Sampling and Analysis Plan

J.H. Baxter & Co. Wood Treating Facility

Eugene, Oregon

ECSI #55

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Prepared for

Prepared by

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Abbreviations and Acronyms

Apex	Apex Laboratories, LLC.
Baxter	J.H. Baxter and Co.
bgs	below ground surface
cm	centimeters
CFR	Code of Federal Regulations
COC	chain-of-custody
COI	chemicals of interest
DEQ	Oregon Department of Environmental Quality
DU	decision unit
EDL	estimated detection level
ECSI	Environmental Cleanup Site Information
EPA	U.S. Environmental Protection Agency
FM	field manager
FSO	field safety officer
GPS	global positioning system
GSI	GSI Water Solutions, Inc.
HAZWOPER	Hazardous Waste Operations and Emergency Response
HASP	health and safety plan
ISM	Incremental Sampling Methodology
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
MDL	method detection limit
MRL	method reporting limit
MS	matrix spike
MSD	matrix spike duplicate
NAD83	North American Datum of 1983

OSHA	Occupational Safety and Health Administration
PAH	polycyclic aromatic hydrocarbon
PCDD/F	polychlorinated dibenzo-p-dioxins and dibenzofurans
PM	project manager
PSHA	Occupational Safety and Health Administration
QA	quality assurance
RBDM	Risk-Based Decision Making
RDL	reported detection limit
ROD	Record of Decision
ROW	right-of-way
RPD	relative percent difference
SAP	sampling and analysis plan
Site	J.H. Baxter & Co. Wood Treating Facility
SOP	standard operating procedure (SOP)
SRM	standard reference material

1. Introduction

1.1 Background

The operating J.H. Baxter & Co. (Baxter) Wood Treating Facility (Site) is located at 85 Baxter Street, on the corner of Baxter Street and Roosevelt Boulevard in Eugene, Oregon. The Site is on about 31 acres located in north Eugene in a mix of industrial, commercial, and residential properties. Roosevelt Boulevard and the Roosevelt Channel border the Site to the north and northwest. Commercial properties, including Yale Transport, Armored Transport, and Lile of Oregon, are located northeast of the facility along Roosevelt Boulevard. The Union Pacific Railroad right-of-way (ROW) borders the Site to the south and there is a stormwater drainage channel along that property line. To the west is Zip-O-Log Mills, Inc., Cascade Plating & Machine, and Heli-Jet Heliport. To the east, is Pacific Recycling, Inc. Figure 1 shows the location of the Site. The Site is identified by Oregon Department of Environmental Quality (DEQ) as Environmental Cleanup Site Information (ECSI) No. 55.

A DEQ Record of Decision was completed for the Site in October 2019 (DEQ, 2019). The remedy includes capping about 16 acres of contaminated soil at the Site, continuing groundwater pumping for hydraulic containment of contaminated groundwater, removal of contaminated ditch sediments on the south side of the Site, and sampling of soil (referred to as soil throughout remainder of this sampling and analysis plan [SAP]) in offsite areas that could reasonably have been impacted by contaminant discharges from the facility. Offsite areas that are more likely to have been impacted are to the north and south of the Site, in the direction of the prevailing winds. The ditch on the south side of the Site accepts stormwater runoff from the east, along the railroad tracks and treated stormwater from the Site.

1.2 Project Objectives

The objectives of the work described in this additional offsite SAP is to:

(1) Perform additional focused surface soil sampling in near offsite areas to refine resolution of elevated detections identified during the 2020 offsite sampling event (GSI, 2020),

(2) Evaluate potential shallow soil impacts to nearby residential properties north of the Baxter facility,

(3) Determine if a soil concentration gradient away from the Baxter facility can be identified that may relate to historic air deposition from past operations, and

(4) Collect additional background surface soil samples required to support the understanding of general area-wide dioxin/furan, polycyclic aromatic hydrocarbons (PAHs), pentachlorophenol (PCP), and metals concentrations present in the localized area and impacts to residential properties that may be related to residential uses over time.

1.3 Team Organization and Responsibilities

This SAP will be implemented by GSI Water Solutions, Inc. (GSI).

1.3.1 Project Manager

Josh Bale, P.E., is the project manager (PM). In this role, he will oversee the work and will be the point of contact for the field staff and the regulatory agencies. Josh will work closely

with the field manager (FM), discussed below, and other project staff members to ensure that the project objectives are achieved. Principal deviations from the SAP will not be made without prior approval from the PM. The PM generally is responsible for the following:

- Overseeing the planning and implementation of all field sampling efforts in accordance with this SAP.
- Coordinating with the FM to address any field problems, approve deviations from this SAP, and resolve any emergencies that may arise.
- Communicating with Baxter and DEQ regarding the schedule, performance, and any anticipated deviations from sampling and analysis activities.

1.3.2 Field Manager

Joe Sherrod, R.G., will serve as the FM for the sampling activities. He will report directly to the PM and coordinate with other project and/or subcontractor staff members. The FM generally is responsible for the following:

- Leading the planning and implementation of all field sampling efforts, including arranging for necessary sampling equipment and laboratory sampling containers.
- Mobilizing for field work and leading all aspects of the sampling to ensure that the appropriate procedures and methods are used in accordance with this SAP.
- Coordinating closely with the PM and field staff members to address any field problems, deviations from this SAP, or emergencies that may arise.
- Maintaining copies of field documentation and laboratory chain-of-custody (COC) forms.
- Functioning as the field safety officer (FSO) and ensuring that the sampling activities adhere to the Health and Safety Plan (HASP) (Attachment A) and are in general compliance with 29 Code of Federal Regulations (CFR) 1910.120.
- Tracking the schedule and performance of the sampling and analysis activities according to this SAP in direct coordination with the PM.

The FM will work closely with the PM to fulfill the listed responsibilities and may be assisted at times by other project staff members.

1.3.3 Data Validation

James Mc Ateer of QA/QC Solutions, LLC will perform a quality assurance (QA) review of the analytical data, add qualifiers to the electronic data deliverables submitted by the laboratories, and incorporate the validated laboratory data into the project database.

1.3.4 Laboratory Services

Apex Laboratories, LLC (Apex), of Tigard, Oregon, will be the primary contract laboratory for all work and will (1) perform chemical analyses of samples collected and (2) subcontract chemical analyses to other analytical laboratories as needed. Philip Nerenberg will serve as the laboratory PM to oversee Apex's laboratory performance.

2. Health and Safety

The FM will function as the FSO during the fieldwork and ensure that safe practices and operating conditions are maintained during the field investigation. The field crew will comply with Hazardous Waste Operations and Emergency Response (HAZWOPER) regulations under CFR 1910.120. The FM will provide a safety briefing at the beginning of the field work, during sampling events as needed (e.g., when conducting new or different field activities), and to any new personnel involved in the field activities.

GSI prepared a HASP (Attachment A) in accordance with Occupational Safety and Health Administration (OSHA) regulations (29 CFR Part 1910). The HASP covers all known field hazards associated with the tasks necessary to complete this SAP. All field personnel will have stop-work authority during the completion of field activities.

Sampling activities may involve work near public roadways. Extreme caution should be used when working within 5 feet of roadway and cones and a spotter should be used, as appropriate, based on volume of traffic.

3. Field Schedule and Sampling Summary

Samples will be collected from locations identified in the attached Figures 2 through 4 and Table 1. The sample locations include 23 soil Incremental Sampling Methodology (ISM) sampling decision units (DUs) that will be immediately analyzed, 10 step-out ISM DUs that will be collected and analyzed, as needed, based on results of adjacent primary units, and five background ISM DUs. Two of the background DUs will be residential properties outside areas with higher potential for air deposition to evaluate baseline residential soil conditions that occur through standard homeowner uses of the property over time and general area-wide deposition. All soil sampling locations are based on a combined assessment of the predominant wind rose directions provided by Maul, Foster, and Associates, Inc. and the Lane Regional Air Protection Agency (LRAPA) preliminary air deposition modeling performed in support of the Cleaner Air Oregon air emissions evaluations at the Baxter Facility.

Analytical testing will include the Record of Decision (ROD) constituents of concern (total metals [arsenic, chromium, copper, and zinc], PAHs, PCP, and dioxins/furans). Samples will be analyzed in accordance with methods identified in Table 2.

The field work described in this SAP is anticipated to occur as soon as possible after access agreements have been secured for areas to be sampled. The following tasks are slated to be performed:

- Collect ISM samples from six background areas to the north of the Baxter Facility. For Peterson, Trainsong, and Emerald Parks, historic aerials will be reviewed to limit DU extents only to portions of the property where limited to no disturbance have occurred over time.
- Collect ISM sample from one background areas to the south of the Baxter Facility. Historic aerials will be reviewed to limit DU extents only to portions of the property where limited to no disturbance have occurred over time.

- Collect ISM sample from one soil sampling location on the Baxter property immediately inside the southern fence line at the top of the south side of the drainage ditch
- Collect ISM sample from two soil sampling location on south shoulder of Roosevelt Blvd in unpaved areas within areas of potential air deposition.
- Collect ISM sample from three soil sampling location on the north slope of the Roosevelt Channel drainage ditch within area of potential air deposition.
- Collect ISM samples from 10 individual properties north of the Baxter Facility within areas of highest potential air deposition.
- Collect ISM samples from up to an additional 10 of individual property locations will based on results of initial adjacent property sampling (defined as step-out locations).

All samples will be transported to Apex at the completion of the sample collection. Initial laboratory analyses will have a turnaround time of approximately 4-5 weeks. If step-out ISM DUs are required to be collected and analyzed, an additional 4-5 weeks will be necessary to receive results for these samples. Re-analysis of any sampling location in an attempt to achieve lower detection limits will increase the turnaround time up to 4-5 week.

4. Soil Sampling

4.1 ISM Surface Soil Sampling Methodology

Surface soil will be characterized using ISM, which is a structured composite sampling and processing protocol that reduces data variability, increases sample representativeness, and reduces the chance of missing significant contamination in a volume of soil targeted for sampling (ITRC, 2020). ISM characterizes the average concentration of chemicals in a predefined area called a decision unit or sampling unit. A decision unit defines the area and depth of sampling units upon which risk decisions can be based. To conduct ISM sampling, numerous samples of soil (each called an increment) are collected and combined, processed, and subsampled according to specific protocols. Each DU for this event will consist of 30-75 increments in accordance with updated DEQ Guidance (DEQ, 2020) and ITRC's Incremental Sampling Methodology Update (ITRC, 2020).

The goal of this sampling approach is to define potential areas of concern early and avoid an iterative approach to characterization. The ISM approach provides high-quality data that help manage uncertainty and support risk management decisions. ISM samples will be analyzed for metals (arsenic, copper, chromium, and zinc), PAHs/PCP, and dioxins/furans, as discussed in Section 8.

ISM sampling DU boundaries are presented in Figures 2 through 4. The actual sampling locations will be determined prior to field effort.

4.2 ISM Sampling Approach

The ISM sampling objective is to characterize the nature and distribution of chemicals of interest (COIs) in surface soil. The planned depth is zero to 6 inches below ground surface (bgs) excluding any cover vegetation, gravel, and associated root zone present in the top 6

inches, which is considered to be the depth of possible air emission particulate settlement over time from site operations.

Sixteen DUs (Figures 2 and 3) and seven background sampling DUs (Figure 4) will be delineated in near-site locations; these areas includes the north slope of the Roosevelt ditch over approximately 850 feet, the south shoulder of Roosevelt Blvd., the closest properties in the neighborhood area north of the Site, areas along the south fence line of the Site, a residential background property northwest of the Site (BKGD-03), a residential background property northeast of the facility (BKGD-05), undeveloped areas of public parks (BKGD-04, BKGD-06, BKGD-08, and BKGD-09), and a Roosevelt ditch location up the channel from the Baxter facility (BKGD-07). Additionally, 10 residential step-out properties will be delineated adjacent to the 10 properties to the north. Samples in will be collected, as needed, and analyzed.

4.3 Triplicate Samples (Field Replicate Samples)

Triplicate ISM samples will be collected in DU-15 to assess the variability in average surface soil concentrations. DU-15 was selected for the triplicate samples as this is one of the residential properties of interest and has a sufficiently large, unpaved yard area to achieve sufficient soil volumes of appropriate spatial separation. Three replicate samples will be collected from at least 30 unique increment locations in the DU and placed into separate sampling containers. The replicate sample increment locations will be collected at different systematic random sampling grid locations than initially used. This is accomplished by generating different points within a grid three time and replicating through each grid in DU-15. Unlike the laboratory split sample, which will be split off from the initial multi-increment sample, the triplicate samples will follow the same procedures as other unique DU samples and be homogenized separately by Apex.

4.4 ISM Location Positioning

Increment locations within each DU will be selected on the basis of a Systematic Random Sampling Grid using a square grid (using Esri ArcGIS 10 and Visual Sample Plan 7) when each grid had one sample placed in the same position within the grids generated. This allows for complete coverage of each DU using a randomized method (DEQ, 2020). Impervious surface areas (i.e.- asphalt or concrete) and structure locations (i.e.- buildings or assumed immobile vehicles) will be excluded from the grid generation process.

Increment positions will be pre-loaded into the global positioning system (GPS) and will be used to target increment locations. Field personnel will attempt to position the incremental samples as close as practical to the target locations. If surface obstructions prevent sampling at the planned location, the location can be moved up to one foot in any direction without recording changes. Movement beyond one foot from the planned location should be recorded with an updated location. Abandonment of the increment should be avoided, if at all possible, and a new location identified to ensure a minimum of 30 increments are collected. However, if any increments are abandoned due to issues with increment collection, rationale should be noted in a field log book. Locations found in the field to be in a paved or hardscaped area not originally identified will be moved as close as possible to the edge of the pavement/hardscaping and collected. If beyond the one foot change in location, the rationale for the movement should be noted.

When obtaining the coordinates, the standard projection method to be used during field activities is Horizontal Datum: North American Datum of 1983 (NAD83), State Plane Coordinate System, Oregon South Zone. The positioning objective is to accurately determine and record the positions of all sampling horizontal locations to within ± 1 foot, where possible. Station accuracy may be affected by satellite positioning and obstructions, such as buildings, dense tree cover, steep banks, or heavy cloud cover.

4.5 ISM Surface Soil Sampling Procedures

Thirty to seventy five increments within grids will be identified in each DU prior to SAP implementation and provided to DEQ, upon request. The final number of increments will be based on available aerial extent for sampling within a DU. The incremental surface samples will be collected using a small-diameter (1- to 2-inch diameter) core-shaped sampling device (stainless steel push tube), a stainless steel hand auger, and/or a small earth auger attached to an electric drill powered by a generator. The sampling device will be decontaminated between sampling in each DU or during duplicate and triplicate sampling but not between increments within a DU sample, as described in Section 7.

At each incremental location, after removal of surface vegetation, debris, and larger gravels and cobbles, remaining soil from the top 6 inches will be extruded from the sampling device and split into a decontaminated stainless steel bowl and a large labeled, pre-cleaned glass sample container (approximately 4 liters). In addition to surface vegetation, significant root mass, when present, should be removed from the top of the core and discarded. However, degraded or fine organic materials are acceptable for collection. The field sampler then will advance to the next incremental location and repeat the process. Field personnel will aim to collect the sample volume (zero to 6 inches bgs) from each increment and each sample will be of equal volume, but must be a minimum of 100 grams. All increments from a single DU will be placed into the single 4 liter sample container provided by the laboratory and will be processed by Apex, as described in Section 8.

Excess soil from the ISM sampling device will be placed back into the sampled increment hole within the DU from which it was collected.

5. Sample Handling, Documentation, and Transport

Samples will be traceable from the time of collection through laboratory and data analysis. To ensure samples collected are traceable, the procedures described in this section will be followed.

5.1 Field Logbook

The field activities and observations will be noted in a field logbook and sample description form. The following site activity records will be documented in the field logbook and/or sample description form:

- Sample information, including station ID, date/time of collection, type of sample, and description (applicable only when field form is not used)
- General physical characteristics of the overall ISM samples will be described and recorded on a sample description form, following the ASTM D2488 visual soil classification procedure (ASTM, 2017)

- Names of visitors, their association, and purpose of visit
- Any changes that occur at the Site (e.g., personnel, responsibilities, deviations from the SAP) and the reasons for such changes

Entries will be written clearly with enough detail so that participants can reconstruct events later, if necessary. Field logbooks will be bound, with consecutively numbered pages—removal of any pages is prohibited. Unbiased, accurate language will be used and entries will be made while activities are in progress or as soon afterward as possible. Field logbook and sample description form corrections will be made by drawing a single line through the original entry allowing the original entry to be legible. Corrections will be initialed and the corrected entry will be written alongside the original. When field activities are complete, the field logbook and sample description forms will be retained in the project file at GSI's Portland, Oregon, office.

5.2 Sample Containers, Preservation, and Holding Times

ISM sample increments will be placed directly in the appropriate sample container (Table 2). Sample containers, as well as coolers and packing material, will be supplied by the laboratory. Commercially available pre-cleaned jars will be used and the laboratory will maintain a record of certification from the suppliers. Sample containers will be labeled clearly at the time of sampling. Labels will include the project name, sample ID, analysis to be performed, date, and time.

5.3 Sample Identification and Labeling

During sample collection, a unique code will be assigned to each sample as part of the data record. Station IDs are listed in Table 1. The ID code will indicate the sample type, sampling location, and level of duplication. The first component of the sample ID will contain an abbreviation for the sample type followed by the station ID, with leading zeros used for stations for ease of data management and correct sorting. The month and year will be added to the sample ID. Additional codes may be adopted, if necessary, to reflect sampling needs.

The following are examples of sample IDs for ISM samples:

- ISM-003_0921: ISM soil sample collected in September 2021 from DU-03.
- ISM-115_0921: Duplicate ISM soil sample collected in September 2021 from DU-15.

5.4 COC Procedures

Samples are in custody if they are in the custodian's view, stored in a secure place with restricted access, or placed in a container secured with custody seals. A COC record will be signed by each person who has custody of the samples and will accompany the samples at all times. Copies of the COC form will be included in contract laboratory reports and attached to the final data evaluation report. When transferring sample custody, the COC form will be signed, dated, and the time of transfer will be noted.

The original COC form will be transported with the samples to the selected contract laboratories. Upon receipt, the laboratory sample custodian will inventory the samples by comparing sample labels to those on the COC form. The custodian will enter the sample number into a laboratory tracking system by project code and sample designation. The

custodian will assign a unique laboratory number to each sample and will be responsible for distributing the samples to the appropriate analyst or for storing samples in an appropriate secure area.

The laboratories will maintain COC procedures internally and when samples are shipped to subcontracted laboratories or during shipment between laboratories.

5.5 Sample Packaging and Shipping

The laboratory will supply sample coolers and packing materials for each sampling event. Upon completion of the final sample inventory, samples will be packed in a cooler. Glass jars will be packed to prevent breakage and separated in the shipping container by bubble wrap or other shock-absorbent material. Ice in sealed plastic bags will be placed in the cooler to maintain a temperature of approximately 4 degrees Celsius (°C).

When the cooler is full, the COC form will be placed in a re-sealable bag and taped onto the inside lid of the cooler. A temperature blank will be added to each cooler. Coolers will be transported to the laboratory by courier or delivery by GSI field personnel.

6. IDW Management

No soil investigation-derived waste (IDW) will be generated. Extra soil from a core will be returned to the increment location. All disposable materials used in sample collection and processing, such as paper towels and gloves, will be placed in heavyweight garbage bags or other appropriate containers. Disposable supplies will be placed in a normal refuse container for disposal at a solid waste landfill.

7. Equipment Decontamination Procedures

Equipment that comes in direct contact with samples, such as stainless steel samplers, homogenization bowls and spoons, or containers, will be decontaminated in the following manner at the beginning of the sampling event, between use at each DU, and at the end of the sampling event:

- Wash with a brush and Alconox or other phosphate-free detergent.
- Rinse with tap water.
- Rinse with deionized water.
- Collect equipment blank sample as described below.
- When dry, cover decontaminated equipment with aluminum foil for temporary storage and/or transport, if applicable.

To minimize sample contamination, gloves will be replaced after handling each DU sample, or more frequently, as appropriate.

7.1 Equipment Blanks

Equipment blanks will be collected once during the sampling event from the soil sampling devices and stainless steel homogenization devices after decontamination to evaluate the decontamination process. The equipment blank sample will be collected by passing

laboratory-supplied deionized water over all sampling equipment (e.g., tube sampler, trowel, spoon, bowl, auger) used during the day. The sample will be collected directly into the sample containers.

8. Laboratory Analysis

This section summarizes the chemical analyses to be performed. The laboratory quality control (QC) and data validation protocols that will be followed to ensure that (1) data quality and representation are in accordance with method requirements and (2) data usability is appropriately assessed.

8.1 Chemical Analysis

All primary soil samples will be analyzed for metals (arsenic, copper, chromium, and zinc), PAHs/PCP, and dioxins/furans. All step-out ISM soil will be analyzed based on constituents that exceed screening levels in primary samples. Table 1 summaries the overall sample collection and analysis plan. Table 2 presents details about the sample containers, preservation, holding times, and analytical methodologies. Method reporting and laboratory detection and control limits by analyte are included in Attachment B.

8.2 Laboratory Processing

When processing the ISM samples, Apex will use the entire sample volume from each DU (i.e., 30-75 incremental sub-samples from each DU) to create a representative sample and representative sub-samples that will represent the mean concentration of the DU upon extraction, digestion and analyses. The ISM sample for each DU will be processed using standardized two-dimensional (2-D) Japanese Slab-Cake procedures, including but not limited to the following:

- The DU sample will be air-dried at room temperature (approximately 20°C). Samples will be dried on baking sheets lined with Teflon to protect the sample from contamination by baking sheet material. Multiple trays may be used for each DU sample to increase surface area and decrease the drying time. The air dry process in conducted in humidity, temperature room equipped with filters to protect samples from contamination.
- Soil will be worked and turned following Apex's standard operating procedure (SOP) (provided upon request) during drying to prevent soils from hardening into "bricks.'' This processing also will decrease the sample drying time.
- Once air dried, all of the DU sample from the baking sheets will be sieved. The material <2 millimeters will be returned to the original ISM sampling container until it can be placed in the grinder (note: sticks, shells, glass, metal fragments, and other material not passing through the sieve will be described, photo documented, and removed before grinding).
- Apex Labs follows the most recent guidelines from ITRC for subsampling (ITRC, 2020, section 5.3.5). Although common Japanese 2-D slab cake method, with a minimum of 30 increments, is still acceptable, the rotary sectorial splitter is the principal method used by Apex. The process is statistically preferred because it produces the least sample heterogeneity of the methods.

- The entire dried and sieved sample will be passed through the sectorial splitter. A representative split subsample of approximately 250 grams is placed in the zirconia puck mill grinder. Zirconia is compatible with all target analytes and will not produce target wear metals. The samples will be ground using a cool grinding technique until soil is a fine powder. Cool grinding is a process to preserve lower boiling point compounds which might otherwise volatilize from the sample. The grinding bowl, puck, and ring will be chilled before grinding. Grinding will be done in short, timed intervals so that heat does not build up in the grinder. After grinding is complete, the material will be transferred back to the baking sheet.
- This process will be repeated until the complete DU sample is ground into a fine powder and placed on the baking sheet(s). On the baking sheet, the grinds will be thoroughly mixed and evenly spread out and split into representative sub-samples that will be collected and placed into glass jars for each requested analysis. Given the small uniform size of the particles, standard sample masses can be used for all organic and inorganic methods proposed. The overall process reduces both compositional sample heterogeneity and grouping and segregationally heterogeneity of sample.
- The remaining sample will be returned to the ISM container for archiving. If additional material is needed for future testing, the entire archived sample will be removed and the required additional representative subsamples will be prepared for from ground material.
- Sufficient sample volume will be composited by the laboratory to create laboratory QA/QC samples, as needed.

9. Quality Control and Quality Assurance

9.1 Laboratory QA/QC Procedures

Laboratory QA/QC will be maintained through the use of standard U.S. Environmental Protection Agency (EPA) methods and other accepted methods and standard analytical procedures for the target analytes. Analytical methods and QC measurements and criteria are based on DEQ guidance. The FM will coordinate with the laboratories during the chemical analyses and throughout delivery and validation of the laboratory results.

As noted for the field QC protocols, the field samples will be packaged, managed, and transferred to the laboratories according to the appropriate procedures and with sufficient time and coordination to meet analytical holding times, as generally summarized in Table 2. Following the successful delivery of samples, the laboratory will follow the method-specific and other analytical and laboratory QC procedures and protocols that will be requested by the laboratory before selection.

9.1.1 Internal QC Samples

Various QC samples are used to evaluate the precision, accuracy, representativeness, completeness, and comparability of the analytical results. Analytical methods specify routine procedures that are required to evaluate whether data are within proper QC limits. Additional internal QC includes collection and analysis of field and laboratory QC samples.

9.1.2 Method Reporting Limit Check

Method reporting limit (MRL) checks, as applicable, are made to ensure that primary contract laboratory instrumentation can achieve the required MRLs. If the initial calibration curve contains a standard at the MRL, the laboratory may forgo analyzing a daily MRL check standard. If not, the laboratory will run an MRL check standard per analytical sequence. The instrument must be able to achieve the requested MRLs without interference. If the instrument cannot achieve these MRLs, the samples must be analyzed on a different instrument that is able to achieve the requested MRLs for this project.

9.1.3 Method Blanks

Introduction of chemicals during sampling and analytical activities will be assessed by the analysis of blanks. Method blanks, as applicable, are used to check for laboratory contamination and instrument bias. Laboratory method blanks will be analyzed at a minimum frequency of 5 percent or one per analytical batch for all chemical parameter groups.

9.1.4 Laboratory Duplicates

Sample analytical variability and laboratory precision and accuracy will be determined by the analysis of laboratory-generated sample splits at a frequency of 5 percent or once per batch of 20 samples. The duplicate results will be used for determination of relative percent differences (RPDs). Variability in organic compound analysis will be evaluated by analysis of matrix spike (MS) and matrix spike duplicate (MSD) samples. Precision and accuracy information will be generated for dioxins/furans using the ongoing precision and recovery samples run per the method.

9.1.5 Surrogate Spikes

Surrogate compound analysis for organics also will follow the guidance in the laboratory's SOPs and will evaluate the laboratory's ability to recover the analytes of interest. If data fall outside the established limits for the surrogates, a corrective action must be implemented, and the PM will be notified. The corrective action can range from reanalysis to re-extraction/reanalysis of the sample. If, after these actions, the surrogates are still outside of established limits, this will be considered matrix effects and discussed in the final data validation report. Qualification of data will occur when organic compound surrogate recoveries fall outside of acceptance limits and will be noted in the laboratory case narrative.

9.1.6 Laboratory Control Samples

Laboratory control samples (LCS), as applicable, are used to monitor the primary contract laboratory's day-to-day performance of routine analytical methods independent of matrix effects. In this sampling effort, an LCS/LCS-duplicate (LCSD) will be analyzed with each batch of organic and inorganic analysis. This should provide usable precision and accuracy measurements for each batch. For inorganic samples, a standard reference material (SRM) also will be conducted. If the laboratory runs a blank spike and blank spike duplicate for organics, then it also will run an appropriate SRM.

9.1.7 MS and MSD Samples

MS and MSD samples, as applicable, provide information to assess laboratory precision and accuracy. The primary contract laboratory will follow EPA guidance for MS/MSD sample

analysis. Percent recoveries, including RPD, will be assessed for organic compounds from the MS/MSD and for inorganic compounds from the MS. MS/MSD recovery will be measured at a minimum frequency of once per sampling event. Precision and accuracy information will be generated for dioxins/furans using the ongoing precision and recovery samples run per the method.

9.2 Instrument/Equipment Testing, Inspection, and Maintenance

Analytical instrumentation will be tested, inspected, and maintained by each laboratory according to requirements specified in the laboratory Quality Assurance Manuals (QAMs), method-specific SOPs, and instrument manufacturer instructions. Laboratory facilities are designed to meet specific operating conditions and maintained in a condition to ensure that acceptable operating conditions are met. Instruments will only be utilized for sample analysis if they demonstrate the capability of achieving the required accuracy and compliance with relevant instrument specifications. Only authorized personnel will operate analytical instrumentation and testing equipment. Instrument maintenance and repair will be documented in maintenance logs or record books.

9.3 Instrument/Equipment Calibration and Frequency

Laboratory instruments will be properly calibrated, and the calibrations will be verified with the appropriate check standards and calibration blanks for each parameter before beginning analysis, as specified in method- and/or laboratory-specific SOPs. Instrument calibration procedures and schedule will adhere to analytical protocol requirement and descriptions included in laboratory QAMs and method-specific SOPs. Records of calibration will be maintained by the laboratory to document the performance and maintenance of each instrument.

Calibration standards will be obtained that are traceable to recognized national or international standards, whenever available. Certificate of analysis records for laboratory standards will be retained by the Laboratory QA Manager. Reference standards will be stored according to the manufacturer's recommendations, laboratory SOPs, and/or test method specifications.

9.4 Data Quality Objectives

To generate data that meet the project objectives described in Section 1.2, it is necessary to identify the types of decisions that will be made and the intended uses of the data, then design a data collection program to meet those requirements. These steps are accomplished by applying the data quality objective (DQO) process defined by DEQ (DEQ, 2015). The DQO process is a systematic planning tool designed to clarify the objectives of and maximize efficiency during the data collection. The DQO process was used to guide the design of data collection. The results of the DQO process are a series of qualitative statements intended to clarify the objectives of the project, define the bounding parameters, and identify the error tolerance appropriate for the decisions being made with project information.

There are seven steps in the DQO process; the output of each step influences the choices of the next step. The DQO process is considered iterative and may be used repeatedly as the project progresses and the decisions change or require a different focus.

The seven DQO steps, along with general statements relative to the investigation are as follows:

1. **State the Problem.** Additional information about deposition of contamination from the Eugene Facility is required to finalize risk evaluations. The sampling design was developed with consideration of the collection of samples in locations closest to the facility based on preliminary air modeling analysis.
2. **Identify the Goals.** This SAP will define the specific sampling activities and is designed to meet the following goals:
    - Perform additional focused surface soil sampling in near offsite areas to evaluate potential impacts.
    - Determine if a soil concentration gradient away from the Eugene Facility can be identified, and
    - Improve understanding of general area-wide background contaminant concentrations
3. **Identify the Information Inputs.** A limited amount of the information used to address these questions has been collected in previous work. Supplemental data will be collected to address the goals listed under DQO Step 2.
4. **Define the Boundaries of the Study.** This step is used to define geographic boundaries and other practical constraints, such as scale of the evaluation and the time frame. The work conducted under this SAP includes close-in offsite areas near the Eugene Facility.
5. **Develop the Analytical Approach.** The analytical requirements for this design investigation are established to meet the primary project objectives stated under DQO Step 2 and as expanded upon in Section 1.2. Analytical detection limits were established to allow design decisions that consider DEQ's Risk-Based Decision Making (RBDM) screening levels (DEQ, 2017).
6. **Specify Performance or Acceptance Criteria.** Uncertainty is present in all measurement data. This step establishes the performance criteria and degree of uncertainty that is acceptable to meet project objectives. These criteria include bias, precision, completeness, sensitivity, representativeness, and comparability. These criteria are addressed by applying QC requirements, which consist of the following:
    a. **Field QC** – Proper sampling procedures described in the SAP, including collection of field duplicate samples, equipment rinsate blanks, and temperature blanks.
    b. **Laboratory QC** – Laboratory QC procedures, MRL checks, method blanks, LCS (e.g., blank spikes), LCSD, MS/MSDs, ongoing precision and recovery samples, laboratory blanks, surrogate spikes, calibration check samples, and laboratory duplicates. These QC and acceptance criteria are described in Section 9.1.

7. **Develop the Plan for Obtaining Data.** The plan for obtaining the data is the primary subject of this SAP. The basis of the sampling design, rationale for sampling tasks, and scope of the investigations are laid out in this SAP.

9.5 Data Quality Indicators

The overall quality objective for investigative sampling is to develop and implement procedures that will ensure the collection of representative data of known and acceptable quality. The QA procedures and measurements that will be used for this project are based on DEQ guidance (DEQ, 2015), EPA guidance (Burgess et al., 2016; EPA, 2002a; EPA, 2016; EPA, 2017b; EPA, 2017c), and on established laboratory methods from other sources (e.g., ASTM International, 2003; Ecology, 1997; Krone et al., 1989).

Data quality indicators, such as bias, precision, completeness, sensitivity, representativeness, and comparability, are commonly used to assess the quality of environmental data (EPA, 2002b) and analytical sensitivity will be used to assess conformance of data with these QC criteria. QC criteria are described in this section.

9.5.1 Bias

Bias represents the degree to which a measured concentration conforms to the reference value. The results for MS, MSD, LCS, LSD, field blanks, and method blanks will be reviewed to evaluate bias of the data. The following calculation is used to determine percent recovery for a MS sample:

$$\%R = \frac{M - U}{C} * 100$$

%R = Percent recovery

M = Measured concentration in the spiked sample

U = Measured concentration in the unspiked sample

C = Concentration of the added spike

The following calculation is used to determine percent recovery for an LCS or reference material:

$$\%R = \frac{M}{C} * 100$$

%R = Percent recovery

M = Measured concentration in the reference material

C = Established reference concentration

Results for field and method blanks can reflect systematic bias that results from contamination of samples during collection or analysis. Any analytes detected in field or method blanks will be evaluated as potential indicators of bias.

9.5.2 Precision

Precision reflects the reproducibility between individual measurements of the same property. Precision will be evaluated using the results of MSDs, laboratory duplicates, and field duplicates. Precision is expressed in terms of the RPD for two measurements and the relative standard deviation for three or more measurements. The following equation is used to calculate the RPD between measurements:

$$\text{RPD} = \frac{|\text{C1} - \text{C2}|}{(\text{C1} + \text{C2})/2} * 100$$

RPD = Relative percent difference

C1 = First measurement

C2 = Second measurement

The relative standard deviation is the ratio of the standard deviation of three or more measurements to the average of the measurements, expressed as a percentage.

9.5.3 Completeness

Completeness is a measure of the amount of data that is determined to be valid in proportion to the amount of data collected. Completeness will be calculated as follows:

$$\text{Completeness (percent)} = \frac{\text{Number of acceptable data points}}{\text{Total number of data points collected}} * 100$$

The DQO for completeness for all components of this project is 95 percent. Data that have been qualified as estimated because the QC criteria were not met will be considered valid for the purpose of assessing completeness. Data that have been qualified as rejected will not be considered valid for the purpose of assessing completeness.

9.5.4 Sensitivity

Analytical sensitivity is a measure of both the ability of the analytical method to detect the analyte and the concentration that can be reliably quantified. The minimum concentration of the analyte that can be detected is the MDL or EDL (for high-resolution mass spectrometry analyses, such as for polychlorinated dibenzo-p-dioxins and dibenzofurans [PCDD/Fs]). The minimum concentration that can be reliably quantified is the MRL. Laboratories use both MDLs or EDLs and MRLs for reporting analyte concentrations, and both values will be used as measures of sensitivity for each analysis.

The MDL is defined as the lowest concentration of an analyte or compound that a method can detect in either a sample or a blank with 99 percent confidence. MDLs are determined by the laboratories using standard procedures outlined in 40 Code of Federal Regulations (CFR) 136, in which seven or more duplicate samples are fortified at 1 to 5 times (but not to exceed 10 times) the expected MDL concentration. The MDL is then determined by calculating the standard deviation of the duplicates and multiplying by the Student's t-factor (e.g., 3.14 for seven duplicates). EDLs are calculated by the laboratories as defined in the QAM, which is generally 3 times the method blank concentration. EDLs are specific to

high-resolution mass spectrometry (for the analysis of PCDD/Fs) and are described in the Method 1613 (EPA, 1994) and laboratory SOPs.

MRLs are equal to or greater than the lower calibration limit defined by the lowest concentration on the calibration curve. RLs, MDLs, and EDLs are adjusted for each sample based on the amount of sample extracted, dilution factors, and percent moisture. All laboratories will report detected concentrations above the MRL without qualification and will report detected concentrations between the MDL or EDL (for PCDD/Fs data only) and the MRL with a J-qualifier indicating the concentration is an estimated value. The EDL calculated in the analysis of PCDD/Fs is a sample-specific detection limit based on the signal-to-noise (S/N ratio) of 2.5 at the time of sampling. Non-detect results will be reported to the MRL or EDL with a U-qualifier. The target MDLs, EDLs, practical quantitation limits, and MRLs are listed in Attachment B.

9.5.5 Representativeness and Comparability

Representativeness and comparability are qualitative QA/QC parameters. Representativeness is the degree to which data represent a characteristic of an environmental condition. In the field, representativeness will be addressed primarily in the sampling design by the selection of sampling locations and sample collection procedures. In the laboratories, representativeness will be ensured by the proper handling and storage of samples and initiation of analysis within holding times.

Comparability is the qualitative similarity of one data set to another (i.e., the extent to which different data sets can be combined for use). Comparability will be addressed through the use of field and laboratory methods that are consistent with methods and procedures recommended by EPA and commonly used for sampling studies.

10. Data Management

Data management protocols for both field data and electronic data will be implemented to provide consistent, accurate, and defensible documentation of data quality.

10.1 Field Documentation

Field activities and observations will be documented in field logbooks during implementation of the sampling activities. Grab sample descriptions will be completed for all sample DUs. COC forms, which document sample possession and handling from the time of collection through relinquishment to the primary contract laboratory, will be maintained as part of the field records.

The field records will be kept in the project file as a permanent record of the sampling or field measurement activities. All field records will be copied, scanned, and/or entered into an electronic spreadsheet to create an electronic record for the project file. QA reviews by the PM will check for electronic/hard copy inconsistencies and identify anomalous values or erroneous entries.

10.2 Electronic Data Management

The electronic field data will be incorporated into the project database by the database manager. Management of electronic data files of this SAP and the other supplemental investigations will be managed in accordance with those guidelines.

11. Property Survey

Attachment C will be used by field personnel during sampling activities to record property observations and sampling approaches. Prior to initiation of sampling activities, a questionnaire will be provided to residents to determine current and historic use of the property (Attachment D). Questions will be written in both English and Spanish..

12. Reporting and Schedule

The data from this SAP will be included in the final data evaluation report. This data evaluation report will document field activities and analytical results from each task, and describe any deviations from the associated SAPs.

The data evaluation report will be submitted as soon as possible after final laboratory data is provided.

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Tables

Table 1. Analytical Schedule for Sampling

J.H. Baxter Eugene Facility, Eugene, Oregon - Offsite Sampling

Station Description*	Rationale	Station ID	Sample ID	Number of Containers	Container Volume (oz)	Step-out location - Analaysis determined by primary location	Analytical Methods		
							8270DLL (PAHs/PCP)	6020A (Arsenic, Chromium, Copper, Zinc)	1613B (Dioxins/Furans)
Primary ISM Soil Samples									
Along north side of Baxter Facility south fence line	Undeveloped location south of the facility with southern wind direction potential air deposition.	DU-01	ISM-001_0921	1	128		X	X	X
South Shoulder of Roosevelt Road in vegetated areas west of entrance	Undeveloped shoulder immediately beyond the facility fenceline with northwesterly wind direction potential air deposition.	DU-02	ISM-002_0921	1	128		X	X	X
South Shoulder of Roosevelt Road in vegetated areas east of entrance	Undeveloped shoulder immediately beyond the facility fenceline with northeasterly wind direction potential air deposition.	DU-03	ISM-003_0921	1	128		X	X	X
North slope of Roosevelt ditch	Undeveloped north bank soil of Roosevelt channel above the assumed elevation of channel sediment deposition (i.e. - high water visual indications) with northwesterly wind direction potential air deposition. Location would also evaluate potential concentration gradients away from DU-02.	DU-04	ISM-004_0921	1	128		X	X	X
North slope of Roosevelt ditch	Undeveloped north bank soil of Roosevelt channel above the assumed elevation of channel sediment deposition (i.e. - high water visual indications) with northly wind direction potential air deposition. This sample is the highest suspected direction of deposition and this sample represents the highest potential for deposition over time based on LRAPA air modeling. Location would also evaluate potential concentration gradients away from DU-02 and DU-03.	DU-05	ISM-005_0921	1	128		X	X	X
North slope of Roosevelt ditch	Undeveloped north bank soil of Roosevelt channel above the assumed elevation of channel sediment deposition (i.e. - high water visual indications) with northeasterly wind direction potential air deposition. Location would also evaluate potential concentration gradients away from DU-03.	DU-06	ISM-006_0921	1	128		X	X	X
JUSTA, LLC (LOT 8200/8300) - Unimproved portion	Unimproved and unutilized portion of lot shared by same owner that is fenced off from the remaining property. Location would evaluate northwesterly wind direction potential air deposition. Location would also evaluate potential concentration gradients away from DU-04.	DU-07	ISM-007_0921	1	128		X	X	X
IRWIN, JAMES L (LOT 5603)	Residential lot north of site. Location would also evaluate potential concentration gradients away from DU-05.	DU-08	ISM-008_0921	1	128		X	X	X
NEETHER, TAHNEE R (LOT 5602)	Residential lot north of site. Location would also evaluate potential concentration gradients away from DU-05.	DU-09	ISM-009_0921	1	128		X	X	X
MEYER, KYLE D (LOT 5501)	Residential lot north of site. Location would also evaluate potential concentration gradients away from DU-05.	DU-10	ISM-010_0921	1	128		X	X	X
LEBANON CARS AND TRUCKS LLC (LOT 2400)	Residential lot north of site. Location would also evaluate potential concentration gradients away from DU-05.	DU-11	ISM-011_0921	1	128		X	X	X
LANDWEHR, ROBERT VERNON (LOT 2300)	Residential lot north of site. Location would also evaluate potential concentration gradients away from DU-05 and DU-06.	DU-12	ISM-012_0921	1	128		X	X	X
HIDALGO, LUIS A (LOT 5400)	Residential lot north of site. Location would also evaluate potential concentration gradients away from DU-08 and DU-09.	DU-13	ISM-013_0921	1	128		X	X	X
BOWMAN, KRISTIE LYNN (LOT 5402)	Residential lot north of site. Location would also evaluate potential concentration gradients away from DU-09 and DU-10.	DU-14	ISM-014_0921	1	128		X	X	X
MEAD, JOSHUA & SHANNON (LOT 2500)	Residential lot north of site. Location would also evaluate potential concentration gradients away from DU-11	DU-15	ISM-015_0921	1	128		X	X	X
STAIR, TANYA J (LOT 2600)	Residential lot north of site. Location would also evaluate potential concentration gradients away from DU-11 and DU-12.	DU-16	ISM-016_0921	1	128		X	X	X
TBD Residential Property	Determine typical residential background concentrations in shallow soil in neighborhood lot beyond anticipated extents of potential aerial deposition related to the Site. Northwesterly direction from Site.	BKGD-03	ISM-017_0921	1	128		X	X	X
Peterson City Park - Eugene	Downwind background location beyond anticipated extents of potential aerial deposition related to the Site	BKGD-04	ISM-018_0921	1	128		X	X	X
TBD Residential Property	Determine typical residential background concentrations in shallow soil in neighborhood lot beyond anticipated extents of potential aerial deposition related to the Site. Northeasterly direction from Site.	BKGD-05	ISM-019_0921	1	128		X	X	X
Trainsong City Park - Eugene	Background location outside anticipated extents of potential aerial deposition related to the Site and in vicinity of other industrial operations in the general area	BKGD-06	ISM-020_0921	1	128		X	X	X

Table 1. Analytical Schedule for Sampling

J.H. Baxter Eugene Facility, Eugene, Oregon - Offsite Sampling

Station Description*	Rationale	Station ID	Sample ID	Number of Containers	Container Volume (oz)	Step-out location - Analaysis determined by primary location	Analytical Methods		
							8270DLL (PAHs/PCP)	6020A (Arsenic, Chromium, Copper, Zinc)	1613B (Dioxins/Furans)
Primary ISM Soil Samples									
North slope of Roosevelt Ditch east of modeling higher potential deposition area	Determine background concentrations on north slope of Roosevelt ditch as far up channel as possible prior to start of buried section. This is at the edge of anticipated extents of potential aerial deposition related to the Site and just south of Lark City Park, which was sampled in 2020 and indicated concentrations indicative of background.	BKGD-07	ISM-021_0921	1	128		X	X	X
Emerald Park - River Road Parks and Recreation District	Background location well beyond anticipated extents of aerial deposition related to the Site. The location was chosen as a point further away from industrial inputs and in a northerly wind direction (specifically northeast) in relation to the Site.	BKGD-08	ISM-022_0921	1	128		X	X	X
Hawkins Heights City Park - Eugene	Background location well beyond anticipated extents of aerial deposition related to the Site. The location was chosen as a point further away from industrial inputs and in a southerly wind direction in relation to the Site.	BKGD-09	ISM-023_0921	1	128		X	X	X
Step-out ISM Soil Samples									
CL2 PROPERTIES LLC (LOT 8100)	Step-out location from DU-07. Samples would be collected during initial investigation. Analytical processing would be triggered by exceedances of screening levels at DU-07.	SO-01	ISM-024_0921	1	128	X			
JUSTA, LLC (LOT 8200/8300) - Gravel portion	Step-out location from DU-07 and DU-08. Samples would be collected during initial investigation. Analytical processing would be triggered by exceedances of screening levels at DU-07 or DU-08. This portion of the lots is currently used as equipment, material, vehicle laydown, etc. Sample increments will likely require adjustment of multiple increments to avoid obstructions to access. Results may indicate elevated concentrations unrelated to air deposition. Top of sampling interval would be below the gravel surfacing.	SO-02	ISM-025_0921	1	128	X			
CL2 PROPERTIES LLC (LOT 8400)	Step-out location from DU-07 and DU-08. Samples would be collected during initial investigation. Analytical processing would be triggered by exceedances of screening levels at DU-07 or DU-08.	SO-03	ISM-026_0921	1	128	X			
CL2 PROPERTIES LLC (LOT 8500)	Step-out location from DU-13. Samples would be collected during initial investigation. Analytical processing would be triggered by exceedances of screening levels at DU-13.	SO-04	ISM-027_0921	1	128	X			
SALIC, JOSE LUIS (LOT 5403)	Step-out location from DU-13 and DU-14. Samples would be collected during initial investigation. Analytical processing would be triggered by exceedances of screening levels at DU-13 or DU-14.	SO-05	ISM-028_0921	1	128	X			
CARTER, CHRISTINA & CHRISTOPHER R (LOT 5404)	Step-out location from DU-13 and DU-14. Samples would be collected during initial investigation. Analytical processing would be triggered by exceedances of screening levels at DU-13 or DU-14.	SO-06	ISM-029_0921	1	128	X			
CRANFORD, DEBRA S (LOT 2800)	Step-out location from DU-15. Samples would be collected during initial investigation. Analytical processing would be triggered by exceedances of screening levels at DU-15.	SO-07	ISM-030_0921	1	128	X			
CARROLL, KIMBERLEY JO LE 1-2 (LOT 2700)	Step-out location from DU-16. Samples would be collected during initial investigation. Analytical processing would be triggered by exceedances of screening levels at DU-16.	SO-08	ISM-031_0921	1	128	X			
CARROLL, SHIRLEY (LOT 1400)	Step-out location from DU-12 and DU-16. Samples would be collected during initial investigation. Analytical processing would be triggered by exceedances of screening levels at DU-12 or DU-16.	SO-09	ISM-032_0921	1	128	X			
RODRIGUEZ, LISA RENEE & JOSE AYALA (LOT 1500)	Step-out location from DU-02 and DU-12. Samples would be collected during initial investigation. Analytical processing would be triggered by exceedances of screening levels at DU-02 or DU-12.	SO-10	ISM-033_0921	1	128	X			
Quality Control ISM Soil Samples									
MEAD, JOSHUA & SHANNON (LOT 2500)	Chosen due to largest area of unimproved yard allows for increased ability to collect three ISM samples with greater separation in increment locations.	QC Location (Field Duplicate/Triplicate) (DU-15)	ISM-115_0921 ISM-215_0921	2	128		X	X	X
QC Sample	Split randomly chosen	Lab Duplicate Sample (BKGD-03)	ISM-917_0921	Shared with BKGD-03 sample	N/A		X	X	X

Notes

*: Names are based on Lane County Assessor website descriptions for legal owners. These may or may not indicate actual individuals residing on the property.

ID: Identifier

oz: Ounces

ID: Identifier

oz: Ounces

PAH: Polycyclic aromatic hydrocarbons

PCP: Pentachlorophenol

QC: Quality Control

Table 2. Laboratory Methods, Sample Containers and Holding Times for Soil Samples

J.H. Baxter Eugene Facility, Eugene, Oregon - Offsite Sampling

Analyte Group	Analyte/Analyte Group	Laboratory Method	Sample Bottle	Preservative
ISM Samples				
Total Metals	Arsenic, chromium, copper, zinc	EPA 6020 A	1 gallon (128 oz) jar	0 - 6 °C
PAHs/PCP	--	EPA 8270 D LL		
Dioxin/Furans	--	EPA 1613 B		

Notes

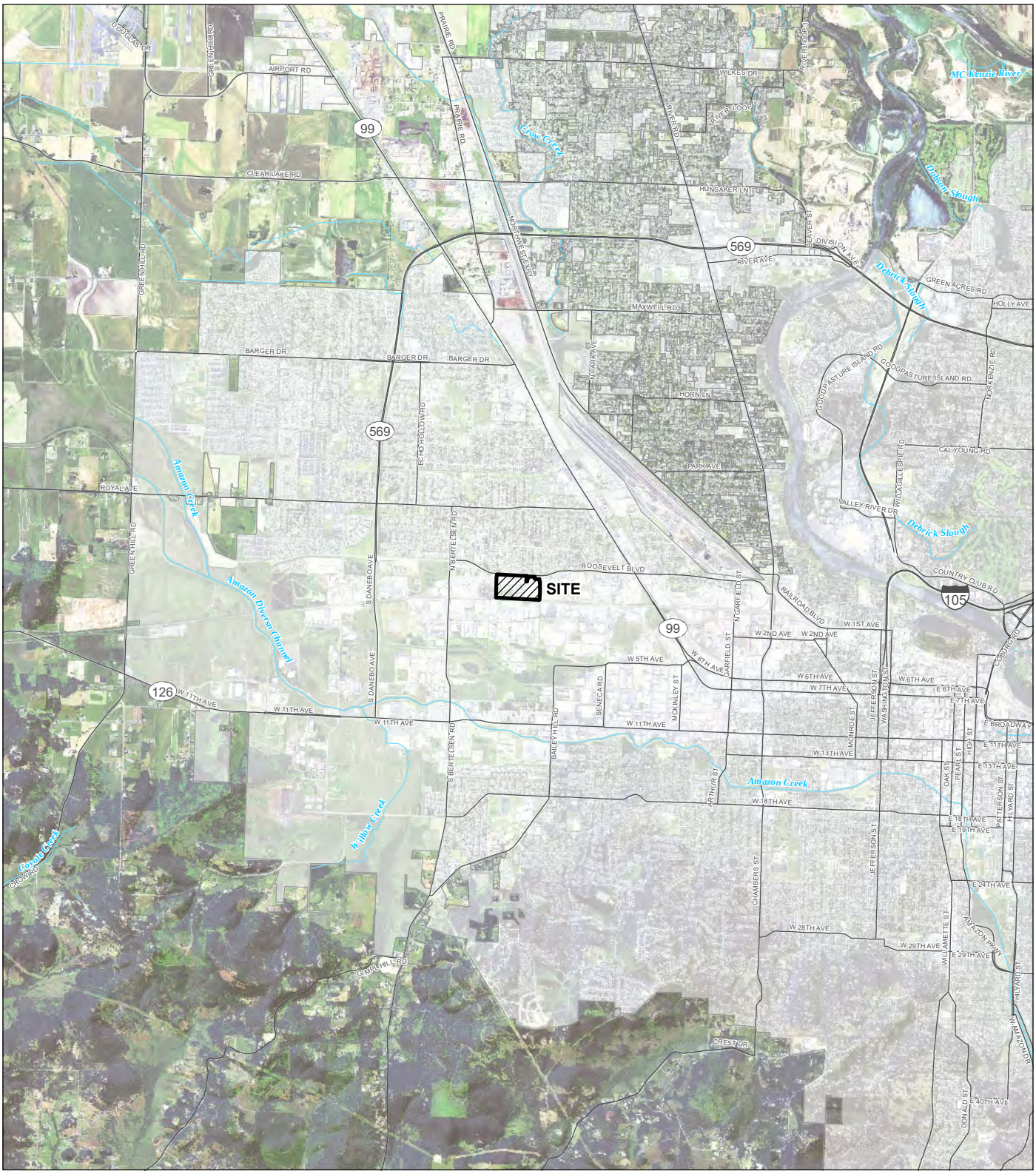
°C: degrees Celsius

EPA: U.S. Environmental Protection Agency

SM: standard methods

ISM: Incremental Sampling Methodology

Figures



LEGEND

- Eugene City Limits
- Major Roads
- Watercourses

MAP NOTES:
Date: July 25, 2016
Data Sources: Air photo taken on June 11, 2014 by the USDA

N

0 0.5 1
Miles

GSI Water Solutions, Inc.

FIGURE 1

Site Vicinity Map

J.H. Baxter Wood Treating Facility
Eugene, Oregon

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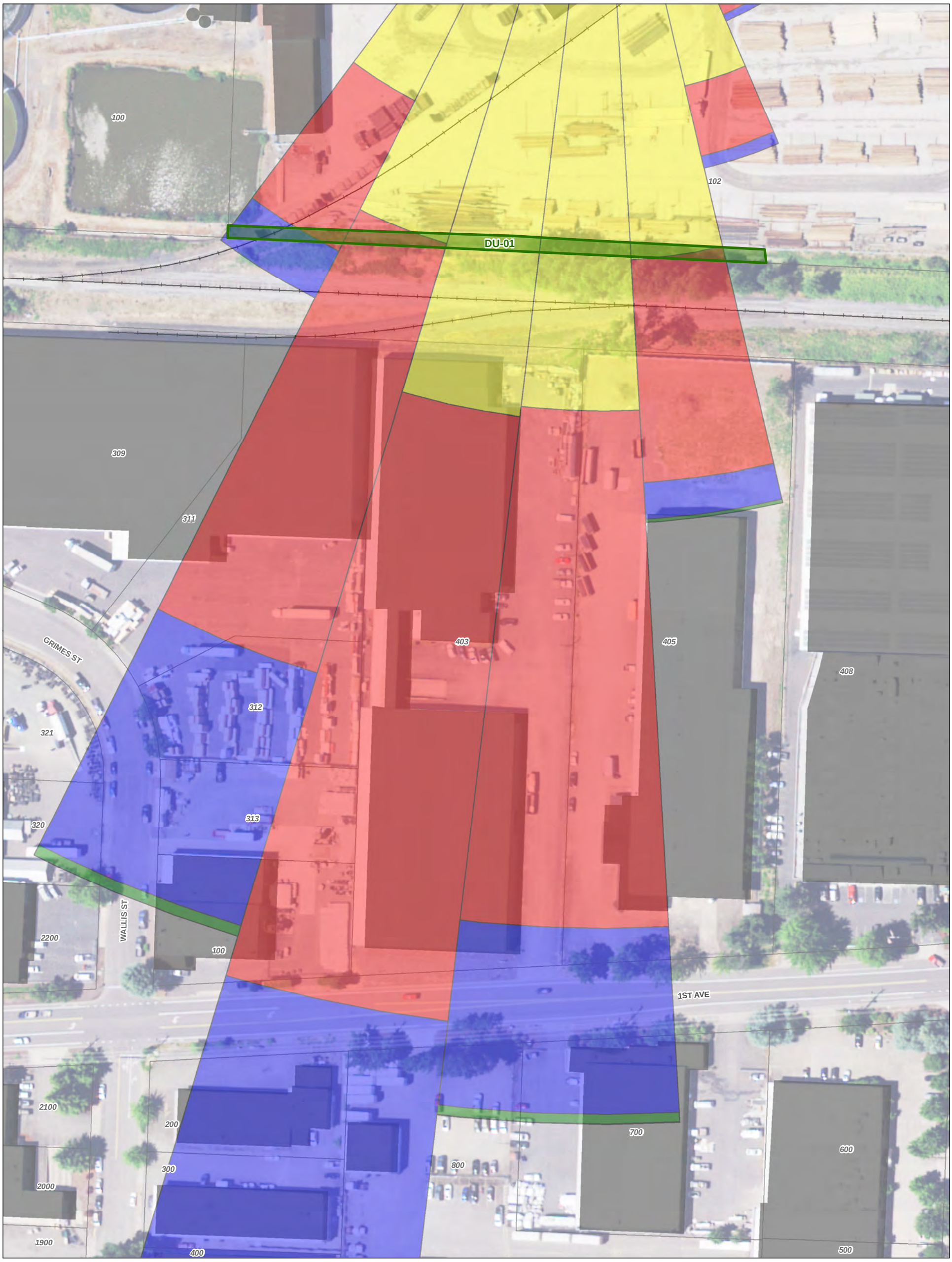

LEGEND

ISM Area	Wind Speed (m/s)	All Other Features
Decision Unit	>= 11.10	Railroad
	8.80 - 11.10	Building Footprint
	5.70 - 8.80	Tax Lot
	3.60 - 5.70	
	2.10 - 3.60	
	0.50 - 2.10	

FIGURE 2

Soil Sampling Location

South Wind Direction

J.H. Baxter & Co.

Eugene, OR

N

0 50 100

Feet

GSI Water Solutions, Inc.

Date: May 21, 2021
Data Sources: BLM, ESRI, ODOT, USGS, Aerial Photo 2019, City of Eugene

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LEGEND

ISM Area	Wind Speed (m/s)	All Other Features
Decision Unit	>= 11.10	Railroad
Step Out	8.80 - 11.10	Tax Lot
	5.70 - 8.80	
	3.60 - 5.70	
	2.10 - 3.60	
	0.50 - 2.10	

FIGURE 3

Off-site Soil Sampling Locations

North Wind Direction

J.H. Baxter & Co.

Eugene, OR

N

0 50 100

Feet

GSI Water Solutions, Inc.

Date: June 29, 2021
Data Sources: BLM, ESRI, ODOT, USGS, Aerial Photo 2019, City of Eugene

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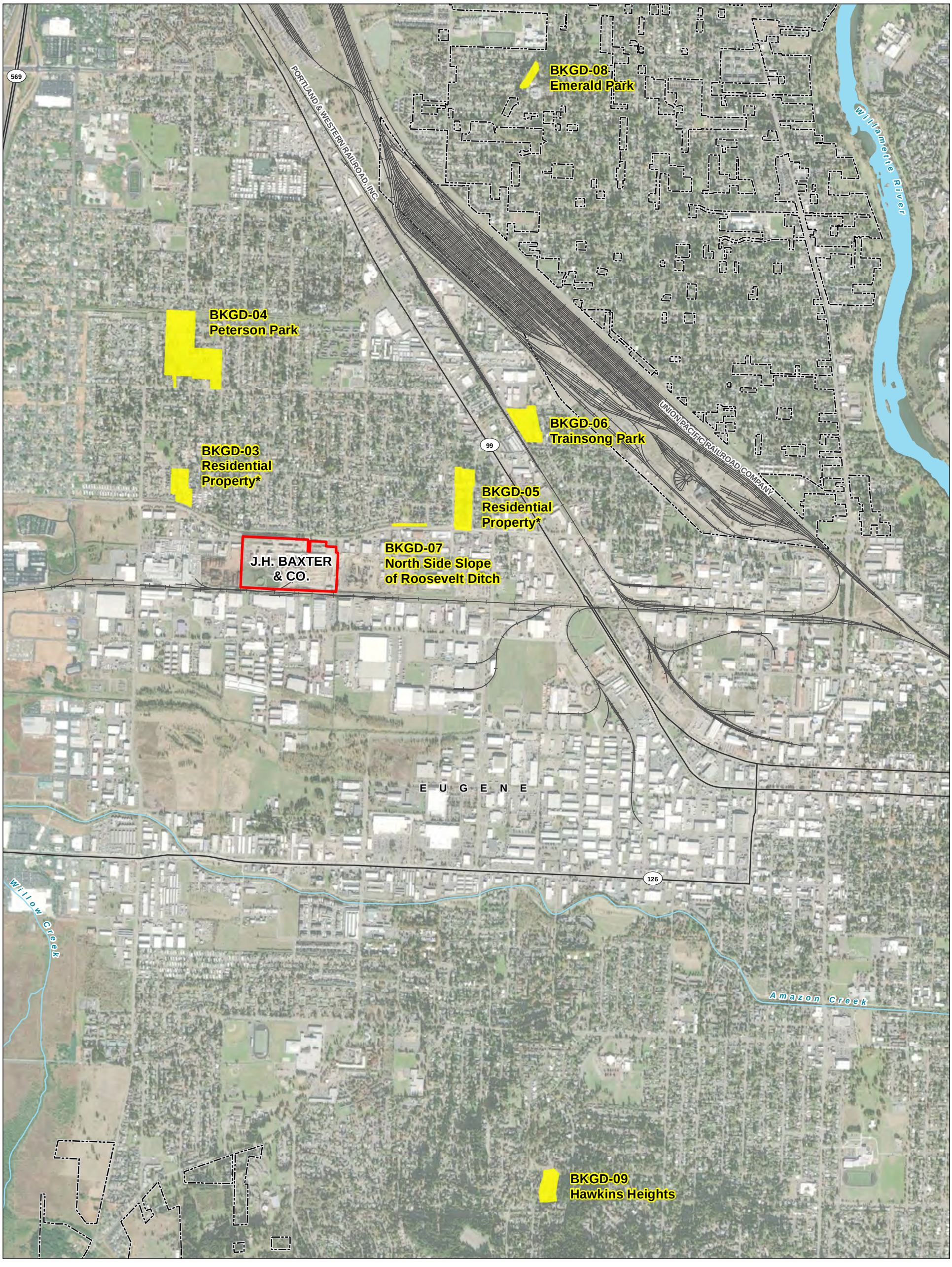

LEGEND

- Proposed Background Sampling Location
- Facility Boundary
- City Boundary
- Railroad
- Major Road
- Watercourse
- Waterbody

FIGURE 4

Background Soil Sampling Locations

J.H. Baxter & Co.
Eugene, OR

NOTES

1. BKGD-01 and BKGD-02 were collected during the 2020 Offsite Soil Sampling Investigation.
2. Only portions of properties with limited to no historic disturbance or development will be included in the background study.

* Location to be determined at a future date based on access agreements.

Date: July 15, 2021
Data Sources: BLM, ESRI, ODOT, USGS, Aerial Photo 2020

N

0 800 1,600 2,400
Feet

GSI Water Solutions, Inc.

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Attachment A
Health and Safety Plan

DRAFT

Appendix A

GSI Site-Specific Health and Safety Plan

J.H. Baxter and Co. Wood Treating Facility, Eugene, Oregon

April 2021

Prepared for

Site-Specific
Health and Safety Plan

Prepared for:

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Josh Bale, PE
HASP Reviewer

Josh Bale, PE
Project Manager

Contents

Tables

Attachments

Abbreviations and Acronyms

a.m.	ante meridian (or before noon)
ACQ	ammoniacal copper quaternary
AED	automated external defibrillator
AHA	activity hazard analysis
AZCA	ammoniacal copper zinc arsenate
Baxter	J.H. Baxter and Co.
CFR	Code of Federal Regulations
COC	chain of custody
CPR	cardiopulmonary resuscitation
CRZ	Contamination Reduction Zone
dBA	decibels (A-weighted scale)
EPA	U.S. Environmental Protection Agency
EZ	Exclusion Zone
F	Fahrenheit
FD	Field Director
FIFRA	Federal Insecticide, Fungicide and Rodenticide Act
GFCI	ground fault circuit interrupter
HAZWOPER	Hazardous Waste Operations and Emergency Response
HASP	Health and Safety Plan
ID	identification
LOTO	lock-out/tag-out
mph	miles per hour
NRC	National Response Center
NRR	Noise Reduction Ratings
OSHA	U.S. Occupational Safety and Health Administration
p.m.	post meridian (or between noon and midnight)

PCBs	polychlorinated biphenyls
PCP	pentachlorophenol
PE	Professional Engineer
PFD	personal flotation device
PM	Project Manager
PPE	personal protective equipment
PVC	polyvinyl chloride
RCRA	Resource Conservation and Recovery Act
SAP	sampling and analysis plan
SDS	safety data sheets
Site	J.H. Baxter and Co. Wood Treating Facility
SSHO	Site Safety and Health Officer
STSC	Safety Trained Supervisor Construction
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.

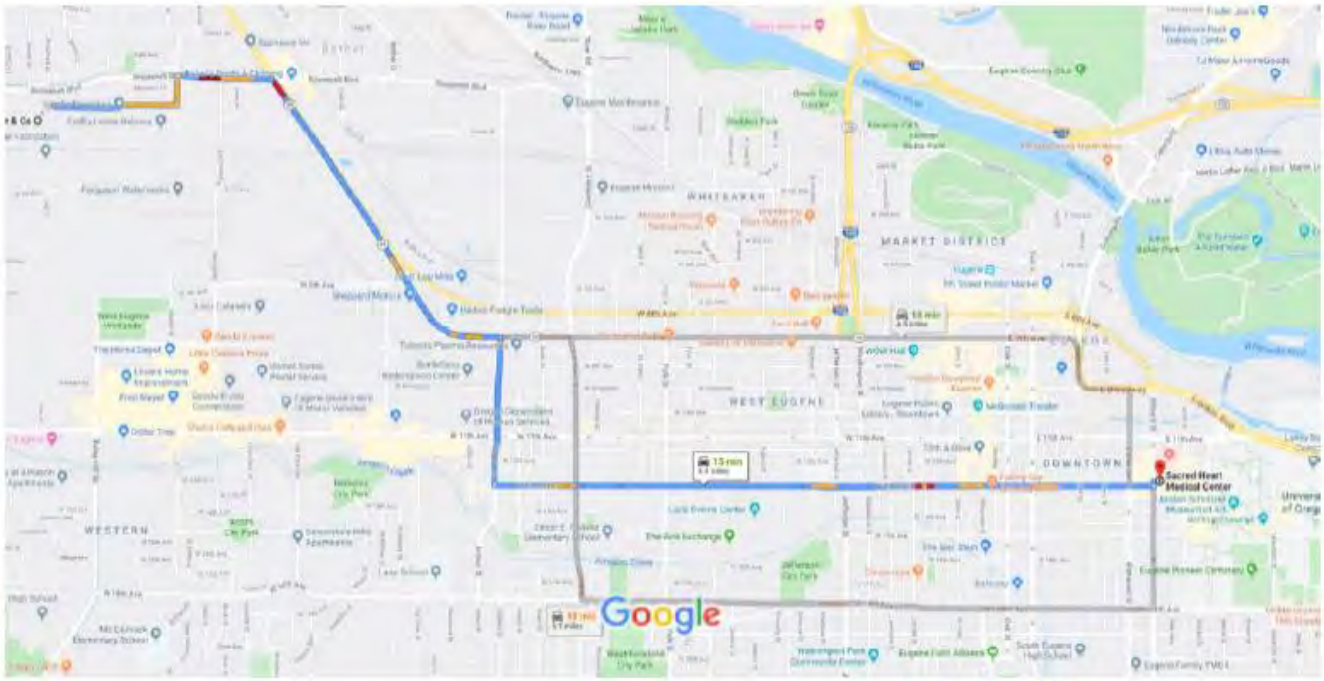
Table 1. Emergency Contacts

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	Josh Bale	Office: 971-200-8502 Cell: 530-276-4188
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 [OSHA])*	—	1-800-321-6742 (Oregon)
GSI Project Manager	Josh Bale	Office: (971) 200-8502 Cell: (530) 276-4188
GSI Field Director	Joe Sherrod	Cell: (253) 486-9014
Client Contact	Georgia Baxter	Office: (650) 349-0201

1.2 Hospital Location and Directions Map

Sacred Heart University Medical Center is the closest emergency service location.

Google Maps J H Baxter & Co to Sacred Heart Medical Center Drive 4.4 miles, 15 min



via OR-99 S and W 13th Ave Fastest route, lighter traffic than usual	15 min 4.4 miles
via OR-99 S	16 min 4.3 miles
via OR-99 S and W 18th Ave Some traffic, as usual	18 min 5.1 miles

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 and at the J.H. Baxter Facility
Fire Extinguisher	Inside work vehicle and at the J.H. Baxter Facility
Mobile Phones	On workers
Traffic Cones	Will be used as needed when collecting samples within 5 feet of edge of road shoulder
Walkie Talkies	N/A
Water or Other Fluid Replenishment	Inside work vehicle
Eye Wash	In work vehicle and at the J.H. Baxter Facility
Chemical Spill Kit	At the J.H. Baxter Facility but generally N/A for GSI led work

SECTION 2: **Organizational Structure**

This site-specific Health and Safety Plan (HASP) has been developed for the J.H. Baxter Eugene Wood Treating Facility and nearby offsite areas (Site) in accordance with (OSHA 29 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, and field reconnaissance.

Site Name and Address

Project Name	J.H. Baxter Eugene	**Project Number**	0302
Date	April 2021	**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.
Joe Sherrod	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.
Joe Sherrod	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 Activities	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.

2.3 Limitations

This HASP was prepared exclusively for the J. H. Baxter Eugene 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
1/2	N/A	Staffing changes	Joe	4/28/2021	

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

3.1 Site Description

The J.H. Baxter and Co. (Baxter) 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 Site latitude is 44.062133, longitude is -123.151536.

The Site and vicinity are generally flat and highly developed, consisting of a mix of industrial, commercial, and residential properties; railways; and public roads. Roosevelt Boulevard and the Roosevelt Channel border the Site to the north and northwest. Industrial properties are located northeast, east, and west of the facility. The Union Pacific Railroad right-of-way is the southern boundary and there is a stormwater drainage channel along that property line.

Baxter developed the Site and began wood treatment in 1943. Before 1943, the area was undeveloped farmland. Figure 5 presents the general site layout and location of historical features. The earliest treating processes used creosote formulations in a single retort (Retort 82). In 1945, Baxter added a second retort (Retort 83) for treating wood products with pentachlorophenol (PCP). Between 1945 and 1970, the facility added four more retorts and began using PCP, metals-based treating solutions, and fire retardants.

Between 1945 and 1955, a burn pit was used to dispose of waste onsite. Additionally, a log pond was located on the southwestern portion of the facility until the mid-1970s, when Baxter filled in a portion of it to construct the stormwater retention pond. The existing pond is approximately 0.75 acre in size and 5 feet deep.

Currently, the Eugene facility processes untreated wood products to produce treated wood products. Processing includes framing, trimming, marking, seasoning, and treatment. The finished products, which include dimensional wood products, guardrails, crossarms, poles, and pilings, are shipped to utilities and other users by truck or rail. The main elements of the pressure treatment system, processes and handling of treated products are summarized below:

- Five retorts are currently in use onsite for pressure treatment of wood products.
- The chemicals used include the following:
    - Creosote
    - PCP
    - Chemonite (ammoniacal copper zinc arsenate)
    - ACQ (ammoniacal copper quaternary)
- Retort 85 utilizes PCP for wood treatment and there are several process and storage tanks associated with this area (Figure 5).
- South of Retort 85 is the main pressure treatment area, which includes the remaining four retorts (Retorts 81, 82, 83, and 84), and multiple work, process, and storage tanks (also shown on Figure 5).
- The ground surface beneath all retorts and tanks is paved, but approximately 80 percent of the remaining facility is unpaved.
- All of the retorts have concrete drip pads.

Pressure-treated products are moved to the treated wood storage areas located throughout the facility, placed on skids for storage, and ultimately shipped offsite by truck and rail. Untreated wood products are stored throughout the facility.

3.2 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.

3.3 Site Access

3.3.1 Operational Hours

Operations at the facility are 24 hours a day. However, site access for GSI employees should be from 7 a.m. to 6 p.m. unless specifically requested with Baxter ahead of time.

3.3.2 Non-Operational Hours

To be determined by Baxter based on site operational schedules.

3.3.3 Visitor Access and Safety

All GSI employees and other site visitors must check in at the main office, be provided a brief safety overview (if new to the facility), sign off on safety briefing, and sign in and out on visitor log at the main office before proceeding to the field.

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 EZ or CRZ.
- 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. Within the boundaries of client facilities, comply with site requirements for motor vehicles. Where possible, move the vehicle to be close to the sampling location. 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 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).

4.6 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.

4.7 Subsurface Utilities

Check for the location of underground services before beginning ground-penetrating work. 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.

4.8 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.

4.9 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.

4.10 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.

4.11 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.

4.12 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) (dBA) 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 (NRR) 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 6).

4.13 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.

4.14 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.

4.15 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.

4.15.1 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 7).

4.15.2 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.

4.15.3 Ultraviolet Exposure

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

4.15.4 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 4).

4.15.4.1 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.

4.15.4.2 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 4).

4.15.4.3 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

4.15.4.4 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.

4.15.4.5 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 4) and the Heat Stress Quick Card (Attachment 5). 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.

4.15.4.6 Liquid Replacement Program

Since dehydration is a primary cause of heat illness, employees should ensure regular hydration is performed ahead of and during work days 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.

4.15.4.7 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.

4.15.5 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 Fact Sheet (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.

4.16 Hazardous Insects/Plants/Animals

Site hazards may include bees, snakes, spiders, and ticks. Avoid contact or seek medical attention if necessary. Wear insect repellent, as appropriate. Survey the area for poison oak and use appropriate caution.

4.17 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.

4.18 Over Water/Near Water

Employees will wear U.S. Coast Guard (USCG) for U.S. operations-approved personal flotation devices (PFDs) (i.e., life jacket or buoyant work vest) at all times when on the sampling vessel. The USCG-approved PFDs are Type II PFDs. Employees should inspect life jackets or work vests daily before use for defects. Do not use defective PFDs.

There is a potential for a man overboard situation while the team is working over water on the research vessel or from the dock. This potential is increased when heavy equipment is being used or during stormy weather. If a person falls overboard, all vessel engines will be stopped immediately. Flotation devices and throw ropes (e.g., life rings) attached to lines will be thrown to the victim from the vessel. The victim then will be brought aboard the research vessel or towed to shore; wet clothes will be removed and replaced with dry blankets or clothing as necessary. No other person shall enter the water during a man overboard event unless the victim is unconscious or seriously injured. Rescuers must wear life preservers and be tethered to the research vessel or shore.

Ensure that working platforms are secured with no tripping hazards; surfaces that become wet and slippery should be cleaned and dried to the extent possible; guard-rails and toe boards should be checked periodically to ensure they are firmly fixed; PFDs should be worn at all times; life buoys fitted with lifelines should be provided and be ready for use at all times; be aware of vessel traffic; be aware of the potential for rapidly changing conditions (e.g., high flows in response to intense rainfall) and drifting debris (e.g., snags) that could collide with vessel.

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. Request assistance from Baxter if hot work is required.

4.21 Lockout/Tagout

Lockout/tagout (LOTO) is a safety procedure used to ensure that hazardous energy sources or machines are properly shut off and locked so they cannot be started again before maintenance or repair work are completed. Hazardous energy sources include electrical, mechanical, hydraulic, pneumatic, chemical, radiation, and thermal.

If an LOTO situation is encountered, GSI employees will stop work and immediately notify the Client Contact (listed on the Emergency Contact form at the front of this HASP) to ensure that energy sources are de-energized or made safe before proceeding.

4.22 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.

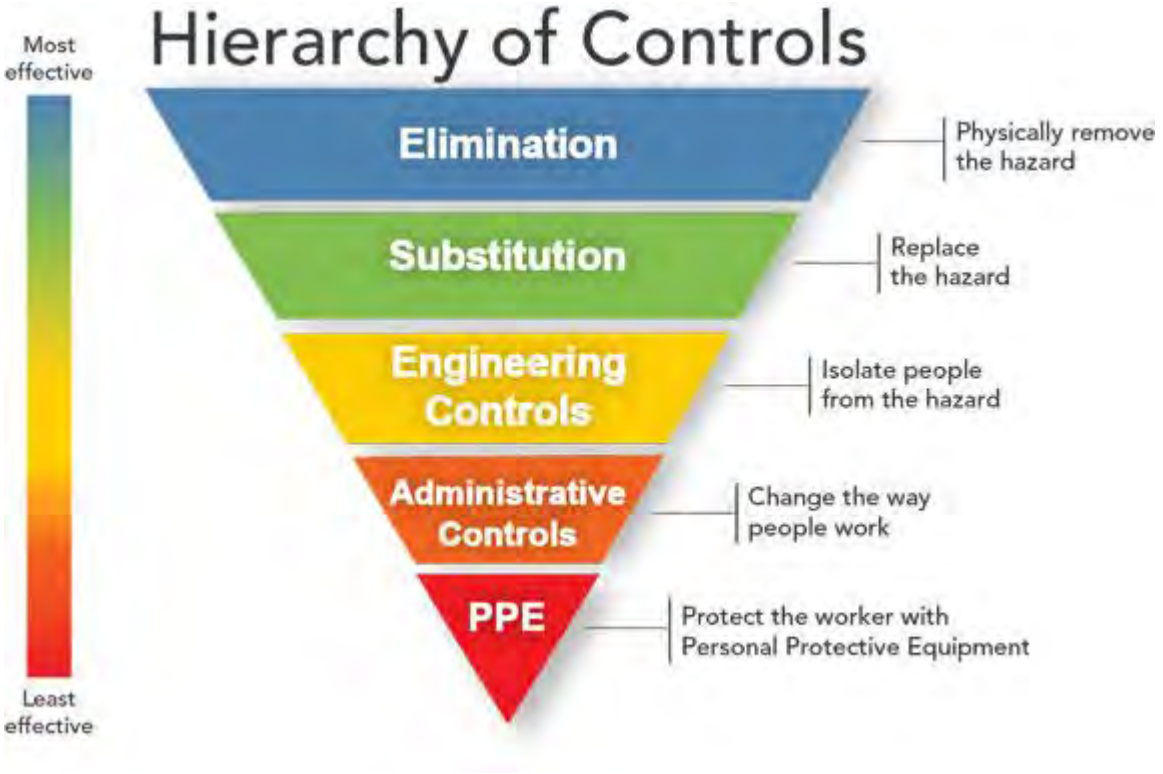
Table 6. Training Requirements

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/CPR/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

[1] Tyvek is a registered trademark of Dupont.

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.

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 client, and may do so only for the purposes of observing project area conditions or operations.

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 locations near roadways, excavations, pits, hazardous areas, driller working areas, 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

Pentachlorophenol (PCP), creosote, ammoniacal copper zinc arsenate (ACZA or Chemonite[2]), and other metal-based treating solutions are registered pesticides under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), and have been used for treating wood products at the Site. Baxter recycles and reuses process residuals and wastewater in accordance with the federal Resource Conservation and Recovery Act (RCRA). In addition, under Baxter's Incidental and Infrequent Drippage Plan (Baxter, 2006), soil is inspected daily during operations and any liquid or stained soil is collected and disposed of as hazardous waste. Hazardous wastes generated at the Eugene facility are managed in accordance with federal, state, and local regulations. Hazardous wastes generated onsite are shipped offsite for disposal. Before shipment, the wastes are stored in a hazardous waste accumulation area.

Table 7. Potential Chemical Hazards

Chemicals Identified Onsite	Exposure Routes	Controls
PCP Creosote AZCA	Skin contact with contaminated materials, inhalation of high-concentration vapors, and ingestion of materials from hand-to-mouth contact due to inadequate personal hygiene	Hazardous material container(s) must be properly labeled with the identity of the hazardous chemical(s) and the appropriate hazardous warning information. Baxter maintains copies of all safety data sheets (SDSs) for any hazardous materials in use at the Site. The SSHO or FD will orient GSI employees and subcontractors to the potential hazards posed by chemicals used and present onsite. All required PPE as specified in the following sections will be worn, and personal hygiene will be carefully monitored. Air monitoring is performed by Baxter and evaluation alarms will sound if high-concentration spills or vapors are present on Site.
Decontamination Chemicals	**Exposure Route**	**Controls**
Alconox	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

[2] Chemonite is a registered trademark of Lonza.

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 Onsite

PPE[1]	Onsite Work	Offsite Work
Steel-toed boots (leather or neoprene safety, slip- and chemical-resistant, waterproof)	X	X
Gloves (leather, nitrile)	X	X (nitrile for sampling)
Eye/face protection (safety glasses, goggles, or face shield)	X	
Hard hat	X	
Splash protection (polyvinyl chloride [PVC] bibs/aprons, or Tyvek coverall)	X	
Hearing protection	X (when necessary)	
High-visibility vest	X	X
Long sleeves required	X	X
Personal flotation device (Type II)	X (if working within 10 feet of edge of pond where no railing is present)	

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 2) 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 samples will be decontaminated before and after sampling events according to procedures specified in the SAP. Heavy equipment in direct contact with soil and/or groundwater, such as the drill rig augers and backhoe 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 Sampling and Analysis Plan ([SAP] Section 6). All visibly impacted soil or sediment and water generated during drilling and sampling will be contained in 55-gallon drums. Drummed materials will be profiled to evaluate disposal options as described in the SAP (Section 6). Construction of temporary stations for personnel and other sampling equipment will be the responsibility of the SSHO.

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

GSI's 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 1. 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: **Reference**

J.H. Baxter & Co. 2006. Accidental Spill Prevention Plan, J.H. Baxter & Co., Eugene, Oregon.

SECTION 15: **GSI Safety Committee Members and Contact Information**

Table 11. GSI Safety Committee Members

Person	Role	Contact Information
Josh Bale	Chairperson (Employee Representative), Health and Safety Coordinator, and HASP Administrator (Employee Representative)	Work: 971.200.8535 Cell: 773.817.4229
Kathy Roush	Management Representative	Work: 971.200.8527 Cell: 919.605.6644
Molly Monroe	Recorder	Work: 541.257.9002 Cell: 541.230.0578
Andrew Wentworth	Employee Representative	Work: 971.200.8534 Cell: 510.593.0120
Andrew Davidson	Employee Representative	Work: 971.200.8502 Cell: 530.276.4188
Laura Burgess	Employee Representative	Work: 971.200.8504 Cell: 503.544.0879
Owen McMurtrey	Employee Representative	Work: 541.257.9005 Cell: 541.740.5619
Jessica Letteney	Employee Representative	Work: 971.200.8524 Cell: 503.410.4431

SECTION 16: **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 Exposure, Injury, Spill, Near Miss Report Form
(Incident Report Form)

EMPLOYEE EXPOSURE / INJURY INCIDENT / SPILL / NEAR MISS REPORT
(Use additional page if necessary)

Date: _____ Time: _____

Name: _____ Employer: _____

Type of Occurrence: employee exposure , / injury incident , / spill , / near miss ,

Site Name and Location: _____

Site Weather (clear, rain, snow, etc.): _____

Nature of Illness/Injury: _____

Symptoms: _____

Action Taken: Rest _____ First Aid _____ Medical _____

Transported By: _____

Witnessed By: _____

Hospital's Name: _____ Treatment: _____

Describe in detail how this Accident/Incident/Spill/Near Miss occurred. (If a spill, list the name of the compounds, quantities and method of clean-up/containment.)

_____

_____

_____

_____

_____

_____

_____

_____

What was the person doing at the time of the accident/incident? _____

_____

Personal Protective Equipment Worn: _____

_____

What immediate action was taken to prevent recurrence? _____

_____

_____

Employee's Signature: _____ Date: _____

Supervisor's Signature: _____ Date: _____

Site Safety Representative's Signature: _____ Date: _____

ATTACHMENT 2

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.

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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.

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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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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

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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.

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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 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 Heat Safety Fact Sheet

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 5

OSHA Heat Stress Quick Card

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 6

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.

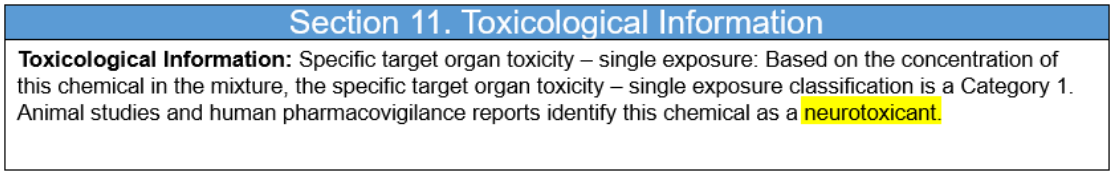

Figure 1: Check the SDS.

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 7

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.

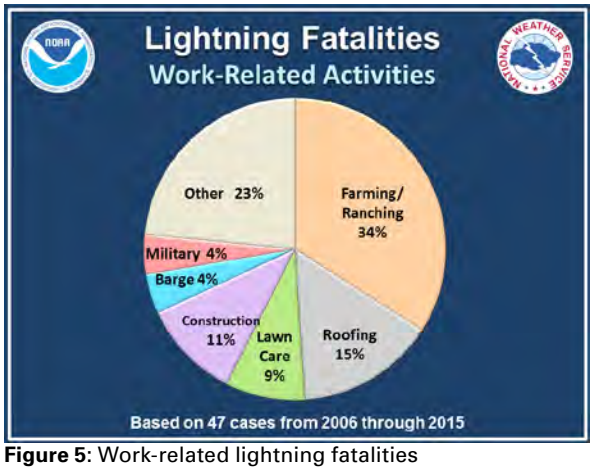

Figure 5: Work-related lightning fatalities

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.

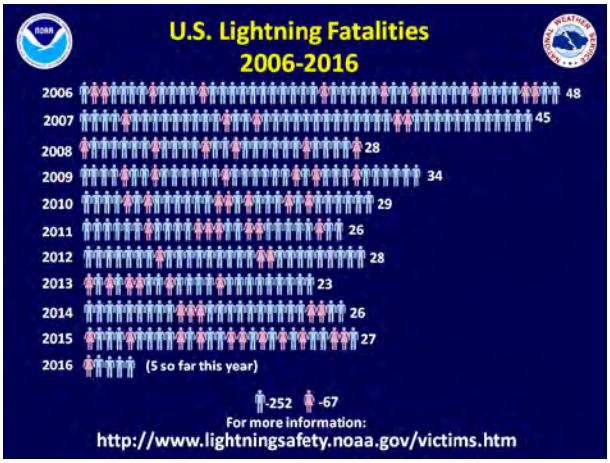

Figure 6: Annual lightning fatalities

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 8

OSHA Cold Stress Fact Sheet

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).

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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.

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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.

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September 2019

ATTACHMENT 9

Modification to Health and Safety Plan

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: _____

Attachment B
Laboratory MDLs/RDLs

Analytical Method Details - Apex Laboratories

Method	Analyte	MDL	MRL	Units	Surr. %R	DUP RPD	Matrix Spike %R	Matrix Spike RPD	Blank Spike %R	Blank Spike RPD	CAS #
Semivolatile Organic Compounds by EPA 8270D in Soil											
EPA 8270D	Acenaphthene	1.33	2.67	ug/kg dry wt	-	30	40-122	30	40-122	30	83-32-9
EPA 8270D	Acenaphthylene	1.33	2.67	ug/kg dry wt	-	30	32-132	30	32-132	30	208-96-8
EPA 8270D	Anthracene	1.33	2.67	ug/kg dry wt	-	30	47-123	30	47-123	30	120-12-7
EPA 8270D	Benz(a)anthracene	1.33	2.67	ug/kg dry wt	-	30	49-126	30	49-126	30	56-55-3
EPA 8270D	Benzo(a)pyrene	2.00	4.00	ug/kg dry wt	-	30	45-129	30	45-129	30	50-32-8
EPA 8270D	Benzo(b)fluoranthene	2.00	4.00	ug/kg dry wt	-	30	45-132	30	45-132	30	205-99-2
EPA 8270D	Benzo(k)fluoranthene	2.00	4.00	ug/kg dry wt	-	30	47-132	30	47-132	30	207-08-9
EPA 8270D	Benzo(b+k)fluoranthene(s)	4.00	8.00	ug/kg dry wt	-	30	45-132	30	45-132	30	BBKF
EPA 8270D	Benzo(g,h,i)perylene	1.33	2.67	ug/kg dry wt	-	30	43-134	30	43-134	30	191-24-2
EPA 8270D	Chrysene	1.33	2.67	ug/kg dry wt	-	30	50-124	30	50-124	30	218-01-9
EPA 8270D	Dibenz(a,h)anthracene	1.33	2.67	ug/kg dry wt	-	30	45-134	30	45-134	30	53-70-3
EPA 8270D	Fluoranthene	1.33	2.67	ug/kg dry wt	-	30	50-127	30	50-127	30	206-44-0
EPA 8270D	Fluorene	1.33	2.67	ug/kg dry wt	-	30	43-125	30	43-125	30	86-73-7
EPA 8270D	Indeno(1,2,3-cd)pyrene	1.33	2.67	ug/kg dry wt	-	30	45-133	30	45-133	30	193-39-5
EPA 8270D	1-Methylnaphthalene	2.67	5.33	ug/kg dry wt	-	30	40-120	30	40-120	30	90-12-0
EPA 8270D	2-Methylnaphthalene	2.67	5.33	ug/kg dry wt	-	30	38-122	30	38-122	30	91-57-6
EPA 8270D	Naphthalene	2.67	5.33	ug/kg dry wt	-	30	35-123	30	35-123	30	91-20-3
EPA 8270D	Phenanthrene	1.33	2.67	ug/kg dry wt	-	30	50-121	30	50-121	30	85-01-8
EPA 8270D	Pyrene	1.33	2.67	ug/kg dry wt	-	30	47-127	30	47-127	30	129-00-0
EPA 8270D	Pentachlorophenol (PCP)	13.3	26.7	ug/kg dry wt	-	30	25-133	30	25-133	30	87-86-5
EPA 8270D	Nitrobenzene-d5 (Surr)			Surrogate	37-122	-	-	-	-	-	4165-60-0
EPA 8270D	2-Fluorobiphenyl (Surr)			Surrogate	44-115	-	-	-	-	-	321-60-8
EPA 8270D	Phenol-d6 (Surr)			Surrogate	33-122	-	-	-	-	-	13127-88-3
EPA 8270D	p-Terphenyl-d14 (Surr)			Surrogate	54-127	-	-	-	-	-	1718-51-0
EPA 8270D	2-Fluorophenol (Surr)			Surrogate	35-115	-	-	-	-	-	367-12-4
EPA 8270D	2,4,6-Tribromophenol (Surr)			Surrogate	39-132	-	-	-	-	-	118-79-6
Total Metals by EPA 6020A (ICPMS) in Soil											
EPA 6020A	Arsenic	0.500	1.00	mg/kg dry wt	-	40	75-125	40	80-120	20	7440-38-2
EPA 6020A	Chromium	0.500	1.00	mg/kg dry wt	-	40	75-125	40	80-120	20	7440-47-3
EPA 6020A	Copper	0.500	1.00	mg/kg dry wt	-	40	75-125	40	80-120	20	7440-50-8
EPA 6020A	Zinc	2.00	4.00	mg/kg dry wt	-	40	75-125	40	80-120	20	7440-66-6
Demand Parameters in Soil											
PSEP/SM 5310B M	Total Organic Carbon	0.020	0.020	%	-	20	-	-	90-110	-	TOC
Solid and Moisture Determinations in Soil											
SM 2540 G	Total Solids	1.00	1.00	%	-	10	-	-	-	-	TS

Cape Fear

Matrix: Water/Soil/Sediments

Analyte	Abb	CAS Number	1613 Soil /Sediment(ppt)		
			MDL (pg/g)	LOD (pg/g)	LOQ (pg/g)
2,3,7,8-Tetrachlorodibenzo-p-dioxin	TCDD	1746-01-6	0.333	0.667	1.00
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	PeCDD	40321-76-4	1.67	3.33	5.00
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	HxCDD	57653-85-7	1.67	3.33	5.00
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	HxCDD	39227-28-6	1.67	3.33	5.00
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	HxCDD	19408-74-3	1.67	3.33	5.00
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	HpCDD	35822-46-9	1.67	3.33	5.00
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	OCDD	3268-87-9	3.33	6.67	10.0
2,3,7,8-Tetrachlorodibenzofuran	TCDF	51207-31-9	0.333	0.667	1.00
1,2,3,7,8-Pentachlorodibenzofuran	PeCDF	57117-41-6	1.67	3.33	5.00
2,3,4,7,8-Pentachlorodibenzofuran	PeCDF	57117-31-4	1.67	3.33	5.00
1,2,3,6,7,8-Hexachlorodibenzofuran	HxCDF	57117-44-9	1.67	3.33	5.00
1,2,3,7,8,9-Hexachlorodibenzofuran	HxCDF	72918-21-9	1.67	3.33	5.00
1,2,3,4,7,8-Hexachlorodibenzofuran	HxCDF	70648-26-9	1.67	3.33	5.00

2,3,4,6,7,8-Hexachlorodibenzofuran	HxCDF	60851-34-5	1.67	3.33	5.00
1,2,3,4,6,7,8-Heptachlorodibenzofuran	HpCDF	67652-39-5	1.67	3.33	5.00
1,2,3,4,7,8,9-Heptachlorodibenzofuran	HpCDF	55673-89-7	1.67	3.33	5.00
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	OCDF	39001-02-0	3.33	6.67	10.0

Attachment C
Off-site Soil Sampling Information Sheet

Baxter Eugene – Off-site Soil Sampling Information Sheet

Property Information	
Resident Name	
Address	
Lot Number	
Describe the type of dwelling (single family home, duplex, multi-family unit such as apartment building, business office, etc.)	
Means to access property (fenced/gate, open access, etc.)?	

Owner Consent		
Permission to access property?	Yes	No

Pertinent Information
Include information from pre-investigation data collection that potentially relevant to field activities

Attach parcel map for use in the field

Field Notes Sheet

1) Sample Collection Information

Sampling Team:	
Sample ID:	
Time and Date of Sampling:	
What equipment was used for increment sample collection?	
Was the increment placed in the same location within grid (where possible)?	Yes No

2) Survey Information

Surveying equipment used for marking increment sampling locations:	
Were any increments relocated?	Yes No
How was the relocated increment information recorded?	

3) Photographs

Photo Reference	Feature

4) Ground cover and Condition

Describe ground cover (surface conditions, vegetation type, gravel thickness, % covered/uncovered, etc.):

5) Detailed Sketch (Attach to this form. Identify location of dwelling on property, paved areas, obstructions to sampling, structures, gardens, play areas, any areas of stained soil, other important features of note.)

Describe all obvious uses of the property – be specific:

General notes and other observations:

Attachment D
Example Resident Questionnaire

Example Resident Questionnaire

1. Are you the property owner? *Yes* _____ *No* _____

   *If **no**, who retains ownership? Please specify:* _____

2. How long have you resided at this property? _____ *years*

3. Do you live at the property year round? *Year-round residence* _____ *Part-time residence* _____

4. Has the property been subdivided or a portion subleased since you have lived at the property?

   Yes _____ *No* _____ *If **yes**, please explain:*

5. Are you aware of any re-development of the property within the last 30 years, especially any development that would have moved soil or added new soil to the property?

   Yes _____ *No* _____ *If **yes**, please explain:*

6. Are there any known shallow buried utilities (less than 1 foot below the surface), including irrigation lines, that we should be aware of?

   Yes _____ *No* _____ *If **yes**, please list:*

7. As part of this study you have the option to receive the results from the sampling we do at your property. Would you like to receive these results?

   Yes _____ *No* _____