweetened drinks if alert (no alcohol).
  - Apply heat packs to the armpits, sides of chest, neck, and groin. Call 911 for additional rewarming instructions.

For Frostbite:

- Follow the recommendations "**For Hypothermia**".
- Do not rub the frostbitten area.
- Avoid walking on frostbitten feet.
- Do not apply snow/water. Do not break blisters.
- Loosely cover and protect the area from contact.
- Do not try to rewarm the area unless directed by medical personnel.

For Trench (Immersion) Foot:

- Remove wet shoes/socks; air dry (in warm area); keep affected feet elevated and avoid walking. Get medical attention.

For more information:

OSHA® Occupational Safety and Health Administration

U.S. Department of Labor

www.osha.gov (800) 321-OSHA (6742)

ATTACHMENT 9

Safety Data Sheets

Safety Data Sheets (SDSs)

SAFETY DATA SHEET
(SDS)

Creation Date 24-Aug-2009 **Revision Date** 12 AUG-2015 **Revision Number** 01

1. Identification

Product Name	**Hydrochloric Acid Solution, Trace Metal Grade**

Cat No. : **A508—P212**

Synonyms Muriatic acid; Hydrogen chloride, HCl

Recommended Use Laboratory chemical. Used as an Environmental sample preservative/pH adjustment.

Uses advised against No Information available

Details of the supplier of the safety data sheet

Company
C & G Containers
152 Easy Street
Lafayette, LA
70506
337-237-7123

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

2. Hazard(s) identification

Classification

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

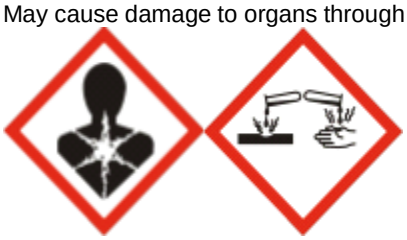
Corrosive to metals	Category 1
Skin Corrosion/irritation	Category 1 B
Serious Eye Damage/Eye Irritation	Category 1
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Respiratory system.	
Specific target organ toxicity - (repeated exposure)	Category 2
Target Organs - Kidney, Liver.	

Label Elements

Signal Word
Danger

Hazard Statements
May be corrosive to metals

Causes severe skin burns and eye damage
May cause respiratory irritation
May cause damage to organs through prolonged or repeated exposure



Precautionary Statements
Prevention
Do not breathe dust/fume/gas/mist/vapors/spray
Wash face, hands and any exposed skin thoroughly after handling
Wear protective gloves/protective clothing/eye protection/face protection
Use only outdoors or in a well-ventilated area
Keep only in original container
Response
Immediately call a POISON CENTER or doctor/physician
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Skin
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
Wash contaminated clothing before reuse
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
Ingestion
IF SWALLOWED: Rinse mouth. DO NOT induce vomiting
Spills
Absorb spillage to prevent material damage
Storage
Store locked up
Store in a well-ventilated place. Keep container tightly closed
Store in corrosive resistant polypropylene container with a resistant inliner
Store in a dry place
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
None identified

3. Composition / information on ingredients

Component	CAS-No	Percent
Water	7732-18-5	83-85
Hydrochloric acid	7647-01-0	15-17

4. First-aid measures

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

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Immediate medical attention is required.

Inhalation Move to fresh air. If breathing is difficult, give oxygen. Do not use mouth-to-mouth resuscitation if victim ingested or inhaled the substance; induce artificial respiration with a respiratory medical device. Immediate medical attention is required.

Ingestion Do not induce vomiting. Call a physician or Poison Control Center immediately.

Most important symptoms/effects Causes burns by all exposure routes. . Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated: Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation

Notes to Physician Treat symptomatically

5. Fire-fighting measures

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

Unsuitable Extinguishing Media No information available

Flash Point No information available
Method - No information available

Autoignition Temperature No information available
Explosion Limits
Upper No data available
Lower No data available
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Corrosive Material. Causes burns by all exposure routes. Thermal decomposition can lead to release of irritating gases and vapors.

Hazardous Combustion Products
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	Flammability	Instability	Physical hazards
3	0	0	N/A

6. Accidental release measures

Personal Precautions Use personal protective equipment. Ensure adequate ventilation. Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak. Do not get in eyes, on skin, or on clothing.

Environmental Precautions Should not be released into the environment. See Section 12 for additional ecological information.

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

7. Handling and storage

Handling Wear personal protective equipment. Do not breathe vapors or spray mist. Do not get in eyes, on skin, or on clothing. Do not ingest.

Storage Keep containers tightly closed in a dry, cool and well-ventilated place. Corrosives area.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH
Hydrochloric acid	Ceiling: 2 ppm	Ceiling: 5 ppm Ceiling: 7 mg/m³ (Vacated) Ceiling: 5 ppm (Vacated) Ceiling: 7 mg/m³	IDLH: 50 ppm Ceiling: 5 ppm Ceiling: 7 mg/m³

Component	Quebec	Mexico OEL (TWA)	Ontario TWAEV
Hydrochloric acid	Ceiling: 5 ppm Ceiling: 7.5 mg/m³	Ceiling: 5 ppm Ceiling: 7 mg/m³	CEV: 2 ppm

Legend

ACGIH *- American Conference of Governmental Industrial Hygienists*
OSHA *- Occupational Safety and Health Administration*
NIOSH IDLH: *The National Institute for Occupational Safety and Health Immediately Dangerous to Life or Health*

Engineering Measures Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

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

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

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

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

9. Physical and chemical properties

Physical State	Liquid
Appearance	Colorless
Odor	pungent
Odor Threshold	No information available
pH	< 1
Melting Point/Range	-35 °C / -31 °F
Boiling Point/Range	57 °C / 135 °F @ 760 mmHg
Flash Point	No information available
Evaporation Rate	No information available
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	125 mbar @ 20 °C
Vapor Density	1.27 (Air = 1.0)
Relative Density	1.18
Solubility	Soluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	1.8 mPa.s @ 15°C
Molecular Formula	HCl.H2O
Molecular Weight	36.46

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products. Excess heat.

Incompatible Materials Metals, Strong oxidizing agents, sodium hypochlorite, Amines, Bases, Fluorine, Cyanides, alkaline

Hazardous Decomposition Products Hydrogen chloride gas

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions Contact with metals may evolve flammable hydrogen gas.

11. Toxicological information

Acute Toxicity

Product Information

Oral LD50 Based on ATE data, the classification criteria are not met. ATE > 2000 mg/kg.

Dermal LD50 Based on ATE data, the classification criteria are not met. ATE > 2000 mg/kg.

Vapor LC50 Based on ATE data, the classification criteria are not met. ATE > 20 mg/l.

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Hydrochloric acid	238 - 277 mg/kg (Rat)	5010 mg/kg (Rabbit)	1.68 mg/L (Rat) 1 h

Toxicologically Synergistic Products No information available

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

Irritation Causes burns by all exposure routes

Sensitization No information available

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

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Water	7732-18-5	Not listed	Not listed	Not listed	Not listed	Not listed
Hydrochloric acid	7647-01-0	Group 3	Not listed	Not listed	Not listed	Not listed

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

Mutagenic Effects Mutagenic effects have occurred in experimental animals.

Reproductive Effects Experiments have shown reproductive toxicity effects on laboratory animals.

Developmental Effects Developmental effects have occurred in experimental animals.

Teratogenicity Teratogenic effects have occurred in experimental animals.

STOT - single exposure Respiratory system

STOT - repeated exposure Kidney Liver

Aspiration hazard No information available

Symptoms / effects,both acute and delayed Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated: Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation

Endocrine Disruptor Information No information available

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

12. Ecological information

Ecotoxicity

Do not empty into drains.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Hydrochloric acid	-	282 mg/L LC50 96 h	-	-

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 water solubility.

13. Disposal considerations

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

14. Transport information

DOT

UN-No UN1789
Proper Shipping Name HYDROCHLORIC ACID
Hazard Class 8
Packing Group II

TDG

UN-No UN1789
Proper Shipping Name HYDROCHLORIC ACID
Hazard Class 8
Packing Group II

IATA

UN-No UN1789
Proper Shipping Name Hydrochloric acid
Hazard Class 8
Packing Group II

IMDG/IMO

UN-No UN1789
Proper Shipping Name Hydrochloric acid
Hazard Class 8
Packing Group II

15. Regulatory information

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Water	X	X	-	231-791-2	-		X	-	X	X	X
Hydrochloric acid	X	X	-	231-595-7	-		X	X	X	X	X

Legend:
X - Listed
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Hydrochloric acid	7647-01-0	35-38	1.0

SARA 311/312 Hazardous Categorization

Acute Health Hazard	Yes
Chronic Health Hazard	Yes
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Water Act

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Hydrochloric acid	X	5000 lb	-	-

Clean Air Act

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Hydrochloric acid	X		-

OSHA Occupational Safety and Health Administration
Not applicable

Component	Specifically Regulated Chemicals	Highly Hazardous Chemicals
Hydrochloric acid	-	TQ: 5000 lb

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

Component	Hazardous Substances RQs	CERCLA EHS RQs
Hydrochloric acid	5000 lb	5000 lb

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

State Right-to-Know

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Hydrochloric acid	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 contains the following DHS chemicals:

Component	DHS Chemical Facility Anti-Terrorism Standard
Hydrochloric acid	0 lb STQ (anhydrous); 11250 lb STQ (37% concentration or greater)

Other International Regulations

Mexico - Grade No information available

Canada
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR

WHMIS Hazard Class

D1A Very toxic materials
D2B Toxic materials
E Corrosive material

16. Other information

Prepared By

Regulatory Affairs
Thermo Fisher Scientific and C & G Containers, Inc.
Email: EMSDS.RA@thermofisher.com

Creation Date 24-Aug-2009
CG Revision Date 12-Aug-2015
FS Revision Date 02-April-2014

Revision Summary

This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)

Disclaimer

The information provided on 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 guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as 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 material or in any process, unless specified in the text.

End of SDS

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 10.18.2017 **Revision**: 10.18.2017

Trade Name: Alconox

1 Identification of the substance/mixture and of the supplier

1.1 Product identifier

Trade Name: Alconox
Synonyms:
Product number: 1104-1, 1104, 1125, 1150, 1101, 1103, 1112-1, 1112

1.2 Application of the substance / the mixture : Cleaning material/Detergent

1.3 Details of the supplier of the Safety Data Sheet

Manufacturer
Alconox, Inc.
30 Glenn Street
White Plains, NY 10603
1-914-948-4040

Supplier

Emergency telephone number:
ChemTel Inc
North America: 1-800-255-3924
International: 01-813-248-0585

2 Hazards identification

2.1 Classification of the substance or mixture:

In compliance with EC regulation No. 1272/2008, 29CFR1910/1200 and GHS Rev. 3 and amendments.

Hazard-determining components of labeling:
Tetrasodium Pyrophosphate
Sodium tripolyphosphate
Sodium Alkylbenzene Sulfonate

2.2 Label elements:

Skin irritation, category 2.
Eye irritation, category 2A.

Hazard pictograms:

Signal word: Warning

Hazard statements:
H315 Causes skin irritation.
H319 Causes serious eye irritation.

Precautionary statements:
P264 Wash skin thoroughly after handling.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P302+P352 If on skin: Wash with soap and water.
P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.
P321 Specific treatment (see supplemental first aid instructions on this label).
P332+P313 If skin irritation occurs: Get medical advice/attention.
P362 Take off contaminated clothing and wash before reuse.
P501 Dispose of contents and container as instructed in Section 13.

Safety Data Sheet

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Effective date: 10.18.2017 **Revision**: 10.18.2017

Trade Name: Alconox

Additional information: None.

Hazard description

Hazards Not Otherwise Classified (HNOC): None

Information concerning particular hazards for humans and environment:

The product has to be labelled due to the calculation procedure of the "General Classification guideline for preparations of the EU" in the latest valid version.

Classification system:

The classification is according to EC regulation No. 1272/2008, 29CFR1910/1200 and GHS Rev. 3 and amendments, and extended by company and literature data. The classification is in accordance with the latest editions of international substances lists, and is supplemented by information from technical literature and by information provided by the company.

3 Composition/information on ingredients

3.1 Chemical characterization : None

3.2 Description : None

3.3 Hazardous components (percentages by weight)

Identification	Chemical Name	Classification	Wt. %
CAS number: 7758-29-4	Sodium tripolyphosphate	Skin Irrit. 2 ; H315 Eye Irrit. 2; H319	12-28
CAS number: 68081-81-2	Sodium Alkylbenzene Sulfonate	Acute Tox. 4; H303 Skin Irrit. 2 ; H315 Eye Irrit. 2; H319	8-22
CAS number: 7722-88-5	Tetrasodium Pyrophosphate	Skin Irrit. 2 ; H315 Eye Irrit. 2; H319	2-16

3.4 Additional Information : None.

4 First aid measures

4.1 Description of first aid measures

General information: None.

After inhalation:

Maintain an unobstructed airway.

Loosen clothing as necessary and position individual in a comfortable position.

After skin contact:

Wash affected area with soap and water.

Seek medical attention if symptoms develop or persist.

After eye contact:

Rinse/flush exposed eye(s) gently using water for 15-20 minutes.

Remove contact lens(es) if able to do so during rinsing.

Seek medical attention if irritation persists or if concerned.

After swallowing:

Rinse mouth thoroughly.

Seek medical attention if irritation, discomfort, or vomiting persists.

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Effective date: 10.18.2017 **Revision**: 10.18.2017

Trade Name: Alconox

4.2 Most important symptoms and effects, both acute and delayed

None

4.3 Indication of any immediate medical attention and special treatment needed:

No additional information.

5 Firefighting measures

5.1 Extinguishing media

Suitable extinguishing agents:

Use appropriate fire suppression agents for adjacent combustible materials or sources of ignition.

For safety reasons unsuitable extinguishing agents : None

5.2 Special hazards arising from the substance or mixture :

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

5.3 Advice for firefighters

Protective equipment:

Wear protective eye wear, gloves and clothing.
Refer to Section 8.

5.4 Additional information :

Avoid inhaling gases, fumes, dust, mist, vapor and aerosols.
Avoid contact with skin, eyes and clothing.

6 Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures :

Ensure adequate ventilation.
Ensure air handling systems are operational.

6.2 Environmental precautions :

Should not be released into the environment.
Prevent from reaching drains, sewer or waterway.

6.3 Methods and material for containment and cleaning up :

Wear protective eye wear, gloves and clothing.

6.4 Reference to other sections : None

7 Handling and storage

7.1 Precautions for safe handling :

Avoid breathing mist or vapor.
Do not eat, drink, smoke or use personal products when handling chemical substances.

7.2 Conditions for safe storage, including any incompatibilities :

Store in a cool, well-ventilated area.

7.3 Specific end use(s):

No additional information.

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 10.18.2017 **Revision**: 10.18.2017

Trade Name: Alconox

8 Exposure controls/personal protection

8.1 Control parameters :

a) 7722-88-5, Tetrasodium Pyrophosphate, OSHA TWA 5 mg/m3

b) Dusts, non-specific OEL, Irish Code of Practice

(i) Total inhalable 10 mg/m3 (8hr)

(ii) Respirible 4mg/m3 (8hr)

(iii) Tetrasodium Pyrophosphate, OSHA TWA 5 mg/m3, (8hr)

8.2 Exposure controls

Appropriate engineering controls:

Emergency eye wash fountains and safety showers should be available in the immediate vicinity of use or handling.

Respiratory protection:

Not needed under normal use conditions.

Protection of skin:

Select glove material impermeable and resistant to the substance or preparation. Protective gloves recommended to comply with EN 374. Take note of break through times, permeability, and special workplace conditions, such as mechanical strain, duration of contact, etc. Protective gloves should be replaced at the first sign of wear.

Eye protection:

Safety goggles or glasses, or appropriate eye protection. Recommended to comply with ANSI Z87.1 and/or EN 166.

General hygienic measures:

Wash hands before breaks and at the end of work.

Avoid contact with skin, eyes and clothing.

9 Physical and chemical properties

Appearance (physical state, color):	White and cream colored flakes - powder	**Explosion limit lower:** **Explosion limit upper:**	Not determined or not available. Not determined or not available.
Odor:	Not determined or not available.	**Vapor pressure at 20°C:**	Not determined or not available.
Odor threshold:	Not determined or not available.	**Vapor density:**	Not determined or not available.
pH-value:	9.5 (aqueous solution)	**Relative density:**	Not determined or not available.
Melting/Freezing point:	Not determined or not available.	**Solubilities:**	Not determined or not available.
Boiling point/Boiling range:	Not determined or not available.	**Partition coefficient (n-octanol/water):**	Not determined or not available.
Flash point (closed cup):	Not determined or not available.	**Auto/Self-ignition temperature:**	Not determined or not available.
Evaporation rate:	Not determined or not available.	**Decompositio n**	Not determined or not available.

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Effective date: 10.18.2017 **Revision**: 10.18.2017

Trade Name: Alconox

Flammability (solid, gaseous):	Not determined or not available.	**Viscosity**:	a. Kinematic: Not determined or not available. b. Dynamic: Not determined or not available.
Density at 20°C:	Not determined or not available.		

10 Stability and reactivity

10.1 Reactivity : None

10.2 Chemical stability : None

10.3 Possibility hazardous reactions : None

10.4 Conditions to avoid : None

10.5 Incompatible materials : None

10.6 Hazardous decomposition products : None

11 Toxicological information

11.1 Information on toxicological effects :

Acute Toxicity:

Oral:

: LD50 > 5000 mg/kg oral rat - Product .

Chronic Toxicity: No additional information.

Skin corrosion/irritation:

Sodium Alkylbenzene Sulfonate: Causes skin irritation. .

Serious eye damage/irritation:

Sodium Alkylbenzene Sulfonate: Causes serious eye irritation .

Tetrasodium Pyrophosphate: Rabbit - Risk of serious damage to eyes .

Respiratory or skin sensitization: No additional information.

Carcinogenicity: No additional information.

IARC (International Agency for Research on Cancer): None of the ingredients are listed.

NTP (National Toxicology Program): None of the ingredients are listed.

Germ cell mutagenicity: No additional information.

Reproductive toxicity: No additional information.

STOT-single and repeated exposure: No additional information.

Additional toxicological information: No additional information.

12 Ecological information

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 10.18.2017 **Revision**: 10.18.2017

Trade Name: Alconox

12.1 Toxicity:

Sodium Alkylbenzene Sulfonate: Fish, LC50 1.67 mg/l, 96 hours.
Sodium Alkylbenzene Sulfonate: Aquatic invertebrates, EC50 Daphnia 2.4 mg/l, 48 hours. Sodium Alkylbenzene Sulfonate: Aquatic Plants, EC50 Algae 29 mg/l, 96 hours.
Tetrasodium Pyrophosphate: Fish, LC50 - other fish - 1,380 mg/l - 96 h.
Tetrasodium Pyrophosphate: Aquatic invertebrates, EC50 - Daphnia magna (Water flea) - 391 mg/l - 48 h.

12.2 Persistence and degradability: No additional information.

12.3 Bioaccumulative potential: No additional information.

12.4 Mobility in soil: No additional information.

General notes: No additional information.

12.5 Results of PBT and vPvB assessment:

PBT: No additional information.

vPvB: No additional information.

12.6 Other adverse effects: No additional information.

13 Disposal considerations

13.1 Waste treatment methods (consult local, regional and national authorities for proper disposal)

Relevant Information:

It is the responsibility of the waste generator to properly characterize all waste materials according to applicable regulatory entities. (US 40CFR262.11).

14 Transport information

14.1 UN Number: ADR, ADN, DOT, IMDG, IATA	None
14.2 UN Proper shipping name: ADR, ADN, DOT, IMDG, IATA	None
14.3 Transport hazard classes: ADR, ADN, DOT, IMDG, IATA	**Class:** None **Label:** None **LTD.QTY:** None

US DOT

Limited Quantity Exception: None

Bulk:
RQ (if applicable): None
Proper shipping Name: None
Hazard Class: None
Packing Group: None
Marine Pollutant (if applicable): No additional information.

Non Bulk:
RQ (if applicable): None
Proper shipping Name: None
Hazard Class: None
Packing Group: None
Marine Pollutant (if applicable): No additional information.

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 10.18.2017 **Revision**: 10.18.2017

Trade Name: Alconox

Comments: None	**Comments:** None
14.4 Packing group: ADR, ADN, DOT, IMDG, IATA	None
14.5 Environmental hazards :	None
14.6 Special precautions for user:	None
Danger code (Kemler):	None
EMS number:	None
Segregation groups:	None
14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code: Not applicable.	
14.8 Transport/Additional information:	
Transport category:	None
Tunnel restriction code:	None
UN "Model Regulation":	None

15 Regulatory information

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

North American

SARA

Section 313 (specific toxic chemical listings): None of the ingredients are listed.
Section 302 (extremely hazardous substances): None of the ingredients are listed.

CERCLA (Comprehensive Environmental Response, Clean up and Liability Act) Reportable

Spill Quantity: None of the ingredients are listed.

TSCA (Toxic Substances Control Act):

Inventory: All ingredients are listed.
Rules and Orders: Not applicable.

Proposition 65 (California):

Chemicals known to cause cancer: None of the ingredients are listed.

Chemicals known to cause reproductive toxicity for females: None of the ingredients are listed.

Chemicals known to cause reproductive toxicity for males: None of the ingredients are listed.

Chemicals known to cause developmental toxicity: None of the ingredients are listed.

Canadian

Canadian Domestic Substances List (DSL):
All ingredients are listed.

EU

REACH Article 57 (SVHC): None of the ingredients are listed.

Safety Data Sheet

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Effective date: 10.18.2017 **Revision**: 10.18.2017

Trade Name: Alconox

Germany MAK: Not classified.
EC 648/2004 – This is an industrial detergent. Contains >30% phosphate, 15-30% anionic surfactant, <5% EDTA salts
EC 551/2009 – This is not a laundry or dishwasher detergent
EC 907/2006 – Contains no enzymes, optical brighteners, perfumes, allergenic fragrances, or preservative agents

Asia Pacific

Australia

Australian Inventory of Chemical Substances (AICS): All ingredients are listed.

China

Inventory of Existing Chemical Substances in China (IECSC): All ingredients are listed.

Japan

Inventory of Existing and New Chemical Substances (ENCS): All ingredients are listed.

Korea

Existing Chemicals List (ECL): All ingredients are listed.

New Zealand

New Zealand Inventory of Chemicals (NZOIC): All ingredients are listed.

Philippines

Philippine Inventory of Chemicals and Chemical Substances (PICCS): All ingredients are listed.

Taiwan

Taiwan Chemical Substance Inventory (TSCI): All ingredients are listed.

16 Other information

Abbreviations and Acronyms: None

Summary of Phrases

Hazard statements:
H315 Causes skin irritation.
H319 Causes serious eye irritation.

NFPA: 1-0-0
HMIS: 1-0-0

Precautionary statements:
P264 Wash skin thoroughly after handling.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P302+P352 If on skin: Wash with soap and water.
P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.
P321 Specific treatment (see supplemental first aid instructions on this label).
P332+P313 If skin irritation occurs: Get medical advice/attention.
P362 Take off contaminated clothing and wash before reuse.
P501 Dispose of contents and container as instructed in Section 13.

Manufacturer Statement:

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 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.

ATTACHMENT 10

Baxter Activity Hazard Analyses

GSI Water Solutions, Inc.

ACTIVITY HAZARD ANALYSIS

ACTIVITY: Subsurface Soil Sampling	**PROJECT:** Former JH Baxter & Co Subsurface Soil Investigation	**DATE:** 12/5/2022
WORK DESCRIPTION: This investigation will involve subsurface soil sampling using a PushProbe rig.		
SITE PROJECT MANAGER: Chris Martin	**SITE SAFETY OFFICER:** Genevieve Schutzius	

Work Activity Sequence Describe the steps and sequence.	**Potential Health and Safety Hazards** Analyze each step for potential hazards.	**Hazard Controls** Develop controls for each potential hazard.
General site activities	COVID-19 Exposure	• Handwashing station or hand sanitizer required onsite. • Personnel that have been diagnosed with COVID-19 will quarantine for the first 5 days of symptoms before returning to work at the site, then will wear a mask for an additional 5 days when indoors or within 6 feet of other people. • Do not come to site if you feel sick. • Perform self-checks prior to leaving house to come to project site.
	Slips, trips, and falls from: • Uneven surfaces • Wet and slick surfaces • Obstacles in travel path	• Always watch where you are walking and take note of any obstacles before starting work; get the lay of the land. • Plant foot straight up and down when walking on wet surfaces, shoes may slip on surface with lateral force on shoe when planting foot. • Practice good housekeeping and don't leave tools or equipment lying around.
	Lifting heavy objects	• Use proper lifting techniques or ask for assistance with heavy objects. • If aboard a vessel, avoid carrying objects directly onto or off the vessel. Hand off to another person. • Evaluate weight and center of gravity of heavier items prior to lifting or moving.
	Weather and cold stress	• Check the weather forecast prior to mobilization and plan accordingly for cold or inclement weather.

Work Activity Sequence Describe the steps and sequence.	Potential Health and Safety Hazards Analyze each step for potential hazards.	Hazard Controls Develop controls for each potential hazard.
		• Layer up or down as necessary to stay warm. Dress to avoid sweating in cold temperatures as it can wick heat away from the body. • Have waterproof raingear available during the rainy season. • Stop work in severe weather conditions (high winds, lightning, flash flooding potential). Resume work when safe to do so.
	Exposure to blood borne pathogens (BBP)	• Survey the site for biohazard objects such as used hypodermic needles, medical waste, or biological waste. • Do not handle potentially infectious items. Isolate the item if possible or use a tool to move it out of the way (i.e. use a shovel to pick up and move a needle). • In the event CPR is performed, use a pocket mask with a one-way valve.
	Insect stings, bug bites, spider bites, snake bites.	• Use insect spray that contains DEET or picardin to protect against mosquitos, bees, and ticks. • Wear light colored clothing to minimize attraction of insects and to help identify ticks on clothing. • Wear orange safety vests over yellows ones to reduce attraction of bees. • Tuck pant cuffs into socks or boots to minimize chance for ticks getting under clothing. • If allergic to stings, bring liquid/capsule Benadryl and/or an Epi-Pen to site and carry at all times.
Vehicle travel to/from site or travel within site.	Vehicle collision, struck by vehicle, vehicle damage.	• Listen and pay attention to backup alarms on vehicles. Ensure all backup alarms are functioning properly. • Use wheel chocks on vehicles parked on slopes. • Park vehicle so that travel in reverse isn't needed. If reversing must be performed, use a spotter when backing up. • Perform a walk around of the vehicle before entering to assess for any changes in vehicle condition after parking.
Sampling work	Injury due to interaction with machinery	• Maintain buddy system for all work performed using a PushProbe rig. • Do not stand or work within 5 feet of PushProbe rig while it is operating. • Maintain eye contact with operator when walking around PushProbe rig. • Wear high-visibility PPE to improve visibility to PushProbe operators.
	Injury due to sharp objects in sampling tube	• Use spoons to dig into soil when collecting sample. Only handle with nitrile-gloved hands if it is apparent that no objects are within targeted sampling interval.

Notes

BBP	blood-borne pathogens	ft	foot or feet	PPE	personal protective equipment
CPR	cardiopulmonary resuscitation	PFD	personal flotation device	SSO	site safety officer

FD field director

Task-Specific Specialty Equipment to be Used	Required Inspections	Task-Specific Required Training
• Sampling work: waterproof steel-toed work boots, stable surface for sample processing	• Inspect boots for damage before beginning work.	None

APPROVED/ANALYZED BY: SIGNATURE: DATE: 12/5/2022

Print Name	Signature	Date	Print Name	Signature	Date
					12/5/2022

ATTACHMENT 11

Modifications to HASP

MODIFICATION TO HEALTH AND SAFETY PLAN

Project:

Modification:

_____
_____
_____
_____

Reasons for Modification:

_____
_____
_____
_____
_____
_____

Site Personnel Briefed

Name: _____ Date: _____

Name: _____ Date: _____

Name: _____ Date: _____

Name: _____ Date: _____

Name: _____ Date: _____

Name: _____ Date: _____

Name: _____ Date: _____

Name: _____ Date: _____

Name: _____ Date: _____

Approvals

Site Supervisor: _____

Site Safety and Health Officer: _____

Other: _____