SITE-SPECIFIC HEALTH AND SAFETY PLAN

Kirtland Airforce Base Bulk Fuel Facility Water Authority Data Gap Well WUABFFMW01

Bernalillo County, Albuquerque, New Mexico

Prepared for:

Albuquerque Bernalillo County Water Utility Authority

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ACRONYMS AND ABBREVIATIONS

ANSI	American National Standards Institute
BBS	Behavior-Based Safety
BFF	Bulk Fuel Facility
CFR	Code of Federal Regulations
CHSO	Chief Health and Safety Officer
CHSP	INTERA Corporate Health and Safety Program
COPC	contaminant of potential concern
CPR	Cardiopulmonary Resuscitation
Decon	Decontamination
EDB	ethylene dibromide
HazCom	Hazard Communication
IDLH	Immediately Dangerous to Life or Health
IDW	investigation derived waste
INTERA	INTERA Incorporated
JSA	Job Safety Analysis
KAFB	Kirtland Airforce Base
NIOSH	National Institute for Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
PM	Project Manager
PPE	Personal Protective Equipment
SCBA	Self-Contained Breathing Apparatus
SDS	Safety Data Sheet
Site	Kirtland Airforce Base Bulk Fuel Facility Data Gap Well
SOP	Standard Operating Procedure
SOW	Scope of Work
SSHASP	Site-Specific Health and Safety Plan
SSO	Site Safety Officer
UV	Ultraviolet Radiation
Water Authority	Albuquerque Bernalillo County Water Utility Authority

KIRTLAND AIRFORCE BASE BULK FUEL FACILITY WATER AUTHORITY DATA GAP WELL WUABFFMW01

SITE-SPECIFIC HEALTH AND SAFETY PLAN

INTERA Incorporated's (INTERA's) Site-Specific Health and Safety Plan (SSHASP) is a dynamic document that is subject to change during the performance of the INTERA scope of work (SOW) designed for the Kirtland Airforce Base (KAFB) Bulk Fuel Facility (BFF) Water Authority Data Gap Well (Site) located in Albuquerque, New Mexico (**Figure 1**). Details regarding INTERA's SOW are provided below in **Section 1.2**. INTERA is providing these services to Albuquerque Bernalillo County Water Utility Authority (Water Authority) under CCN 2020-0029 Purchase Order Number CE001306 dated September 27, 2021.

The purpose of this SSHASP is to protect personnel involved in ongoing activities at the Site. All INTERA personnel involved in activities at the Site must review this SSHASP and sign the Personnel Acknowledgment Form (**Form 1**) prior to beginning work at the Site. The contents of this SSHASP will also be reviewed with INTERA subcontractor personnel, and these personnel will also be asked to sign the Personnel Acknowledgment Form (**Form 1**) prior to beginning work at the Site.

INTERA CONTACT INFORMATION		
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Site Safety Officer (SSO)	To be determined based on field activities and INTERA personnel on-Site. The SSO will be noted daily on Tailgate Safety Meeting Forms.	Not Applicable
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SSHASP Prepared by: Austin Hanson, INTERA in accordance with applicable provisions of the Occupational Safety and Health Administration (OSHA) 29 Code of Federal Regulations (CFR) 1910.120.
SSHASP Reviewed by: Joseph Tracy, INTERA
INTERA Project No.: ABWUA.C009.KAFB

1.0 SITE LOCATION AND DESCRIPTION

Site Address: 800 Indiana Street, Albuquerque, NM 87108 (**Figure 1**)

Description:

- The Site is located northwest of KAFB in a residential neighborhood that includes single family dwellings, apartments, and schools. (**Figure 2**).
- Drilling, monitoring well installation, and monitoring well development will occur at the intersection of Katheryn Avenue SE and Indiana Street SE. The laydown yard shown on Figure 2. Monitoring wells where pneumatic slug testing will occur are located within the immediate vicinity.
- Given that the field activities associated with this SSHASP are located within a residential neighborhood, active traffic and pedestrians represent a potential hazard throughout the duration of the project for all field tasks.

In the event of an emergency that requires evacuation of the Site, the evacuation assembly point is designated as on the sidewalk immediately west of the residence located at 804 Indiana Street as described in **Section 8.0, Site Emergency Response Plan**. Additional information regarding emergency response protocols is provided in **Section 6.0, Emergency Contacts List** and **Section 7.0, Hospital Route Maps**. Field personnel should become familiar with the information in these sections prior to the start of field work so that personnel are prepared to act quickly and efficiently in the event of an emergency.

1.1 SITE HISTORY

The BFF and associated infrastructure operated from 1953 until 1999. During this time, the fueling area was separated into a tank holding area where bulk shipments of fuel were received and a fuel loading area where individual fuels trucks were filled. Kirtland AFB removed the underground piping at the facility from service in 1999 due to discovery of underground leakage. Even though the fuel leak was identified by Kirtland AFB, the exact history of the leaks or releases is unknown. Releases could have occurred when fuel was transferred from railcars to the pump house. Initially, it was thought that the leak only affected surface soil around the identified source area; however, Kirtland AFB learned through characterization activities that the leaked fuel had reached the groundwater table and that the dissolved phase fuel contamination migrated northeast and north of Kirtland AFB.

In order to comply with NMED Hazardous Waste Bureau requirements, Interim Measures were introduced for both groundwater and soil. The goals of the groundwater Interim Measure are to protect drinking water supply wells, collapse the EDB plume, and remediate the light non-aqueous phase liquid (LNAPL). As a result of the expanded monitoring program, the nature and extent of groundwater contamination became better understood. It was determined that the dissolved-phase plume containing BTEX was situated south of Ridgecrest Drive SE, while the dissolved-phase EDB plume extended further north, approximately 2,200 feet (ft) north of Gibson Boulevard SE.

In December 2008, the San-Juan Chama Drinking Water Project became operational. Since that time, the Albuquerque Bernalillo County Water Utility Authority has met its water needs with a combination of surface water from the Rio Grande and groundwater. As groundwater withdrawal 50 from the regional aquifer was reduced, the water table in the vicinity of SWMUs ST-106/SS-111 began to rise. As a result, existing well screens that were installed to span the water table became fully submerged. This resulted in

a reduction of unsubmerged well screen monitoring points at the water table. This was identified as a data gap, and several wells have been installed since 2015 to address this data gap.

The current groundwater interim measure consists of a network of four groundwater extraction wells located within the Interim Measure Operational Area in the distal portion of the dissolved-phase EDB plume. The goals of the groundwater interim measure are to protect drinking water supply wells and collapse the EDB plume located within the Interim Measure Operational Area. Groundwater impacted by EDB is removed by the extraction wells and conveyed to the groundwater treatment system. The groundwater treatment system consists of two treatment trains of two 20,000-pound granular activated carbon vessels each.

Well WUABFFMW01 proposed to be drilled in the SSHASP is to address the data gap found at the northern extent of the EDB plume.

1.2 TASKS TO BE PERFORMED UNDER THIS SSHASP

The following provides a summary of INTERA's tasks associated with this project. If available, please refer to other project documents such as Work Plans, Field Sampling Plans, and/or INTERA Standard Operating Procedures (SOPs) for specific project objectives and detailed task information. Refer to **Section 5.10** for additional information on applicable SOPs. All tasks performed by INTERA (and INTERA subcontractors, as applicable) are covered by this SSHASP. Additional tasks may be hand-written into this list as they are added to the project scope. Tasks currently included under this SSHASP are:

- Monitoring well drilling and installation
- Bore hole geophysics
- Monitoring well development
- Surveying
- Monitoring well sampling via Bennett Pump (low-flow)
- Monitoring well sampling via passive samplers
- Investigation derived waste (IDW) profiling
- Pneumatic slug testing

1.3 SITE-SPECIFIC HAZARDS AND CHEMICALS OF CONCERN

Active traffic and pedestrians within the residential area of the Site are the primary physical hazards that are not part of the scope of work under this SSHASP.

The contaminant of potential concern (COPC) at the site is ethylene dibromide (EDB).

Potential activities that are likely to involve direct contact with COCs include:

- Monitoring well drilling and installation,
- Handling investigation derived waste,
- Decontaminating equipment,
- Monitoring well development,
- Measuring fluid levels,
- Collecting soil and groundwater samples, and
- Pneumatic slug testing.

Chemicals that will be brought to the site by either INTERA, INTERA subcontractors, or other subcontractors during conduct of the SOW are discussed in **Section 5.5** as part of the Hazard Communication Program.

2.0 ROLES AND RESPONSIBILITIES

The responsibilities of the INTERA Project Management team are outlined below. Personnel have the authority **and responsibility** to stop an activity if it is being performed in a hazardous manor. If an employee believes that he or she is being asked to perform work in an unsafe environment, that employee is authorized to decline the request and alert the Project Manager, Site Safety Officer, Branch Office Health and Safety Coordinator, or the Chief Health and Safety Officer to the details surrounding the unsafe environment.

Project Manager – Responsible for any changes to the SOW and oversight of general operations of the project on a day-to-day basis. PM responsibilities include the following:

- Assign a Site Safety Officer for the Site.
- Ensure that a Job Safety Analysis (JSA) has been completed for each task in accordance with **Attachment A** prior to beginning work on that task.
- Work with the SSO to create and revise this SSHASP, as necessary.
- Review the completed SSHASP or designate a qualified individual to conduct the review, as appropriate.
- Review revisions to this SSHASP or designate a qualified individual to conduct the review, as appropriate.
- Assist the SSO in assessing and providing proper personal protection equipment (PPE) and other health and safety equipment for the project.
- Supervise the implementation of the approved SSHASP with assistance from the INTERA Chief Health and Safety Officer (CHSO) and/or a Branch Health and Safety Coordinator.
- Assign trained personnel to the Site and verify that personnel assigned to the Site are in compliance with respect to OSHA 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training and annual 8-hour refresher training in accordance with OSHA regulation 29 Code of Federal Regulations (CFR) 1910.120 for general site workers.
- Assign personnel to the Site and verify that personnel assigned have current First Aid, cardiopulmonary resuscitation (CPR), and Bloodborne Pathogens training.
- Verify that personnel assigned to the Site are in compliance with regard to any necessary Medical Surveillance.
- Verify that personnel assigned to the Site are in compliance with regard to necessary respirator training, fit-testing requirements, and medical monitoring, as appropriate for job requirements.
- Confirm that the project is performed in a manner consistent with this SSHASP.
- Determine compliance with this SSHASP by INTERA (and subcontractor personnel, as appropriate).
- Report incidents, including property or environmental damage, and near misses to the INTERA CHSO.
- Report safety-related incidents or accidents to the INTERA CHSO.

Senior Advisor/Reviewer – Assists the PM and can perform any of the above responsibilities, as necessary.

Task Manager – Assists the PM and senior advisors/reviews by managing tasks of the project and interacting directly with field staff and subcontractors.

Site Safety Officer – Responsible for on-site health and safety as well as the safety of work operations and procedures. The SSO is responsible for reporting safety and health concerns to the Project Manager and the INTERA CHSO. SSO responsibilities include the following:

- Coordinate with Project Manager as required in matters of health and safety.
- Develop this SSHASP in coordination with the Project Manager.
- Implement this SSHASP in coordination with the Project Manager, INTERA CHSO, and/or a Branch Office Health and Safety Coordinator.
- Work with the Project Manager and other field personnel to complete JSAs for each field task.
- Work with the Project Manager and other field personnel to modify this SSHASP prior to conducting new field tasks not currently covered under this SSHASP.
- In coordination with the Project Manager, determine appropriate PPE for the Site tasks to be performed and provide the appropriate PPE to field personnel. Also responsible for providing other health and safety equipment for the project, as appropriate, such as drinking water and sunshades.
- Direct health and safety activities on Site, including the implementation and maintenance of a Site-specific Hazard Communication (HazCom) Program.
- Conduct a kick-off health and safety meeting to discuss the health and safety topics covered in this SSHASP. Solicit input from drilling subcontractor, if applicable, to cover health and safety topics related to the drill rig (e.g. review of kill switch locations, when it is safe to approach the rig, procedures for geologic sample collection, etc.). Input from other subcontractors will also be solicited, as applicable. The kick-off safety meeting will be documented using **Form 2**.
- Conduct a health and safety meeting prior to start of work each day, at the start of each shift change, and at the beginning of each new task. These meetings are often referred to as “daily safety meetings” or “tailgate safety meetings” and will include a review of relevant routine health and safety topics, a review of any items related to health and safety that occurred during the previous day or on the previous shift, a discussion of health and safety issues for the specific tasks at hand along with associated PPE, and will solicit any health and safety observations or input from field personnel and subcontractors. Daily/tailgate safety meetings will be documented using **Form 2**.
- Monitor compliance with the current and approved SSHASP. Maintain health and safety equipment on-site, as specified in this SSHASP.
- Report incidents, property or environmental damage, and near misses to the Project Manager and the CHSO. Maintain health and safety equipment on-site, as specified in this SSHASP.
- Monitor subcontractors for compliance with the current and approved SSHASP.
- Maintain a log of Site visitors.
- Inform Site visitors as to on-site procedures, conditions, and hazards before allowing visitors to enter the Site.
- Implement emergency action and evacuation procedures, as necessary, in response to Site conditions and events.
- Make PPE exceptions for site personnel based on site-specific information such as air monitoring data, visual observations, and weather data/observations.
- Suspend work or otherwise limit exposure to personnel if the SSHASP appears to be unsuitable or inadequate.

- Direct personnel to change work practices or remove personnel from the project if their actions or condition endangers their health and safety or the health and safety of co-workers.

INTERA Chief Health and Safety Officer (CHSO) – Responsible for developing, implementing, maintaining, and evaluating the INTERA Corporate Health and Safety Program. Responsibilities include serving as the plan/program administrator for the various plans and programs in the Corporate Health and Safety Program, assisting Project Managers in assessing site hazards, supporting the development and evaluation of SSHASPs, and assisting employees in obtaining and maintaining the training necessary to perform their tasks.

Branch Office Health and Safety Coordinator – Responsible for representing the INTERA CHSO at the local level, assisting project managers in assessing hazardous sites, supporting the development and evaluation of SSHASPs, and assisting employees in obtaining and maintaining the training necessary to perform their tasks.

3.0 COMPREHENSIVE PLAN FOR SITE SAFETY

INTERA considers the prevention of illness, injury, and accidents in the workplace to have greater importance than any other facet of the work. Safety shall always take precedence over expediency or shortcuts, and every attempt shall be made to reduce the possibility of injury, illness, or accident occurrence. Site activities shall be conducted in accordance with the established safety regulations of the OSHA and other applicable Federal, State, County, and City regulations. The requirements and actions summarized in the following sections will be completed by INTERA and INTERA subcontracted personnel (as necessary). Personnel must sign the Site Personnel Acknowledgment Form included as **Form 1** indicating that they have read and understood this SSHASP. This SSHASP does not cover any activities that the client, or personnel subcontracted to the client, may perform at the Site without INTERA involvement.

INTERA subcontractors are responsible for having their own Health and Safety Plan, which must be at least as stringent as INTERA's SSHASP, and are responsible for complying with applicable OSHA, Federal, State, County, and City regulations. Subcontractors may be requested to provide their Health and Safety Plan to the Project Manager for review prior to commencement of work at the Site. Subcontractors will be monitored for compliance with INTERA SSHASP requirements as well as applicable OSHA, Federal, State, County, and City regulations.

The training and medical surveillance requirements described in the following sections apply to all INTERA employees and INTERA subcontractor employees.

3.1 HEALTH AND SAFETY TRAINING REQUIREMENTS

Site personnel must have completed the 40-hour OSHA 1910.120 HAZWOPER training and must be up to date on their 8-hour HAZWOPER refresher training. This training includes general training for hazard recognition, use of site monitoring instruments, and use of PPE. Equivalent training may be acceptable but must be approved by the Project Manager and INTERA CHSO. Site personnel are also required to have completed a minimum of three days of actual field work under the direct supervision of a trained, experienced supervisor before they will be allowed to engage in hazardous substance removal or other activities that have the potential to expose workers to hazardous substances and health hazards.

Per OSHA, on-site project managers and site supervisors will have completed at least eight additional hours of specialized training at the time of job assignment on such topics as, but not limited to, the employer's safety and health program and the associated employee training program, PPE program, spill containment program, and health hazard monitoring procedure and techniques.

Site personnel should have up-to-date training in first aid, blood-borne pathogens, and cardiopulmonary resuscitation (CPR). Personnel entering or attending to a person entering a confined space must be trained in accordance with 29 CFR 1910.146. Site personnel must also have completed hydrogen sulfide (H_2S) awareness training for sites where H_2S is known or expected to occur.

Emergency response by Site personnel is limited to their extent of training. Medical emergencies beyond general first aid and fire emergencies will be handled by trained Emergency Medical or Fire Personnel.

Personnel will not be allowed to work or supervise work at the Site until they have received the necessary project training for the level of their job responsibilities. Complete copies of certification documents recording that Site personnel have had the necessary training will be kept by the INTERA CHSO and Branch Office Health and Safety Coordinator, as applicable. Copies of these documents will be provided to the Client upon request.

3.2 MEDICAL SURVEILLANCE

Site personnel who may need to wear a respirator or who may be exposed to hazardous substances above published exposure levels for 30 days or more a year are required to participate in their employer-sponsored medical surveillance program (this includes subcontractors). INTERA field personnel are given the option of participating in the medical surveillance program even if they do not fall under the previous requirements, at no cost to themselves.

Employees participating in the medical surveillance program will receive a medical examination by a physician at least once every 12 months. This examination must certify that the employee is fit to work around hazardous substances and is fit to use appropriate respiratory protection equipment required to perform job responsibilities.

3.3 INCIDENT PREVENTION PROGRAM

An incident is any work-related accident, injury, illness or fatality where an event or exposure in the work environment either caused or contributed to the condition, or significantly aggravated a pre-existing condition. INTERA's belief is that incidents can and should be prevented, and INTERA values and encourages employee involvement in the process of providing a safe and healthy working environment for our employees, subcontractors, and clients and in the effort to protect the public, Client assets and property, and the environment. INTERA's incident prevention program is detailed in the following sections.

3.3.1 HEALTH AND SAFETY MEETINGS

Site personnel (INTERA personnel, subcontractors, and site visitors) are required to participate in health and safety meetings as follows:

- Prior to the start of work at each new project/site. This meeting is referred to as the Kickoff Safety Meeting and will be documented using **Form 2**;
- Prior to the start of work each day;
- At the start of each shift change, and
- Prior to conducting a new task that was not covered by a previous health and safety meeting.

The last three types of health and safety meetings are often referred to as either "tailgate safety meetings" or "daily safety meetings". The term Tailgate Safety Meeting will be used hereafter, and these meetings will also be documented using **Form 2**.

The Kickoff Safety Meeting should discuss the health and safety topics covered in this SSHASP including, but not limited to, known hazards at the Site, required PPE, and emergency procedures such as evacuation routes, communication procedures and contact numbers, and hospital locations. Input from the drilling subcontractor will be solicited, if applicable, to cover health and safety topics related to the drill rig. These topics may include a review of kill switch locations, when it is safe to approach the rig, procedures for geologic sample collection, hearing protection, and communication techniques under loud conditions. Input from other subcontractors will also be solicited, as applicable. Personnel must sign **Form 2** at the conclusion of the Kickoff Safety Meeting.

Tailgate Safety Meetings are meant to review the relevant health and safety concerns specific to each day, shift, or new task. Topics to be reviewed include, but are not limited to, items related to health and safety that occurred during the previous day or on the previous shift, a discussion of health and safety issues for the specific tasks at hand along with associated PPE, special equipment to be used on-site for that day/shift (if any), any changes with regard to chemical or physical hazards, mobile phone availability,

emergency procedures, and other topics as necessary. Health and safety observations or input from field personnel and subcontractors will also be solicited. Personnel must sign **Form 2** at the conclusion of the Tailgate Safety Meeting.

3.3.2 HAZARD RECOGNITION AND REPORTING

All INTERA personnel have the authority to stop an activity if it is being performed in a hazardous manner. If an employee believes that he or she is being asked to perform work in an unsafe environment, that employee is authorized to decline the request. Every employee has the right and responsibility to communicate their health and safety concerns to management and to implement changes to work procedures where needed to reduce injury and illness exposures in the workplace.

Each time a new task is started at the Site, a Job Safety Analysis (JSA) will be completed prior to commencement of the task. A new JSA will not need to be created each time the task is to be repeated (i.e., a JSA for groundwater sampling will be filled out prior to the first sampling event, and field personnel will review the JSA at the beginning of each subsequent sampling event but will not need to recreate the JSA).

The Job Safety Analysis Program can be seen in **Attachment A** and completed JSAs, as well as blank forms can be found under **Form 3**.

3.3.3 BEHAVIOR-BASED SAFETY PROGRAM

The Behavior-Based Safety (BBS) Program is a safety audit process that helps personnel identify and choose a safe behavior over an unsafe one. This process is designed to open the communication lines between personnel to reinforce safe behaviors and correct unsafe behaviors in order to eliminate incidents, including accidents and illnesses. BBS Audits can be performed by any field personnel who are observing other field personnel (i.e., if there is a team of two personnel doing groundwater sampling, one person may do an audit by watching the other person perform the sampling). Safety in the workplace is based on the following components:

- A specific person's physical capabilities, experience, and training.
- The environment the specific person works in, including engineering controls, equipment available for the task, and the job task itself.
- The specific person's behavior while performing the task.

The BBS Program is based on behavioral observations by someone not involved in the task, a review of the observations (both safe and unsafe behaviors), positive reinforcement on the safe behaviors, non-threatening feedback on the unsafe behaviors, and improvement goals. These observations provide direct, measurable information on safe work practices.

Specific instructions on how to perform a BBS Encounter can be found in **Attachment B** and the BBS Encounter Forms are available as **Form 4**. Completed BBS Encounter Forms will be kept in this SSHASP and reviewed occasionally by the INTERA CHSO to confirm that safe behaviors are being continued. A BBS Encounter should be performed for each task a minimum of once a year. Complicated tasks or tasks performed on a regular basis should have more frequent BBS Encounters.

3.3.4 INCIDENT INVESTIGATION

An incident is any work-related injury, illness or fatality where an event or exposure in the work environment either caused or contributed to the condition, or significantly aggravated a pre-existing condition. A near-miss is any work-related action or event that did not result in injury, illness, or damage, but given a slight shift in time or position, illness injury or damage could have occurred. Near-misses often precede loss-producing events (incidents or damage) but may be overlooked because there was no

harm. Near-misses should be considered red-flag warnings of what could have happened. Recognizing and reporting near-miss incidents provides an opportunity to identify and control hazards, reduce risk, and prevent future incidents. Reporting of near misses is not designed to single out workers for wrongdoing and may be reported anonymously, if desired.

All incidents, property or environmental damage, and near misses must be reported IMMEDIATELY (after ensuring that all personnel are safe) by the affected employee(s) to the Project Manager or Site Safety Officer. If it is a fatality, or the affected employee is incapacitated, another employee will report the incident as a substitute for the affected employee. Employees who fail to report incidents or property or environmental damage may be subject to disciplinary action as described in **Appendix 8** of the INTERA Corporate Health and Safety Program (CHSP).

All incidents, including property and environmental damages, and near misses must be reported to the INTERA CHSO by management personnel as follows:

- IMMEDIATELY (after ensuring that all personnel are safe) for any OSHA reportable incident;
- IMMEDIATELY (after ensuring that all personnel are safe) for any property or environmental damage;
- BY THE END OF THE WORK SHIFT for any OSHA recordable incident that is not also an OSHA reportable incident;
- WITHIN 48 HOURS for all incidents that are neither recordable or reportable; and
- WITHIN 48 HOURS for a near-miss.

The **Incident Investigation Report Form** (**Form 5a**) will be used to report incidents and property or environmental damage and to guide the investigation into the root cause and contributing factors of the event. Further information about incident reporting can be found in the **Appendix 3** of the CHSP. In addition, INTERA records information regarding near misses using INTERA's **Near-Miss Report Form** (**Form 5b**).

Section 1 of the **Incident Investigation Report Form** (**Form 5a**) or the **Near-Miss Report Form** (**Form 5b**) should be completed by employees who were either involved in the incident or near miss or who witnessed the event along with the relevant Supervisor or Project Manager. Information from **Section 1** will then be used by the incident investigator to guide the investigation into the root cause and contributing factors of the incident, property or environmental damage, or near miss, and the results of the investigation will be recorded in **Section 2**.

The first section of the **Incident Investigation Report Form** or **Near-Miss Report Form** will be filled out according to the following schedule:

- WITHIN 24 HOURS of any recordable incident; and
- WITHIN 48 HOURS for a near-miss or property or environmental damage.

Section 2 of **Form 5a** and **Form 5b** will be completed within 5 days of implementation of corrective actions.

Incidents that occur at a client-owned site will be reported to the client by the Project Manager or the INTERA CHSO. The client may have a different incident reporting form, and in most cases, both INTERA's form and the client's form will need to be filled out. A copy of INTERA's completed **Incident Investigation Report Form** will be provided to the client after it is finalized, as appropriate.

3.4 SITE CONTROL

Visits to project sites by persons not directly involved in tasks identified in the project work plan are discouraged. Persons designated as “Site visitors” will sign in on a Site Visitor Log (included as **Form 6**) and will be briefed by the SSO as to Site procedures, conditions, and hazards before entering the Site. Site visitors shall provide their own PPE as required for the area that they are visiting and shall be expected to follow applicable procedures and protocols. Site visitors will be asked to remain in the Clean Zone (if applicable) unless accompanied by INTERA personnel.

3.5 TRANSPORTATION OF SITE MATERIALS

Known or potentially contaminated materials and/or hazardous materials generated during implementation of the activities described herein shall be managed by field personnel according to the procedures specified in the site-specific Work Plan/SAP/FSP. Off-site transportation of Site materials other than as samples collected for characterization purposes is not anticipated. Personnel shall not transport any contaminated or potentially contaminated Site materials or product (other than characterization samples in the appropriate sample container) from the Site in company vehicles or rental vehicles. Contaminated materials and/or free product (e.g., LNAPL) shall be disposed of properly via a subcontractor using the proper chain of custody applicable by regulations for disposal of hazardous or non-hazardous waste. For any potentially hazardous media, field personnel shall comply with DOT requirements which may require alternate arrangements for transporting these types of media, as required.

In the event that free product (e.g. LNAPL) is encountered during monitoring at the Site and removal is required, product shall be skimmed, bailed, or pumped into drums for temporary storage. Care shall be taken during pumping that the product is not spilled, or an overflow does not occur. Personnel shall don the proper PPE during the handling and containerizing of free product. Dermal protection including gloves, long sleeve shirts, and pants (or coveralls/Tyvek, if necessary) shall be worn during product pumping activities for added personnel protection. Breathing exposure levels shall be recorded using the photoionization detector (PID) meter during the product draw-down test to monitor personnel exposures (Section 5.4). Level C PPE shall be donned if necessary (Section 5.1). The drums shall be labeled according to their contents and stored temporarily in a safe manner.

To prevent risks to the health and safety of laboratory personnel, laboratory directors or contacts shall be informed of any contaminant levels in collected samples that would require special handling procedures upon transfer of sample custody.

3.6 GOOD HOUSEKEEPING

Typical good housekeeping procedures that should be followed at all field sites include the following:

- Keep site clean and neat by picking up tools, trash, and equipment.
- Keep trip hazards out of work zone such as coolers or other unused sampling equipment.
- Avoid bringing unnecessary tools and equipment into the work zone.

Site litter may also be transported offsite by INTERA as part of good housekeeping procedures.

4.0 SITE HAZARDS

4.1 PHYSICAL HAZARDS

There are numerous physical hazards at any site. All personnel have the authority and responsibility to stop an activity if it is being performed in a hazardous manor. If an employee believes that he or she is being asked to perform work in an unsafe environment, that employee is authorized to decline the request. Field personnel shall follow the **Site Emergency Response Plan** as detailed in Section 8.0 and shall report any new hazards to the SSO and the INTERA CHSO so steps can be taken to mitigate the hazard.

A list of potential physical health and safety hazards associated with the activities at the Site are provided in **Table 4-1. Table 4-1** should be revised to include additional physical hazards that may be identified during conduct of field activities.

Table 4-1 Potential Physical Hazards

Potential Hazard	Source of Potential Hazard	Hazard Mitigation Control
Heat or cold stress	• Adverse weather conditions can occur any time of the year • PPE such as respirators, gloves, and protective clothing can exacerbate heat stress	• For heat stress, drink plenty of fluids and be aware of potential heat stress conditions. Notify SSO or PM of any adverse physical conditions before and during the task. • For heat stress, observe a work/rest schedule and take breaks when necessary. • For cold stress, wear sufficient cold weather clothing. • Use the buddy system and say something if someone around you looks like they are suffering from heat or cold stress. • See **Attachment C - Heat and Cold Stress Casualty Prevention Plan** for more information.
Slip, trip, and fall	• Construction zone conditions, debris, uneven ground and/or wet ground	• Be aware of surroundings while working and don't leave equipment on the ground in work areas.
Straining and pinching	• Working around machinery and equipment (including drill rigs) • Rushing too quickly to finish a task	• Make sure that you have the proper training for the job. • Be aware of your surroundings and know the hazards of the machinery or equipment you are using. • See **Attachment D** - **Health and Safety Requirements for Drilling Operations.** • See **Attachment E** - **Health and Safety Requirements for Heavy and Light Equipment**. • Slow down and take the time necessary to do the job safely. • Make sure that vehicles are in proper working order.

Table 4-1 Potential Physical Hazards		
Potential Hazard	**Source of Potential Hazard**	**Hazard Mitigation Control**
Ultraviolet radiation (UV)	• Sun • Welding flame	• Wear sunscreen, long sleeves, long pants, and field hats to minimize sun exposure. • Do not look at a welding flame unless wearing welding glasses.
Automobile and pedestrian accidents	• Traveling on paved roads to get to the Site • Traveling on dirt roads to get to a work location • Working around heavy equipment • Excessive speed • Driver distraction	• Be aware of your surroundings and designate standing and working areas that are away from driving areas. • See **Attachment E** - **Health and Safety Requirements for Heavy and Light Equipment**. • Ensure that vehicles are in proper working order. • When at job sites, remember the largest vehicle has the right-of-way. • Do not text or talk on cell phones while driving. Pull over to a safe location before using a cell phone. • Talking on a cell phone is discouraged. Urgent calls may be taken if it is legal and the phone and vehicle are connected by Bluetooth so that the call can be completed handsfree. • Follow the guidelines established in **Attachment 6 of the CHSP**.
Head injuries	• Overhead hazards • Heavy equipment	• Wear a hard hat when working around overhead hazards. • Be aware of overhead hazards at all times.
Falling from heights	• Working at heights	• Field personnel will be harnessed and anchored when working at heights above 6 feet or where there is a danger of falling.
Electric shock	• Heavy equipment, including drill rig malfunction or incorrect use • Remediation system equipment malfunction or incorrect use • Buildup of static electricity • Drilling near overhead or buried electric lines while still energized	• Inspect equipment prior to use. • Follow correct procedures for discharging energy prior to repair or maintenance as described in the Lock Out/Tag Out Program in **Section 5.8**. • Consider all electric lines to be energized unless the power company is on-site to verify shutoff with lockout/tagout procedures. Drilling or raising the mast within 20 feet of overhead power lines is not allowed. • See **Attachment D - Health and Safety Requirements for Drilling Operations**.

Table 4-1 Potential Physical Hazards		
Potential Hazard	**Source of Potential Hazard**	**Hazard Mitigation Control**
Fire	• Steel cutting, brazing, welding, and other activities that generate heat, sparks, or open flames • Vehicles parked in dry grass • Presence of flammable chemicals	• Performing activities that generate heat, sparks or open flames in windy conditions or near ignitable materials is not allowed. • Subcontractors shall notify INTERA if activities that could generate fire shall be performed. • A Hot Work Permit (**Form 7**) shall be requested from INTERA prior to performing these tasks, and the established procedures described in **Section 5.9** shall be followed.
Whipping Hoses and fluid burns	• Release of pressurized hydraulic or pneumatic lines	• Inspect hoses regularly for exposed reinforcement wires, leaks, damaged or corroded fittings, excessive dirt or grease buildup, and missing guards, shields, and clamps.
Noise hazards	• Operation of heavy equipment (including drill rigs) • Traffic • Operation of remediation equipment (generators, blowers, pumps, compressors, etc.)	• Wear appropriate hearing protection for the job. • Hearing protection must be worn when the 8-hour time-weighted average noise level reaches or exceeds 85 decibels. • Various decibel measuring apps on cell phones can also be used to measure noise at the job site. • In general, if you have to raise your voice for someone to hear you at arm's length, you should be wearing hearing protection.
Lightning strikes	• Working during thunderstorms	• If lightning is heard, the "30-30" rule should be employed – if the time between the lightning and thunder is 30 seconds or less, work should be stopped and shelter should be found. This rule corresponds to a distance of 6 miles. Work should not resume until 15 minutes or more has passed from hearing the last thunder. • Various weather apps on cell phones can also be used to track distance of the nearest lightning strike. • If the lightning cannot be seen but thunder is heard, then it is likely that lightning is within striking range. • The nearest acceptable shelter is usually inside a vehicle. If moving to a vehicle is not immediately practical, the "lightning crouch" should be employed. This involves squatting on the ground with feet together and head tucked while covering one's ears.
Fatigue	• Working long hours	• Take rest breaks when needed • Do not drive while fatigued
Space below is provided for hazards identified during conduct of field work.		

Table 4-1 Potential Physical Hazards		
Potential Hazard	**Source of Potential Hazard**	**Hazard Mitigation Control**
	•	•
	•	•

4.2 CHEMICAL HAZARDS

Personnel and Site visitors may be exposed to chemical hazards through four routes of exposure: inhalation, ingestion, skin contact, and eye contact. Ingestion of chemical hazards shall be controlled by prohibiting eating, drinking, or smoking in the immediate vicinity of the work area and any known hazardous chemicals, and by requiring all field personnel to wash hands (and face, if necessary) before eating, drinking, or smoking.

Contact with chemical hazards through the four exposure routes can cause serious burns, rashes, irritations, or bodily harm. Field personnel shall follow the **Site Emergency Response Plan** as detailed in **Section 8.0** and shall report any skin, eye contact, or other exposure symptoms to the SSO or the Project Manager, so steps can be taken to provide medical care and eliminate the potential for similar exposures events. Project management will report exposure incidents to the INTERA CHSO as detailed in **Section 3.3.4**.

The best assurance of protection against hazardous chemicals is avoidance. Whenever possible, Site personnel shall avoid direct contact with contaminated (or potentially contaminated) surfaces. Workers shall not kneel or place equipment on potentially contaminated ground. If contact is unavoidable in order to perform a required task, potential hazards are minimized by using appropriate PPE to protect against exposure to toxic materials.

A list of potential chemical hazards associated with the activities at this Site is provided below in **Table 4-2. Table 4-2** should be revised to include additional chemical hazards that may be identified during conduct of field activities. Chemicals that are brought on Site by INTERA or INTERA subcontractors are part of the HazCom Program. The HazCom Program is described in **Attachment G** and the Hazardous Chemicals List, Safety Data Sheets, and/or National Institute for Occupational Safety and Health (NIOSH) Guide to Chemical Hazards Sheets are provided in **Attachment H**.

Table 4-2 Potential Chemical Hazards

Potential Hazard	Source of Potential Hazard	Hazard Mitigation Control
Contaminated soils	• Potential known or unknown contaminated soils within the work area • Dusty working conditions	• Wear appropriate PPE (nitrile gloves, dust mask, etc.). • Limit exposure to known contaminated areas. • Discontinue work if extremely dusty conditions persist. • Be aware of unusual odors and ground color while excavating. • Wash hands before eating, drinking, or applying cosmetics/sunscreen.
Drilling Mud and/or Additives	• Drilling fluids • Drilling operations • Decon or maintenance activities	• Avoid skin contact with drilling fluids. • Wash hands before eating, drinking, or applying cosmetics/sunscreen. • Have water on-hand to flush affected area if exposure occurs.
Chemical burns	• Spills or other contact with preservatives in groundwater sampling bottles	• Wear appropriate PPE (nitrile gloves, eye protection). • Avoid skin contact with preservatives. • Wash hands before eating, drinking, or applying cosmetics/sunscreen. • Avoid tipping over preservative bottles before they are filled with sample water.

Table 4-2 Potential Chemical Hazards		
Potential Hazard	**Source of Potential Hazard**	**Hazard Mitigation Control**
Exposure to heavy metals or other contaminants in groundwater	• Ingestion or skin contact with groundwater	• Wear appropriate PPE (nitrile gloves, eye protection). • Avoid skin contact with groundwater. • Wash hands before eating, drinking, or applying cosmetics/sunscreen. • Avoid spilling filled sample bottles. • Be aware of purge water location.
Release of fuels (gasoline, diesel, oil) or other chemicals	• Contaminated water or soil within the work area. • Spills that occur during fueling or when lubricating equipment and vehicles • Spills from equipment malfunction or on-site accidents	• Wear appropriate PPE (nitrile gloves). • Limit exposure to known contaminated areas. • Fuel or lubricate equipment in a designated area with appropriate spill preventions in place. • Be prepared to clean up contamination resulting from accidental spills. This includes having proper absorbent material in place. • Be aware of unusual odors and ground color while excavating. • Wash hands before eating, drinking, or applying cosmetics/sunscreen.
Space below is provided for hazards identified during conduct of field work.		
	•	•
	•	•

Fuel oils are generally low in toxicity, have low volatility, and are not readily absorbed through the skin; however, they may cause skin irritation, or "dermatitis", upon contact. Waste oils may contain certain cancer causing components such as heavy metals and oil derivatives which can be absorbed through the skin.

Gasoline is considered more toxic than oils; it has relatively high volatility, and certain components are readily absorbed through the skin. Gasoline contains certain components, such as benzene, which are classified as potential carcinogens.

The symptoms of inhalation over-exposure to petroleum products include dizziness, loss of coordination, general malaise, headaches, and nausea. If any of these symptoms occur, the project manager and the nearest hospital should be contacted. The dangers associated with over-exposure to petroleum products should be acknowledged and taken seriously.

NOTE: INTERA personnel are **NOT** authorized or trained to perform rescue operations or any other work that requires use of a respirator of any kind.

4.3 BIOLOGICAL HAZARDS

Numerous types of pests and organisms may be present at the Site. A list of potential biological health and safety hazards associated with the activities at the Site is provided in **Table 4-3.**

Table 4-3 should be revised to include additional biological hazards that may be identified during conduct of field activities.

Table 4-3 Potential Biological Hazards		
Potential Hazard	**Source of Potential Hazard**	**Hazard Mitigation Control**
Poisoning or allergic reaction	• Stinging or biting insects (bees, wasps, spiders) • Venomous snakes • Poisonous plants	• Avoid exposing hands or other body parts to cool, dark areas where these pests are known to dwell. • Use caution opening equipment or well vaults and other cool, dark enclosures, especially anything that has been sitting unopened for extended periods of time. • Do not intentionally approach snakes or insects. Move them away slowly to avoid agitating the biological hazard, if possible. Inform appropriate parties to have hazard removed, if necessary. • Use insect repellant, if appropriate, if mosquitos, ticks, chiggers, or other biting insects are present. • Know how to recognize and avoid poisonous plants such as poison ivy. Wear gloves and wash exposed flesh with soap and water as soon as possible if exposure is suspected. • Rattle snakes could be encountered at the site – additional information on venomous snakes is provided in **Attachment I.**
Bite lacerations	• Feral or domestic animals and livestock • Rodents • Reptiles	• Avoid exposing hands or other body parts to cool, dark areas where these pests are known to dwell. • Use caution when walking in rocky terrain where reptiles could be hiding. • Avoid contact with feral or domestic animals and livestock. • Contact authorities if an unrestrained animal is exhibiting aggressive behavior toward Site personnel.
Exposure to Hanta Virus or Plague	• Contact with rodents or rodent excrement • Agitating dried rodent urine or droppings greatly increases the potential for exposure	• Areas with visible evidence of rodent activity and excrement should be avoided. • If avoidance is not possible, it is important to NOT stir up dust - do not sweep or vacuum up droppings, urine, or nesting materials. While wearing a dust mask and latex or nitrile gloves, spray with a mixture of 1-part bleach to 10 parts water. Use paper towels to collect the excrement and place in a trash bag.

Table 4-3 Potential Biological Hazards		
Potential Hazard	**Source of Potential Hazard**	**Hazard Mitigation Control**
Exposure to unknown biological pathogens	• Medical waste in landfill • Blood-borne pathogen exposure from an injury • Dirty needles	• Avoid direct contact with known landfill waste whenever possible. If contact is unavoidable in order to perform a required task, potential hazards are minimized by using appropriate PPE to protect against exposure. • If needles are found on Site, notify coworkers and do not touch the needle. • Site personnel will be up to date on first aid and blood-borne pathogen training.
Space below is provided for hazards identified during conduct of field work.		
	•	•
	•	•

5.0 SITE HEALTH & SAFETY PROCEDURES

Field personnel should have reviewed this SSHASP prior to arrival at the Site. Upon arrival at the Site and prior to start of work, the SSO or other supervisory personnel will lead a Kickoff Safety Meeting. The following topics should be covered during the Kickoff Meeting:

- Discussion of the Site's history.
- Discussion and identification of Site work zones and control measures such as high traffic areas, PPE, and location of emergency equipment.
- Emergency evacuation procedures and location of evacuation assembly area. Note wind direction if that may affect the location of the evacuation assembly area.
- Identification of "shut-off" switches located on any equipment to be used and familiarization with their use.
- Discussion of the location and use of the nearest phone(s).
- Review of emergency procedures and the location of the nearest hospital. **The Hospital Route Map(s) are** included in **Section 7.0**.
- Personnel must sign the Site Personnel Acknowledgment Form included as **Form 1** indicating that they have read and understood this SSHASP.
- Personnel must also sign **Form 2** indicating attendance and participation in the Kickoff Safety Meeting.

General good housekeeping practices to be followed at the Site are as follows:

- If necessary, ONE CALL Notification should be completed at least two days prior to beginning Site work. Location of power, gas, phone, and cable lines will be verified with the individual utility departments.
- A Tailgate Safety Meeting shall be conducted prior to the start of work each day, at the start of a new shift and at the beginning of each new task. Field personnel (INTERA and any associated subcontractors) will attend this health and safety meeting to review the safety concerns at the Site. Topics to be reviewed include, but are not limited to, , items related to health and safety that occurred during the previous day or on the previous shift, a discussion of health and safety issues for the specific tasks at hand along with associated PPE, special equipment to be used on-site for that day/shift (if any), any changes with regard to chemical or physical hazards, mobile phone availability, emergency procedures, and other topics as necessary. Health and safety observations or input from field personnel and subcontractors will also be solicited. Personnel will sign **Form 2** at the conclusion of Tailgate meeting.
- Proper PPE shall be selected for the work to be performed (see **Section 5.1**).
- Bottled water or a water source shall always be available on-site for use as an eye wash and for use when administering first aid. Personnel are responsible for bringing drinking water to the Site to prevent dehydration (wash hands and/or face before drinking). Electrolyte drinks or tablets are encouraged for field personnel who will be exposed to extreme heat for extended periods of time.
- A first aid kit will be in the field vehicle for use during work activities, and any injuries shall be reported to the SSO, Project Manager, and INTERA CHSO IMMEDIATELY once site is secure and threat of immediate danger is over, personnel are safe and/or receiving medical care, as appropriate.
- A telephone (cell phone is acceptable) for emergency situations must be easily accessible and in working order when performing any type of fieldwork. All site workers shall be made aware of the

location of a telephone each day before work activities begin. If cell phone service at the Site is limited, workers must be aware of the nearest location where cell service is known to work.

5.1 SAFETY EQUIPMENT

To provide a better understanding about how to properly protect the head, eyes, skin, feet, and respiratory system, this subsection discusses general safety equipment and PPE. The SSO has the authority to make PPE exceptions for Site personnel if he/she deems it is in the best interest of the field personnel's wellbeing. Such a PPE exception (i.e., modification to the guidance laid out in this SSHASP) shall be based on Site-specific information such as air monitoring data, visual observations, and weather data/observations. An example of such a modification to the SSHASP is a decrease in the use of hard hats, or poorly breathable clothing if heat stress is a primary concern during Site activities and the use of the PPE was intended for a low-risk precaution. The SSO shall not make a PPE exception/modification if personnel shall be without the protection needed to be safe or to properly protect their health. If it appears that proposed and readily available PPE is inadequate, Site work shall be suspended until new PPE or planning allows personnel to work safely.

5.1.1 OSHA PPE LEVELS

PPE to protect the body against contact with known or anticipated chemical hazards has been divided into four categories by OSHA (i.e., Levels A, B, C, and D) according to the degree of protection afforded (1910.120 Appendix B). For reference, these PPE categories are described below in **Table 5-1**.

Table 5-1 PPE Required for OSHA Protection Levels

Protection Level	Required PPE	Optional PPE
Level D	• Coveralls • Chemical resistance steel-toe and shank boots/shoes	• Gloves • Chemical resistance outer boots (disposable) • Safety glasses or chemical splash goggles • Hard hat • Escape mask • Face shield
Level C	• Full-face or half-mask air purifying respirators (NIOSH approved) • Hooded chemical-resistant clothing • Chemical-resistant outer gloves • Chemical-resistant inner gloves	• Coveralls • Chemical resistance steel-toe and shank boots (outer) • Chemical resistance outer boot-covers (disposable) • Hard hat • Escape mask • Face shield

Table 5-1 PPE Required for OSHA Protection Levels		
Protection Level	**Required PPE**	**Optional PPE**
Level B ***Not approved for use at the site***	• Positive pressure, full-face self-contained breathing apparatus (SCBA), or positive pressure supplied air respirator with escape SCBA (NIOSH approved) • Hooded chemical-resistant clothing • Chemical-resistant outer gloves • Chemical-resistant inner gloves • Chemical-resistant steel-toe and shank boots (outer)	• Coveralls • Chemical resistance outer boot-covers (disposable) • Hard hat • Face shield
Level A ***Not approved for use at the site***	• Positive pressure, full-face SCBA, or positive pressure supplied air respirator with escape SCBA (NIOSH approved) • Hooded chemical-resistant clothing • Chemical-resistant outer gloves • Chemical-resistant inner gloves • Chemical-resistant steel-toe and shank boots (outer)	• Coveralls • Chemical resistance outer boot-covers (disposable) • Hard hat • Face shield

NOTE: *If Site conditions require the use of Level A, Level B or Level C PPE work will cease and the INTERA CHSO will be notified immediately to verify that proper training and procedures are in place prior to conduct of fieldwork. Revisions to this SSHASP will also be necessary.*

Personnel are NOT authorized to work in immediately dangerous to life or health (IDLH) conditions.

5.1.2 PPE LEVELS APPROVED FOR THE SITE

The levels of protection selected for activities specified in this SSHASP are:

- Level D
- Modified Level D
- Level C

Level D: This level of PPE will be required during basic Site maintenance activities. This includes steel-toe boots (chemical resistance, shank not required), long pants, and long-sleeve shirts (short-sleeve shirts will be allowed in hot weather and as activities permit).

Modified Level D: This level of PPE will be required while working near an operational drill rig, when working near roadways, and anytime overhead hazards are present. Modified level D includes hard hats, impact-resistant safety glasses, work gloves, and high-visibility safety vests. Hearing protection is required when working around heavy equipment or any other time high noise levels are anticipated.

If contaminated soil, groundwater, or any other kind of hazardous waste is encountered, chemical-resistant gloves and chemical splash goggles may be required. Work at the site will stop until the proper PPE can be determined using **Table 5-1** as guidance.).

Level C / Modified Level C: *It is recommended that Site personnel be prepared for this contingency level of protection.* This level of PPE will be required when personnel will be working in conditions where

concentrations of contaminants in air have the potential to be above the action levels shown in the Air Quality Action Levels Section of this SSHASP (Section 5.4.1), and oxygen levels are measured to be above 19.5% but below 23.5%. Oxygen levels above 23.5% are explosive and no work shall be done. This level includes the requirements of Level D or modified Level D, with a full-face respirator and the proper cartridges, as determined by the situation. To fulfill this requirement, medical surveillance and respirator training shall have been completed by personnel before work commences. Each employee shall have his/her own respirator fit-tested to confirm proper fit. Proof of respirator training and fit testing should be submitted to the Project Manager before work commences. A copy of the INTERA respirator selection and maintenance procedures are included in **Attachment J.**

5.1.3 GENERAL PPE REQUIREMENTS

Any PPE provided must meet NIOSH or American National Standards Institute (ANSI) specifications.

- **Respiratory Protection:** AS NEEDED for Site personnel and visitors. Respirators may be worn when concentrations of contaminants in air have the potential to be above the action levels shown in Air Quality Action Levels Section of this SSHASP (Section 5.4.1), and oxygen levels are measured to be above 19.5% but below 23.5%. Oxygen levels above 23.5% are explosive and no work shall be done. Personnel who are not part of the medical surveillance program, or who do not have the proper training will not be allowed to wear respirators.
- **General Work Clothing:** REQUIRED for Site personnel and visitors. Clothing must be close fitting and comfortable, but without loose ends, straps, drawstrings, or belts, or otherwise unfastened parts that might catch on rotating or moving components of equipment. Long pants and long-sleeve shirts are required at all times (short-sleeve shirts will be allowed in hot weather and as activities permit).
- **Chemical Protective Clothing:** AS NEEDED for Site personnel and visitors. Tyvek coveralls may be worn when additional skin protection is necessary.
- **Safety Headgear:** REQUIRED for Site personnel and visitors. Head protection shall be nonconductive to prevent limited electrical shock and shall meet the requirements of ANSI Standard Z89.1. Required when working near roadways, while heavy equipment (including drill rigs) is operational, and when there are other overhead hazards.
- **Safety-toe Boots:** REQUIRED for Site personnel and visitors. Foot protection shall meet the minimum requirements of ANSI Standard Z41.1. As determined by the SSO, safety boots may be required to meet the Class 75 standards (steel-toe boots, steel shank, chemical resistant, 6- to 8-inch tops, etc.).
- **High Visibility Safety Vests or Clothing:** REQUIRED for Site personnel and visitors during drilling operations or when working in areas where there is traffic or moving vehicles. Must be fluorescent orange, yellow, or green. High visibility clothing for night shift personnel will also have reflective tape.
- **Safety Glasses:** REQUIRED for Site personnel and visitors. All eye protection shall meet the ANSI Z87.1 standard. Prescription glasses shall be an approved safety type or safety glasses that fit over the prescription glasses must be used. Eye protection should be worn at all times, and splash goggles should be worn when splashes present a significant hazard to eyes.
- **Gloves:** REQUIRED for Site personnel and visitors. Specific gloves should be selected based on the activities being performed. Puncture resistant (i.e., leather) gloves shall be worn for protection against cuts and abrasions that could occur while handling tools or other sharp objects or when working around drill rigs. Chemical-resistant gloves (i.e., nitrile) shall be worn during activities that could result in contact with hazardous chemicals, groundwater, or other contamination.

- **Hearing Protection:** REQUIRED for Site personnel and visitors when noise levels are at or above 85 decibels. Ear plugs or other hearing protection will be available to site personnel as necessary. Hearing protection may be required when working around heavy equipment or any other time high noise levels occur or are anticipated, such as during drilling activities or working near generators.
- **Fall Protection:** NOT REQUIRED - INTERA personnel shall not perform work above 6 feet without the approval of the project manager; tasks to be performed in Section 1.2 do not warrant working from heights. Full body harnesses with shock absorbing lanyards will be required when working above 6 feet or when there is a danger of falling (this also applies to the use of ladders).

5.2 WORK ZONES

To minimize the movement of contaminants from work sites to uncontaminated areas, three work zone areas will be established as-needed at work areas where contact with contamination or hazardous chemicals occurs. The work zone areas may be revised as contaminant data is collected at the Site. The three work zones include the following:

- Zone 1: Exclusion Zone
- Zone 2: Contamination Reduction Zone
- Zone 3: Clean Zone

Exclusion Zone: The Exclusion Zone is the zone where contamination does or could occur. Persons entering this zone shall wear the level of protection deemed necessary in the Safety Equipment Section (**Section 5.1**). Smoking, eating, and drinking are not allowed in this zone.

Contamination Reduction Zone: Between the Exclusion Zone and the Clean Zone is the Contamination Reduction Zone, which provides a transition zone between the contaminated and clean areas of the Site. This zone shall be located directly outside the Exclusion Zone. Personnel shall decontaminate in the Contamination Reduction Zone when leaving the Exclusion Zone. Decontamination procedures shall be followed as shown in **Section 5.3**. Smoking, eating, drinking and applying cosmetics/sunscreen are not allowed in this zone.

Clean Zone: The Clean Zone shall be an uncontaminated area from which operations shall be directed. It is essential that contamination from the work area be kept out of this area.

At excavations and drilling sites where contamination is anticipated, the boundaries of the Exclusion Zone will be defined with flagging and/or caution tape.

During groundwater sampling and pneumatic slug testing activities at well vaults with contamination, the Exclusion Zone will be defined by the bollards surrounding each vault (if applicable). If no bollards are present, cones will be placed to define the boundaries of the Exclusion Zone. The Contamination Reduction Zone will extend 10 feet (or as far as deemed necessary by the SSO) from the Exclusion Zone boundary and will be marked with cones or stakes.

5.3 DECONTAMINATION PROCEDURES

The following are general decontamination procedures for Site activities:

- Remove gross contamination from tools, respirator (if used), monitoring equipment, etc., prior to leaving the Site using either de-ionized water or an Alconox/water solution.
- Either completely decontaminate soiled equipment at the work site using detergent and water (if possible) or wrap equipment in a plastic bag for transport until complete decontamination is

possible. Decontamination of excavation equipment may not be necessary unless municipal waste and/or stained soil with odor is encountered during digging or drilling.

- Dispose of contaminated gloves, Tyvek suits, used respirator cartridges, paper towels, etc., by placing in a plastic bag and discarding in a designated waste container for the Site (non-hazardous waste).
- Wash hands (and face, if necessary) thoroughly with soap and water before lunch or coffee breaks and after finishing work for the day.

Refer to site-specific Work Plan/SAP/FSP and SOPS for additional information and details on decontamination procedures.

5.4 AIR QUALITY MONITORING

Air quality hazards are not expected at this Site; therefore, air quality monitoring is not planned as part of site activities. Should conditions change, work will be suspended and this SSHASP will be revised to include the appropriate air monitoring.

5.5 RESPIRATORY PROTECTION PROGRAM

INTERA's corporate policy is that respirators are to be used only where engineering control of respiratory hazards is not feasible, while engineering controls are being installed, or in emergency situations. No respirator is capable of preventing all airborne contaminants from entering the wearer's breathing zone. Properly selected and used respirators help protect against certain airborne contaminants by reducing airborne contaminant concentrations in the breathing zone to below recommended exposure levels. Misuse of respirators may result in overexposure to the contaminant and cause sickness or death. For this reason, proper respirator selection, training, use, and maintenance are mandatory in order for the wearer to be properly protected.

Respirators are not currently anticipated to be necessary for this Site. If it is determined, through change of scope or air monitoring results that respiratory protection is necessary, work must be stopped and this SSHASP must be revised to include a Respiratory Protection Program as Attachment J.

Additional information on INTERA's Respiratory Protection Program can be found in **Appendix 14** of the CHSP. **Personnel are NOT authorized to work in IDLH conditions.**

5.6 CONFINED SPACES

No one shall enter a confined space without the proper training and documentation needed to perform confined space work activities. Following are definitions associated with a confined space and the procedures that will be used if a confined space is encountered.

A **confined space** is an enclosed or partially enclosed space that:

1. Has been identified as such in a risk assessment.
2. Is not intended or designed primarily as a place of work.
3. May have restricted entry and exit.
4. May:
    a. Have an atmosphere which contains potentially harmful levels of contaminant.
    b. Not have a safe level of oxygen, e.g., following a nitrogen purge.

c. Cause entrapment or engulfment.

Confined spaces may include, but are not limited to:

1. Storage tanks, process vessels, boilers, pressure vessels, tank-like compartments that have only a manhole for entry, and ceiling and floor spaces.
2. Open-topped pits, grease traps, or excavations more than 1.5 meters deep.
3. Pipes, pumps, sewers, shafts, ducts, drains, tunnels, cellars, basements, or similar.
4. Abandoned mine workings and adits.

Contaminant: Any dust, fume, mist, vapor, gas, or other substance in liquid or solid form, the presence of which may be harmful to health and safety.

Entry to confined space: This occurs when any portion of a person's body breaks the plane of entry into the confined space. Evaluation of air quality should be done by insertion of a tube from the measuring device into the confined space from outside of the confined space without any portion of the person's body breaking the place of the confined space.

Identification: Confined spaces must be identified and signs erected at the entry points denoting that a permit is required prior to entry. Where signage is impractical, for example with adits, other means of highlighting the dangers need to be used.

Permit-Required Confined Space: A confined space that requires a permit before the space can be entered because it has, or has the potential for, one or more of the following characteristics:

- An atmosphere that can become IDLH due to toxic, flammable, or asphyxiating characteristics.
- The potential for engulfment.
- A size or shape that can trap or asphyxiate.
- Any other recognized serious hazard.

Confined spaces are not known or anticipated to occur on the Site*, and confined space entry is not authorized during execution of the SOW as defined for this SSHASP.*

If a confined space is encountered, a sign stating that entry is prohibited shall be posted and the Project Manager and CHSO shall be notified. Personnel shall not enter the confined space for any reason at any time under this SSHASP. ***If it is determined that a confined space must be entered during this project, work must stop while this SSHASP is revised to include a Confined Spaces Program as Attachment K.***

5.7 HAZARD COMMUNICATION (HAZCOM) PROGRAM

The HazCom Program designates the personnel responsible for the implementation and maintenance of hazardous chemical labeling and provides information for employee training on HazCom requirements. INTERA's written HazCom program is provided in **Attachment G**, and the site-specific **Hazardous Chemical List** and **Safety Data Sheets** (SDSs) are provided in **Attachment H** at the back of this SSHASP.

The Hazardous Chemical List includes chemicals/constituents that are currently present at the Site, or which may be brought to the Site, as required for the specific tasks to be performed. The Hazardous Chemical List should include all chemicals brought to the Site by INTERA, INTERA subcontractors, or other contractors to which field personnel may be exposed. SDSs provide detailed information on specific chemicals, including potential hazardous effects, physical and chemical characteristics, and recommendations for appropriate protective measures.

5.8 LOCK-OUT/TAG-OUT PROGRAM

Lock-out/tag-out procedures must be followed for any Site activities that involve hazardous energy. Hazardous energy includes energy derived from electrical, pneumatic, hydraulic, stored (springs, batteries), potential (by virtue of position), or heat (hot water, steam) sources.

Minimum requirements for the lock-out of energy isolating devices must be followed whenever maintenance or servicing is performed on machines or equipment. Lock-out/tag-out procedures shall be used to make sure that the machine or equipment is stopped, isolated from potentially hazardous energy sources, and locked out before employees perform any servicing or maintenance where the unexpected energization or start-up of the machine or equipment or the release of stored energy could cause injury.

5.8.1 LOCK-OUT/TAG-OUT PROCEDURES FOR THIS SITE

The need for lock-out/tag-out procedures are not anticipated during tasks to be performed under this SSHASP. However, lock-out/tag-out should be reviewed during tailgate safety meetings, and subcontractors, such as drill rig operators or other equipment operators, should identify when lock-out/tag-out procedures will be used for maintenance or other tasks performed during drilling activities or other site activities, as applicable.

The following sections are included in the event that lock-out/tag-out procedures become necessary.

5.8.2 AUTHORIZED AND AFFECTED EMPLOYEES

Two groups of employees are identified in the OSHA Hazardous Energy Isolation Regulations: Affected Employees and Authorized Employees. Affected Employees are personnel who will be working in areas on the worksite where the lock-out/tag-out procedures may be used due to the potential for hazardous energy releases. The Affected Employee needs to be aware of the purpose of the energy isolation procedures, how to read and interpret the tags or other written instructions in the area, and they need to know and understand that they are **NOT** authorized to apply and/or remove energy isolation devices or tags.

Authorized Employees are personnel who will be working in or on the equipment that potentially has hazardous energy associated with its operation. Authorized Employees are the only employees who are allowed to affix the energy isolating devices, complete the tags, and perform the work in the regulated areas. Only keyed locks will be used, and in some cases, they will be used in conjunction with chains or other pre-engineered isolation devices. The locks will be color coded to match with the Host/Client Site energy isolation program, as applicable. Weather-proof tags will be attached to the locks to identify the person affixing the lock and the purpose.

Authorized Employee training will be completed prior to the start of a project where these responsibilities are required.

5.8.3 LOCK-OUT TAG-OUT SYSTEM PROCEDURE

Preparation for Lock-out/Tag-out

1. Identify the proper hazardous energy control procedure for the equipment or machine to be locked-out or tagged-out based on manufacturer instructions or process knowledge.
2. Identify Affected Employees by job title whose job requires him/her to operate or use a machine or equipment on which service or maintenance is being performed under lock-out or tag-out or whose job requires him/her to work in an area in which such servicing or maintenance is being performed.

3. Identify Authorized Employees by job title that will be responsible for lock-out and/or tag-out of machines and equipment in order to perform servicing or maintenance on that machine or equipment.

Application of Lock-out/Tag-out Procedure

1. Prior to initiating lock-out and/or tag-out procedures, the Authorized Employee shall know the type and magnitude of the energy the machine or equipment uses, the hazards of the energy to be controlled and the methods or means to control the energy.
2. Notify Affected Employees that the Lock-out/Tag-out Procedure is going to be used and the reason for its use. Affected Employees will be notified before controls are applied and after they are removed.
3. Shut down the equipment by normal stopping procedures. Operate the equipment to be sure it is shut off. Operate the switch, valve or other isolation devices so that isolation from the energy sources is confirmed.
4. Stored energy must be dissipated or restrained by methods such as repositioning, blocking, bleeding down, etc. (Steps 2 and 3 may be performed by Host/Client site personnel).
5. Lock-out and/or Tag-out the energy isolating devices with the assigned individual locks and/or tags. **NOTE:** Combination locks are prohibited for use in any lock-out of machines or equipment.
6. Do not attempt to operate any switch, valve or energy isolating device while it is Locked-out or Tagged-out.

Testing the Equipment to Ensure the Power is OFF

1. After assuring that no personnel are exposed, check that the energy sources are isolated by pushing the start button, or other normal controls, to make certain the equipment will not operate.
2. This may also require the testing of valves by trying to turn the valve handle.
3. Return the controls to the neutral or “Off” position after the test.

Temporarily Restoring the Energy

1. There are times when the energy must be re-applied temporarily while the work is being done on an isolated piece of equipment to test the repair or the operation. This temporary application of power must be done very carefully.
2. First, the Authorized Employee(s) must verify that no personnel are exposed and that only specified Authorized Employees are in the area.
3. Then temporarily remove the energy isolating device.
4. Perform the function check or measurement.
5. Immediately re-apply the energy isolation device to complete the work on the equipment.

Restoring the Energy to Normal Production Operation

1. After service and/or maintenance are complete and the equipment is ready for normal production operations, check the area to ensure no one is exposed.
2. Ensure that tools have been removed from the area and guards have been reinstalled.
3. Remove lock-out/tag-out devices and operate the energy isolating devices to restore energy to the machine or equipment.

5.8.4 GROUP LOCK-OUT/TAG-OUT PROCEDURES

Before any group Lock-out/Tag-out is implemented, this procedure will be reviewed with the personnel affected by or authorized to implement the group Lock-out/Tag-out event.

1. One Authorized Employee will coordinate the Lock-out/Tag-out procedure for the group Lock-out/Tag-out events.
2. Each employee will affix his/her lock or tag to the equipment being serviced or on which maintenance is being performed.
3. No employee will be allowed to remove another employee's lock or tag. Each employee will remove his/her own lock when his/her portion of the work is complete.
4. When maintenance or service will take more than one shift, the members of the off-going shift will remove their locks and/or tags as the members of the on-coming shift apply their locks and/or tags.
5. When equipment has room for only one lock, the coordinator of the procedure will apply his/her lock and place the key in a lockable box or cabinet. Each other Authorized Employee will then affix his/her lock to the cabinet or box.

All employees are required to comply with the restrictions and limitations imposed upon them during the use of lock-out. All authorized employees are required to perform the lock-out in accordance with approved procedures. Employees, upon observing a machine or piece of equipment which is locked out to perform servicing or maintenance, shall not attempt to start, energize, or use that machine or equipment.

5.9 HOT WORK PROGRAM

All temporary operations involving open flames or that purposefully producing heat and/or spark shall be performed with the proper safety controls and equipment in place to eliminate the risk associated with igniting combustible materials. No hot work shall be conducted without first completing a **Hot Work Permit**.

A Hot Work Program shall be followed when performing any brazing, cutting, grinding, soldering, welding, or other activity that results in the production of heat. Properly designed and operated "intrinsically safe" equipment is excluded from the Hot Work Program. The permit requirement may be fulfilled by completing the permit form included as **Form 7** and abiding by the Hot Work Program. The Hot Work Program includes the following procedures:

- Establish permissible areas for hot work.
- Ensure that only approved apparatus, such as torches, manifolds, regulators, and pressure reducing valves, are used.
- Ensure that all individuals involved in the hot work operations are familiar with Hot Work Program requirements.
- Ensure that individuals involved in the hot work operations are trained in the safe operation of their equipment and the safe use of the process. These individuals must have an awareness of the risks involved and understand the emergency procedures in the event of a fire.
- Determine Site-specific flammable materials, hazardous processes, or other potential fire hazards present or likely to be present in the work location.
- Ensure that combustibles are protected from ignition by the following means:
  - Move the work to a location free from combustibles or flammable gasses.
  - If the work cannot be moved, ensure the combustibles are moved to a safe distance or have the combustibles properly shielded against ignition, and ventilate the area and continuously monitor for flammable gasses.

  - Ensure that hot work is scheduled such that operations that could expose flammables or combustibles to ignition do not occur during hot work operations.
  - If any of these conditions cannot be met, then hot work must not be performed.
- Determine that fire protection and extinguishing equipment are properly located and readily available.
- Ensure sufficient local exhaust ventilation is provided to prevent accumulation of any smoke and fumes.
- Ensure that an individual is posted to watch for fire (fire watch) when hot work is performed in a location where a fire might develop, or where the following conditions exist:
  - Combustible materials in building construction or contents are closer than 35 feet to the point of hot work.
  - Combustible materials are more than 35 feet away but are easily ignited by sparks.
  - Wall or floor openings are within 35 feet and expose combustible materials in adjacent areas. This includes combustible materials concealed in walls or floors.
  - Combustible materials are adjacent to the opposite side of partitions, walls, ceilings, or roofs, and are likely to be ignited.
- Where a fire watch is not required, a final inspection shall be conducted 1/2-hour after the completion of hot work operations to detect and extinguish possible smoldering fires.

An operator must cease hot work operations if unsafe conditions develop or are suspected.

5.10 STANDARD OPERATING PROCEDURES

SOPs applicable to the tasks covered under this SSHASP are included in the Work Plan/Sampling Analysis Plan for Data Gap Monitoring Well Installation, Well WUABFFMW01 Kirtland Airforce Base Bulk Fuels Facility, Albuquerque, New Mexico. These SOPs are as follows:

- SOP 2- Decontamination
- SOP 7- Monitoring Well Installation
- SOP 8- Monitoring Well Development
- SOP 9- Monitoring Well Gauging
- SOP 10- Monitoring Well Groundwater Sampling
- SOP 15- Slug Test Procedures

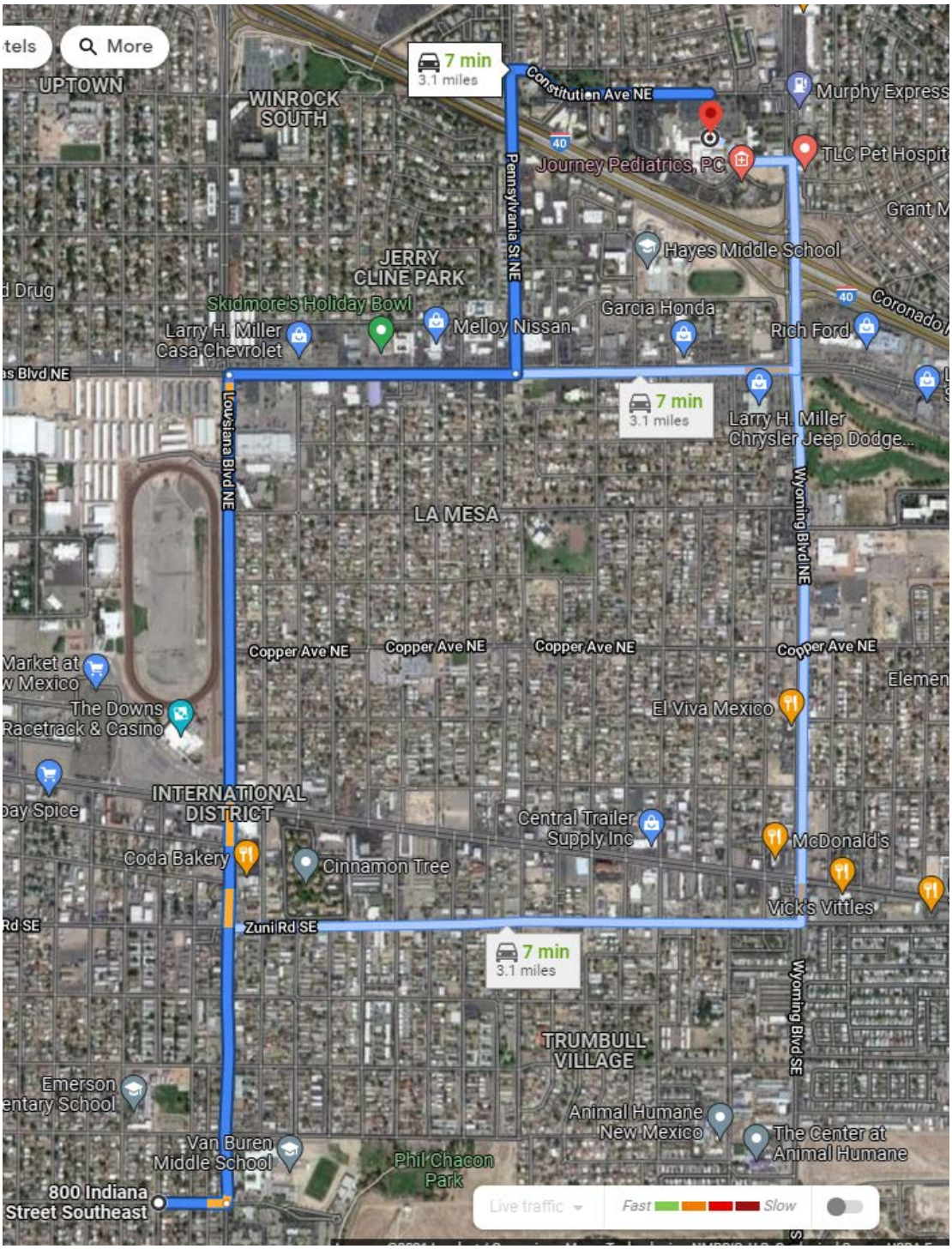
6.0 EMERGENCY CONTACTS LIST

AMBULANCE:	911
FIRE:	911
POLICE:	911 (non-emergency 311)
POISON CONTROL:	1-800-222-1222
SITE ADDRESS:	800 Indian Street, Albuquerque, NM 87108
HOSPITAL: **Address:** **Hospital Phone Number:**	UNM Hospital 2211 Lomas Blvd. NE Albuquerque, NM 87106 (505) 272-2111 (non-emergency)
LOCATION OF NEAREST HOSPITAL:	See Map included in **Section 7.0**
LOCATION OF NEAREST PHONE:	Mobile phones

Project Manager (PM)	Joe Tracey – INTERA	(505) 246-1600 (o) (505) 301-1134 (m)
Senior Advisor/Reviewer	Joe Galemore – INTERA	(505) 246-1600 (o) (505) 239-6414 (m)
Senior Advisor/Reviewer	Rob Sengebush – INTERA	(505) 235-3271 (m)
Site Safety Officer (SSO)	To be determined based on field activities and INTERA personnel on-Site. The SSO will be noted daily on Tailgate Safety Meeting Forms.	Not Applicable
Task Manager	Lynda Price – INTERA	(505) 246-1600 (o) (512) 492-2072 (m)
Task Manager	Lee Dalton – INTERA	(505) 730-7372 (m)
Task Manager	Austin Hanson – INTERA	(505) 246-1600 (o) (484) 264-3095 (m)
INTERA Chief Health and Safety Officer	Noreen Baker – INTERA	(512) 425-2023 (o) (512) 663-8319 (m)
Albuquerque Branch Health and Safety Coordinator	Brian Archuleta – INTERA	(505) 246-1600 (o) (505) 553-2156 (m)
Project Manager (PM)	Joe Tracey – INTERA	(505) 246-1600 (o) (505) 301-1134 (m)
Senior Advisor/Reviewer	Joe Galemore – INTERA	(505) 246-1600 (o) (505) 239-6414 (m)
Client Project Manager	Diane Agnew – Water Authority	(505) 289-3008 (o) (512) 206-7148 (m)
Cascade Drilling	Greg Zekoff - Regional Director	(480) 226-5485
Jet West Geophysical Services	Mick Peterson – Manager/Logger	(505) 325-8531
Southwest Safety	George Thompson - Estimator	(505) 873-0044

AES, Inc.	Ron Harvey - Compliance Manager	(843) 599-0330
High Mesa Consulting Group	Paul Street - Technical Manager	(505) 345-4250

7.0 HOSPITAL ROUTE MAP



Directions to Presbyterian Kaseman Hospital

8300 Constitution Ave NE, Albuquerque, NM

1) Head east of Kathryn Ave SE towards Kentucky St SE (0.1 mi)
2) Turn Left onto Louisiana Blvd SE (1.5 mi)
3) Turn Left on Pennsylvania St NE (0.6 mi)
4) Turn Right onto Constitution Ave NE (0.2 mi)
5) Continue straight to stay on Constitution Ave NE (0.2 mi)
6) Arrive at Presbyterian Kaseman Hospital

8.0 SITE EMERGENCY RESPONSE PLAN

Any incident or accident must be reported to the Project Manager and the INTERA CHSO immediately (i.e., once site is secure and threat of immediate danger is over, and personnel are safe and/or receiving medical care, as appropriate). Incidents must be documented by the employee(s) who witnessed the event (and with the Project Manager's involvement) on the INTERA Incident Investigation Report Form (**Form 5a**).

EMERGENCY COMMUNICATION PROTOCOLS:

In the case of an emergency, *CALL 911*.

- Talk in a controlled and steady manner
- Pass on as much information as possible (Person, Location, Nature or Emergency, Injuries, Number of people injured, Assistance required, any other important detail)
- Verify that the emergency communication has been heard and understood

The person receiving the call should:

- Record details of emergency
- Seek clarification on details as necessary
- Begin organizing emergency responders and contacting persons that need to know

Other Site Personnel

- Make yourself ready in case you are called up to assist in the emergency response

PERSONAL INJURY: Check the accident scene to determine if you or anyone else is in danger. FOLLOW EMERGENCY COMMUNICATION PROTOCOLS. Keep non-essential personnel out of the area. Remove personnel from immediate danger if there is no suspicion of neck or back injury. If there is a question about whether it is safe to move the victim, DO NOT move the victim; instead, make him or her as comfortable as possible while waiting for emergency assistance. Administer appropriate minor first aid only within your competency and training. Wait for emergency personnel to assist and notify the Project Manager and INTERA CHSO as soon as personnel are out of immediate danger.

CHEMICAL EXPOSURE: For signs of inhalation exposure, retreat to fresh air for recovery. If symptoms are serious, such as nausea or fainting, FOLLOW EMERGENCY COMMUNICATION PROTOCOLS and discontinue work at that location. In the case of skin or eye irritation due to chemical contact FOLLOW EMERGENCY COMMUNICATION PROTOCOLS, and wash affected skin with soap and water, or flush eyes with generous amounts of water while waiting for emergency response. Notify the Project Manager and INTERA CHSO as soon as personnel are out of immediate danger.

FIRE: If fire occurs, FOLLOW EMERGENCY COMMUNICATION PROTOCOLS. After the alarm has been raised, if the fire can be easily contained and extinguished, you may do so with a portable fire extinguisher. This is not a requirement unless the employee has received hands-on fire extinguishing training. Project vehicles will have working fire extinguishers in them for use in the event of small fires. Personnel shall only use extinguishers in cases of small fires, when the individual has been trained to use a portable fire extinguisher and is comfortable attempting to put out the fire. If the fire cannot be contained and extinguished with a portable fire extinguisher, or if explosion risk is present, evacuate all personnel to the muster point. There is no building or equipment that is more valuable than a person. It is preferable that the fire creates damage rather than injury. All unnecessary personnel must be kept back from the fire and out of harm's way.

SITE EVACUATION: If an emergency Site evacuation becomes necessary for any reason, the SSO shall alert all personnel to leave the Site and notify the Project Manager of the situation. Personnel shall not return to the Site until an all-clear notification has been received from the SSO.

SITE-SPECIFIC EVACUATION ASSEMBLY AREA – On the sidewalk immediately east of the residence located to the south of the project area, 804 Indiana Street.

EMERGENCY SITUATIONS INVOLVING THE SURROUNDING COMMUNITY: In the highly unlikely event that a Site emergency has the potential to affect the community surrounding the Site, FOLLOW EMERGENCY COMMUNICATION PROTOCOLS and notify the Project Manager as soon as practical. No communication is to be made to community or media groups. If calls come in from either of these groups, contact details such as names and numbers are to be collected and passed onto the Project Manager (and then to the Client) to formulate a response.

SPILL RESPONSE: Where chemicals are unknown or the hazard is great, FOLLOW EMERGENCY COMMUNICATION PROTOCOLS then establish an exclusion zone. This exclusion zone must be maintained until cleanup has been completed or the area determined safe. All appropriate PPE must be worn as per the SDS for cleanup and response to a chemical spill.

For known low-hazard spills, a Spill Kit may be available at the Site. Small spills may be cleaned up with a shovel and a bucket. An external resource may need to be engaged for larger spills.

Any amount of any material in such quantity as may with reasonable probability injure or be detrimental to human health, animal or plant life, or property, or may unreasonably interfere with the public welfare or the use of property, must be reported to the appropriate regulatory agency such as New Mexico Environment Department (505-827-9329) or the Texas Commission on Environmental Quality (1-800-832-8224). This includes chemical, biohazardous, petroleum-product, and sewage spills and incidents. This includes chemical, biohazardous, petroleum-product, and sewage spills and incidents. Texas has established reportable quantities, which can be found here: https://www.tceq.texas.gov/response/spills/spill_rq.html. New Mexico has not established reportable quantities.

In addition to recent spills, the discovery of evidence of previous unauthorized discharges, such as contaminated soil or groundwater, also must be reported. New Mexico has not established reportable quantities. Verbal notification must be provided as soon as possible after learning of a discharge, but in no event more than twenty-four (24) hours thereafter.

INCIDENT REPORTING: All incidents, property or environmental damage, and near misses must be reported IMMEDIATELY (once site is secure and threat of immediate danger is over, and personnel are safe and/or receiving medical care, as appropriate) by the affected employee(s) to the Project Manager or Site Safety Officer, who will then report it to the Chief Health and Safety Officer as detailed in above in **Section 3.3.4**.

An “OSHA reportable incident” is any work-related incident that involves:

- a fatality,
- in-patient hospitalization of three or more employees,
- amputations, or
- loss of an eye.

OSHA reportable incidents shall be reported **IMMEDIATELY** (i.e., once site is secure, threat of immediate danger is over, and personnel are safe and/or receiving medical care, as appropriate) to the Chief Health and Safety Officer who must report to OSHA within eight (8) hours for a fatality or twenty-four (24) hours for all other reportable incidents.

(OSHA reporting rules were updated January 1, 2015. This document reflects those changes.)

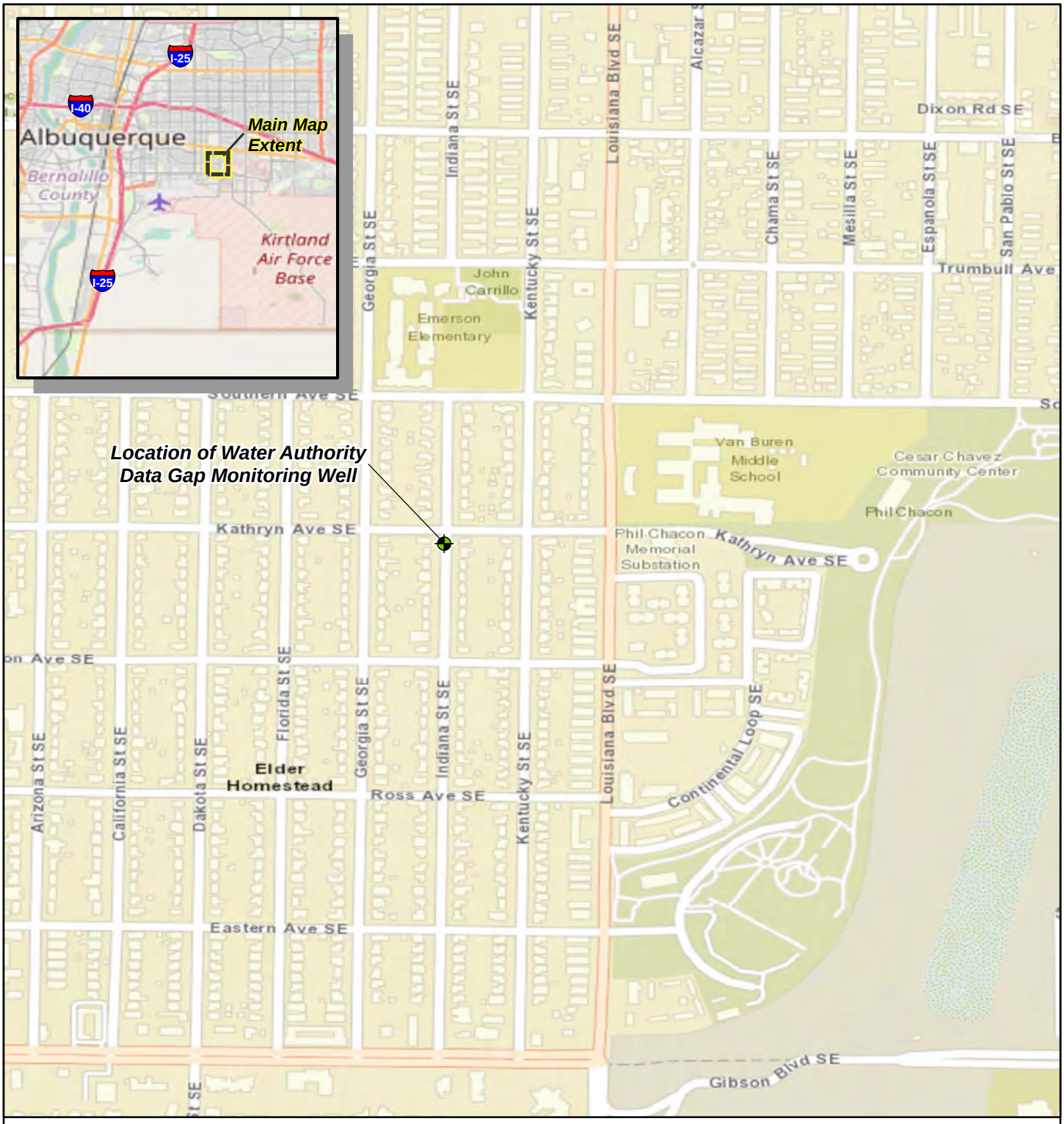
All other incidents and near misses must be reported to the INTERA CHSO as soon as reasonably possible, but no later than within 24 hours of occurrence, after ensuring that personnel are safe. Reporting of near misses is not designed to single out workers for wrongdoing and may be reported to the Project Manager or the CHSO anonymously, if desired. The Incident Investigation Report Form (see **Form 4**) will be used to report the event and to guide the investigation into the root cause and contributing factors of the event. Further information about incident reporting can be found in the **Appendix 3 of the INTERA Corporate Health and Safety Program (CHSP)**. The first section of the Incident Investigation Report Form (see **Form 4**) will be filled out according to the following schedule:

- BY THE END OF THE WORK SHIFT for a non-reportable injury,
- WITHIN 48 HOURS for a near-miss or property or environmental damage.

The Incident Investigation Report Form (**Form 4**) will be used to guide the investigation into the root cause and contributing factors of the incident, near-miss, or property or environmental damage and the results of the investigation will be recorded on the second section of the form.

Incidents that occur at a client-owned site will be reported to the client by the Project Manager or the Chief Health and Safety Officer. The client may have a different incident reporting form, and in most cases, both INTERA’s form and the client’s form will need to be filled out. A copy of INTERA’s completed Incident Investigation Report Form will be provided to the client after it is finalized, as appropriate.

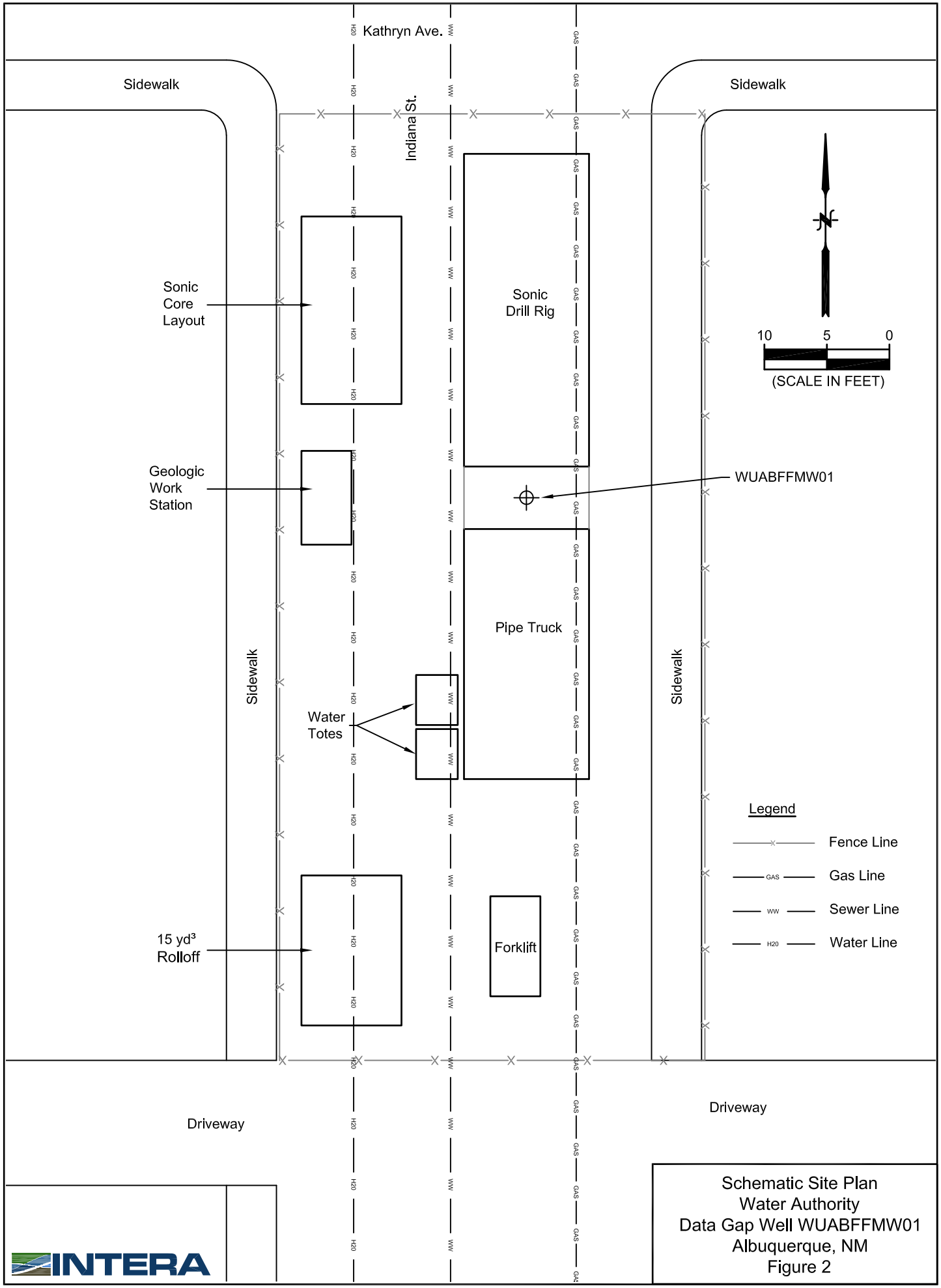
FIGURES



WUABFFMW01 Location
Water Authority Data Gap Well
Bernalillo County, New Mexico

INTERA

FILE: S:\ABQ\ABWUA.C009.KAFB\Data_Gap_Well\Graphics\GIS\Map_Docs\00_WADataGapWellLoc.mxd Date: 12/7/2021



Schematic Site Plan
Water Authority
Data Gap Well WUABFFMW01
Albuquerque, NM
Figure 2

INTERA

FORMS

Form 1	Site Personnel Acknowledgment Form
Form 2	Kickoff/Tailgate Safety Meeting Form
Form 3	Job Safety Analysis and Personal Protective Equipment Worksheet
Form 4	Behavior-Based Safety Encounter Form
Form 5a	Incident Investigation Report Form
Form 5b	Near Miss Report Form
Form 6	Site Visitor Log
Form 7	Hot Work Permit
Form 8	Air Monitoring Log [**RESERVED**]

SITE PERSONNEL ACKNOWLEDGMENT FORM

Project Name: _____

SSHASP Date: _____ Project Number: _____

By signing the following I acknowledge that I have read, understood, and agree to comply with the INTERA Site Specific Health and Safety Plan (SSHASP) and have been briefed on the nature of the contaminants (if any) and site hazards and the level and degree of exposure likely as a result of participation in this project.

Subcontractors: This site-specific HASP does not replace the requirement or liability for your company to have its own safety program and site-specific HASP. I also acknowledge that this plan is specific for this INTERA site and may not address unforeseen hazards not included in the SSHASP or for the specific contracted task.

Printed Name	Signature	Company/Organization	Date

KICKOFF/TAILGATE SAFETY MEETING FORM

Date &Time: _____ **PROJECT NO**.:_____

PROJECT Name and Activity: _____

Weather Outlook: _____

Emergency Procedures (e.g., facility alarms; E-Stops; evacuation routes procedures; muster points; first aid kits, fire extinguishers; emergency numbers):_____

_____

_____

Communication Method(s): _____

Nearest Hospital: _____

List Short Service Employees:_____

Planned Tasks:

List JSAs Reviewed: (JSAs should be available. If not, STOP and fill out a blank JSA template.)

NOTE: provide copies of signed JSAs to CHSO.

HAZCOM TOPICS PRESENTED

List Hazardous Chemicals/Substances being used for task(s) and Site Chemicals of Concern:

Confirm that **Safety Data Sheets** are available for listed hazardous chemicals/substances.

Yes □ **No** □ **N/A** □ (If **No**, take steps to obtain SDS or stop work, as appropriate.)

ADDITIONAL SAFETY TOPICS PRESENTED

Discuss physical, biological and/or other hazards, as applicable; lessons learned; safety shares:

REQUIRED PPE FOR PROTECTION AGAINST SITE HAZARDS:

PPE Category	Required for Daily Tasks	Specify as needed	PPE Category	Required for Daily Tasks	Specify as needed
Hearing	□		High Visibility Clothing	□	
Respiratory Protection	□		Safety Shoes	□	
Safety Glasses	□		Hard Hats	□	
Goggles/Face Shield	□		Other (Suits, etc)	□	
Gloves	□		Other (Suits, etc)	□	

NOTE: Verification through observation has occurred for each employee listed on this form with regard to proper fit and use of PPE including confirmation of their knowledge on how to properly don, doff, adjust and wear PPE as indicated on this form.

Confirm that field employees have current HAZWOPER or other applicable training certifications as necessary for site tasks. **Yes** □ **N/A** □

Subcontractor Confirmation (Initial&Date):_____

Confirm that subcontractors have completed safety checks on drilling equipment or other heavy equipment. **Yes** □ **N/A** □

Subcontractor Confirmation (Initial&Date):_____

Confirm that electrical equipment has been checked per manufacturer recommendations.
Yes □ **N/A** □

Confirm that a Ladder Safety Checklist has been completed, as applicable, for planned work tasks.
Yes □ **N/A** □

Confirm that hand and power tools have been checked per manufacturer recommendations.
Yes □ **N/A** □

Confirm that scaffolds and scaffold components have been checked by a competent person for visible defects. **Yes** □ **N/A** □

Confirm that Asbestos, Lead, H_2S, and Benzene safety issues have been covered, as applicable, for planned work tasks. **Yes** □ **N/A** □

Confirm that Confined Spaces issues have been covered, as applicable, for planned work tasks.
Yes □ **N/A** □

Confirm that Working at Height issues have been covered, as applicable, for planned work tasks.
Yes □ **N/A** □

Other: _____

ATTENDEES

Print Name:	Signature	Company/Organization

Meeting Conducted by:

_____ _____

Name Printed Signature

_____

Date

Note: use additional pages as necessary to discuss topics and list attendees.

Job Safety Analysis (JSA) and Personal Protective Equipment (PPE) Worksheet

Project Task:	Project Site:
Project Number:	Date:
Prepared by (Name/Title):	General PPE: Modified Level D

Note to User: replace highlighted text with task-specific information, remove highlights, and delete this sentence when JSA is complete.

Job Steps List key job steps	**Hazards** Identify hazards/hazard sources and consequences associated with performing each job step (Be specific)	**Mitigations/Controls** Determine effective mitigations/controls for each hazard listed in the previous column	**PPE** Task specific	**Hazard Classification (HC)***
1. Insert Job Step #1	**Hazards/Sources:** list hazards and/or sources of hazards **Consequences:** describe consequences	• List specific mitigations/controls for each hazard • •	Insert specific PPE, if any	Add HC
2. Insert Job Step #2	**Hazards/Sources:** **Consequences:**	• • •		
3. **Insert Job Step #3**	**Hazards/Sources:** **Consequences:**	• • •		
4. **Continue with job steps as necessary**	**Hazards/Sources:** **Consequences:**	• • •		

NOTE: Use with other JSAs as necessary for additional tasks to be performed.
*Hazard classification is assessed assuming specified mitigations/controls are in place.

I have read and reviewed this JSA and understand the hazards and controls associated with this task:

Name	Signature	Date		Name	Signature	Date

Hazard Identification Memory Jogger and Risk Ranking Matrix: Use these tools when identifying hazards. Rank hazards by overall Hazard Classification. Prior to performing a job step, ensure that the assigned controls and mitigations are effective and appropriate for each identified hazard.

Overall Hazard Classification						
		Consequence				
		1 Minor	2 Medium	3 Serious	4 Major	5 Catastrophic
Probability	A - Almost Certain	Moderate	High	Critical	Critical	Critical
	B - Likely	Moderate	High	High	Critical	Critical
	C - Possible	Low	Moderate	High	Critical	Critical
	D - Unlikely	Low	Low	Moderate	High	Critical
	E - Rare	Low	Low	Moderate	High	High

Hierarchy of Controls: Listed from most effective to least effective: Use this tool when determining controls, mitigations, and PPE.

BEHAVIOR-BASED SAFETY ENCOUNTER FORM

Work Site Observed:		
Interaction Date:	**Interaction Start Time:**	**Interaction End Time:**
Observer's Name:		
Who was observed?		
Task Observed:		
Was a JSA (pre-task hazard assessment) completed, reviewed, signed-off, and adequate for the task being performed? Yes or No (circle one) **If No, expand on issues below.**		
Were SOPs available and followed? Yes or No (circle one)		
Was Kickoff/Tailgate Safety Meeting held and documented? Yes or No (circle one)		
Observed Safe Behaviors:	**Observed Unsafe Behaviors:**	
Was immediate constructive feedback provided to observed party?: Yes or No (circle one)		

BEHAVIOR-BASED SAFETY ENCOUNTER FORM (continued)

Select all Interaction Categories below that apply and indicate a desired (✓) and/or undesired (✗) behaviour for each. Leave blank if not observed or not applicable.		
Condition of Work Area		
☐ Work area Clean & Orderly	☐ Slips, Trips Fall Hazards	☐ Adequate lighting
☐ Work area barrier in place	☐ Air Quality	☐ Visibility to heavy equipment
Body Position and Ergonomics		
☐ Movements & positions - lifting / carrying	☐ Movements & positions - repetitive acts / movements	☐ Movements & positions - avoiding pinch points
☐ Movements & positions - overexertion / strain	☐ Movements & positions - bending / twisting	
Body Protection and PPE		
☐ Protecting hearing	☐ Protecting respiratory system	☐ Protecting the body
☐ Protecting the head	☐ Protecting the eyes/face	☐ Protecting the feet
☐ Protecting the hands/arms	☐ Other (describe):	
Equipment and Tools		
☐ Tool/equipment selection - correct for job and proper use	☐ Tool/equipment - good condition/proper storage	☐ Pre-op equipment inspection
Practices and Housekeeping		
☐ Controls implemented for identified hazards	☐ Hazardous materials - use and storage requirements followed	☐ Communicating with others about hazards / risks
☐ Work was not rushed / distracted	☐ Walking and working surfaces/platforms (clear and clean)	☐ Proper workplace housekeeping maintained
Procedures / Permits		
☐ Proper procedures followed	☐ Management of change	☐ Run-off is controlled
☐ Work at heights (protecting from fall hazards)	☐ Lifting (following safe work practices)	☐ Isolation (proper use of lock-out/tag-out)
☐ Confined spaces (following safe work practices)	☐ Hot work (following safe work practices)	☐ Dust control procedures followed (minimizing dust)
☐ Hazardous materials - proper segregation & disposal	☐ Hydrocarbon pollution prevention measures taken	☐ Excavation (following safe work practices)
Vehicles / Mobile Equipment and Driving		
☐ Eyes on direction of travel	☐ Pre-shift inspection	☐ Securing parked vehicles
☐ Vehicle speed (driving to conditions / speed limits)	☐ Wearing seatbelt	☐ Operating Safely (interaction between people & equipment)
Weather		
☐ Protecting from cold stress	☐ Protecting from heat stress	☐ Protecting from lightning
☐ Protecting from rain	☐ Protecting from (UV exposure)	

BEHAVIOR-BASED SAFETY ENCOUNTER FORM (continued)

Action Item(s) Resulting from BBS Review:	Date Completed:

INCIDENT INVESTIGATION REPORT FORM

Attach additional pages as necessary, if more than one employee was injured, each employee must fill out their own form. This form should also be used to report property or environmental damage.

Circle or Highlight One of the Following: Reportable / Recordable / Non-Recordable /Property Damage / Environmental Damage	**Case Number from OSHA 300 Log:**
Site:	**Project Number:**

SECTION 1: INCIDENT REPORT

SECTION 1

Employee Injured, Ill, or Deceased (Skip this box for property or environmental damage.)
Name:
Address:
Date of Birth:
Company Name and Date Hired:
Circle One or Highlight: Male / Female

Names and Project Roles of Other Affected Personnel
(List witnesses of incident and/or personnel involved in property or environmental damage.)

Site Project Manager:

Event Date:	**Event Time:**	**Time Personnel Began Work:**

Exact Location of Event: (Provide description or address, if available.)

Event Resulted in: (Circle or Highlight One) **Fatality / Injury / Illness / Property Damage / Environmental Damage**

If fatality, date of death: ___ / ___ / ___

Nature of the Event: (Brief summary including body parts affected and/or property that was damaged.)

Object or substance that directly harmed the employee or property: (Leave blank if not applicable.)

Task Being Performed Just Prior to the Incident: (Describe the work objective, the specific activity being carried out, and any tools or equipment being used.)

Circle or Highlight One of the Following: Reportable / Recordable / Non-Recordable /Property Damage / Environmental Damage	**Case Number from OSHA 300 Log:**
Site:	**Project Number:**

SECTION 1

Did the incident involve a vehicle? (Include full description of vehicle and rental agency information if appropriate.)

Full Description of Incident: (Include task being performed, how the event occurred, equipment being used at the time, materials involved, workplace condition, and any other impacts.)

Was First Aid Given? (Circle One) **Yes or No** (If No, skip next 2 boxes.)

Name of First Aid Attendant(s):

List First Aid Given:

Was Medical Treatment Beyond First Aid Necessary? (Circle or Highlight One) **Yes or No** (If No, skip to end of Section 1.)

Was Employee Treated in an Emergency Room? (Circle or Highlight One) **Yes or No**

Was Employee Hospitalized overnight as an in-patient? (Circle or Highlight One) **Yes or No**

Type of Emergency Transportation: (i.e., ambulance, rental car)

Location of Medical Treatment Facility:
Name:
Address:
Phone number:

Name of Doctor Providing Medical Treatment:

Expected Length of Medical Leave Resulting from Incident:

Medical Diagnosis:

Section 1 Completed by: _____ **Title:** _____
Phone: _____ **Date:** _____

Circle or Highlight One of the Following: Reportable / Recordable / Non-Recordable /Property Damage / Environmental Damage	**Case Number from OSHA 300 Log:**
Site:	**Project Number:**

SECTION 2: INVESTIGATION REPORT (to be filled out by Incident Investigator)

Witness statements: (Attach sheets as necessary, or NA if no witnesses.)

Evidence collected:

Factors in Incident: (check all that apply)

☐ Mental stress factor	☐ Fatigue	☐ Remote site health
☐ Alcohol/drugs	☐ Exposure to sound/noise	☐ Exposure to particulates
☐ Biological exposure	☐ Mechanical vibration	☐ Cold Stress
☐ Chemical exposure	☐ Travel health	☐ Heat Stress
☐ Exposure to ionizing radiation	☐ Exposure to non-ionizing radiation	☐ Pre-existing medical condition
☐ Exposure to gas or vapor	☐ Repetitive movements	☐ Working at height
☐ Other muscular stress	☐ Other health/exposure	☐ Workplace design
☐ Non-compliance	☐ Equipment/property design	☐ Lifting/Hoisting
☐ Electrical	☐ Equipment/property fire	☐ Equipment/property damage
☐ Equipment failure	☐ Housekeeping	☐ Not otherwise specified

Details: (From Factors in previous section.)

SECTION 2

Circle or Highlight One of the Following: Reportable / Recordable / Non-Recordable /Property Damage / Environmental Damage	**Case Number from OSHA 300 Log:**
Site:	**Project Number:**

Actual Consequence Level (1 to 5):

Potential Risk Classification Table: (This table is used for any incident, or property or environmental damage to determine if the Actual Consequence Level was a reasonably expected outcome or if the outcome could have been even worse. If the Maximum Reasonable Outcome was High or Critical, Corrective Actions must be put in place to lower future Reasonable Outcomes.)

Probability	Consequence: 1 Minor	2 Medium	3 Serious	4 Major	5 Catastrophic
A – Almost Certain	Moderate	High	Critical	Critical	Critical
B – Likely	Moderate	High	High	Critical	Critical
C – Possible	Low	Moderate	High	Critical	Critical
D – Unlikely	Low	Low	Moderate	High	Critical
E – Rare	Low	Low	Moderate	High	High

		Max Reasonable Outcome:
Max Reasonable Consequence (1 to 5):		☐ Critical ☐ High ☐ Moderate ☐ Low
Max Reasonable Probability (A to E):		

Summary of Investigation Findings:

SECTION 2

Circle or Highlight One of the Following: Reportable / Recordable / Non-Recordable /Property Damage / Environmental Damage	**Case Number from OSHA 300 Log:**
Site:	**Project Number:**

Corrective Actions Taken to Prevent Recurrence of Event:

Date Corrective Actions Implemented: ___ / ___ / ___

Risk Analysis: (does the corrective action generate a new risk?)

SECTION 2

Section 2 Completed by: _____ Title: _____
Phone: _____ Date: _____

List of Necessary Contacts for Notification of Incident:

- INTERA Chief Health and Safety Officer
- INTERA Chief Operating Officer
- INTERA Branch Office Health and Safety Coordinator
- INTERA Project Manager
- INTERA Human Resources Manager, as applicable
- Client Project Manager, as applicable
- OSHA, as applicable.

Extra Space for Notes Regarding Form A3-1:

NEAR-MISS REPORT FORM

(Attach additional pages as necessary)

Project Name:	**Project Number:**

SECTION 1: EVENT REPORT

Event Date:

Names and/or Project Roles of Affected Personnel: (or write "anonymous")

Description of Event Location: (location within the site or office)

Object or Substance that COULD have Caused Harm:

Task Being Performed Just Prior to the Event: (Describe the work objective, the specific activity being carried out, and any tools or equipment being used)

Full Description of Event: (include task being performed, how the event occurred, equipment being used at the time, materials involved, workplace condition, and any other impacts)

SECTION 1

Project Name:	**Project Number:**

SECTION 2: HAZARD MITIGATION

Factors in Event: (check all that apply)

☐ Mental stress factor	☐ Fatigue	☐ Remote site health
☐ Alcohol/drugs	☐ Exposure to sound/noise	☐ Exposure to particulates
☐ Biological exposure	☐ Mechanical vibration	☐ Cold Stress
☐ Chemical exposure	☐ Travel health	☐ Heat Stress
☐ Exposure to ionizing radiation	☐ Exposure to non-ionizing radiation	☐ Pre-existing medical condition
☐ Exposure to gas or vapour	☐ Repetitive movements	☐ Working at height
☐ Other muscular stress	☐ Other health/exposure	☐ Workplace design
☐ Non-compliance	☐ Equipment/property design	☐ Lifting/Hoisting
☐ Electrical	☐ Equipment/property fire	☐ Equipment/property damage
☐ Equipment failure	☐ Housekeeping	☐ Not otherwise specified

Actual Consequence Level (1 to 5):	

Potential Risk Classification Table: (This table is used to determine if the Actual Consequence Level was a reasonably expected outcome or if the outcome could have been even worse. If the maximum reasonable outcome was high or critical, corrective actions must be put in place to lower future reasonable outcomes.)

Probability	Consequence: 1 Minor	2 Medium	3 Serious	4 Major	5 Catastrophic
A – Almost Certain	Moderate	High	Critical	Critical	Critical
B – Likely	Moderate	High	High	Critical	Critical
C – Possible	Low	Moderate	High	Critical	Critical
D – Unlikely	Low	Low	Moderate	High	Critical
E – Rare	Low	Low	Moderate	High	High

	Max Reasonable Consequence (1 to 5):		**Max Reasonable Outcome:** ☐ Critical ☐ High ☐ Moderate ☐ Low
	Max Reasonable Probability (A to E):		

What can be done to prevent this from happening in the future?

SECTION 2

SITE VISITOR LOG

Project Name: _____

Project Number: _____

Date	Name/Signature	Company/Organization	Purpose of Visit	Arrival Time	Departure Time

HOT WORK PERMIT

All temporary operations that involve open flames or produce heat and/or sparks require a Hot Work Permit. This includes, but is not limited to: Brazing, Cutting, Grinding, Soldering, Thawing, and Welding.

INSTRUCTIONS FOR SAFETY SUPERVISOR

1. **Verify precautions listed at right (or do not proceed with the work).**
2. **Complete page 1 and retain for job files.**
3. **Post page 2 in vicinity of hot work.**

Date	**Job No.**

Location (Be Specific)

Description of Work Being Performed

Name of Person/Contractor Doing Hot Work

The above location has been examined, the precautions checked on the Hot Work Checklist have been taken to prevent fire, and permission is authorized for this work.

Signed: _____
(Permit Authorizing Individual)

Signed: _____
(Person doing Hot Work)

Signed: _____
(Fire Watch)

Time Started:

Date:_____ Time: _____ AM/PM

Date:_____ Time: _____ AM/PM

FIRE WATCH SIGNOFF

Work area and all adjacent areas to which sparks and h might have spread were inspected during the fire wa period and were found fire safe.

Signed: _____

FINAL CHECKUP (minimum 30 minutes after Hot Work)

Work area was monitored for_____hour(s) following Hot Work and found fire safe.

Signed: _____

HOT WORK CHECKLIST

OK NA

☐ ☐ Hot Work Equipment in good condition (e.g., power source, welding leads, torches, etc.).

☐ ☐ Multi-purpose fire extinguisher and/or water pump can.

REQUIREMENTS WITHIN 35 FEET OF WORK

☐ ☐ Debris, flammable Liquids, dry weeds, flammable solids, and oily deposits removed.

☐ ☐ Explosive atmosphere in area checked for and eliminated.

☐ ☐ Combustible surfaces wet down and covered with damp sand or fire blankets.

☐ ☐ Remove flammable and combustible material where possible. Otherwise protect with fire blankets, guards, or metal shields.

WORK IN CONFINED SPACES

☐ ☐ Confined space cleaned of all combustibles (example: grease, oil, flammable vapors).

☐ ☐ Containers purged of flammable liquids/vapors.

☐ ☐ Follow confined space guidelines.

FIRE WATCH/HOT WORK AREA MONITORING

☐ ☐ Fire watch will be provided during and for 30 minutes after work, including any coffee or lunch breaks.

☐ ☐ Fire watch is supplied with an extinguisher, and/or water pump can, also making use of other extinguishers located throughout work area.

☐ ☐ Fire watch is trained in use of this equipment and familiar with fire notification procedures.

☐ ☐ Fire watch may be required for opposite side of vent shafts, plates, scrap metal, etc.

☐ ☐ Post warning sign when others are working in the vicinity

OTHER PRECAUTIONS TAKEN (LIST)

_____

_____

_____

WARNING!

HOT WORK IN PROGRESS
WATCH FOR FIRE!

IN CASE OF AN EMERGENCY:

CALL: FIRE DEPARTMENT

AT: 911

WARNING!

ATTACHMENT A

Job Safety Analysis and Personal Protective Equipment Plan

2021 INTERA Corporate Health and Safety Program

Appendix 12: Job Safety Analysis and Personal Protective Equipment Plan

INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS

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TABLE OF CONTENTS

LIST OF FORMS*

Form A12-1: Job Safety Analysis and Personal Protective Equipment Worksheet

ACKNOWLEDGMENT

Akmt A12: Job Safety Analysis and Personal Protective Equipment Plan Acknowledgment Page: 2021

*Forms are provided in **Appendix 100** of the Corporate Health and Safety Program.

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1.0 PURPOSE

The purpose of this **Job Safety Analysis and Personal Protective Equipment Plan** (Plan) is to provide for the protection of employees from workplace hazards by training them to identify the hazards or potential risks associated with each step of the job and to develop a solution for each hazard that will eliminate, reduce or control the exposure to the hazard. This Plan will result in a series of Job Safety Analyses (JSAs) that provide written, step-by-step procedures for reducing hazards for routine and non-routine project tasks/jobs, as necessary. Preparation of JSAs also includes an evaluation of the personal protective equipment (PPE) necessary for each job step, and the required PPE is then specified for each step. This Plan is an integral part of the overall INTERA Corporate Health and Safety Program (CHSP).

2.0 RESPONSIBILITY

The Chief Health and Safety Officer, **Noreen Baker**, is designated as the Plan Administrator and, as such, is responsible for the implementation of the Plan and has full authority to make the decisions necessary to provide for the success of the Plan. This authority includes hiring personnel and purchasing the equipment necessary to implement and operate the Plan. Branch Office Health and Safety Coordinators are the designated representatives of the Chief Health and Safety Officer, and along with the Chief Health and Safety Officer, are responsible for implementation and operation of the Plan in each branch office. The Plan has been developed in accordance with the requirements of **29 CFR 1910.132** and covers each of the basic elements in the regulations. The Chief Health and Safety Officer will review the Plan annually and will amend these instructions when necessary.

INTERA employees whose work includes performing field activities at client sites and locations where job hazards may exist (including, but not limited to, hazardous wastes) and/or where PPE is required for the safe conduct of work will be trained to the Plan. The Chief Health and Safety Officer or Branch Office Health and Safety Coordinator will be responsible for ensuring that these employees are trained in the provisions of this Plan.

All INTERA personnel have the authority to stop an activity if it is being performed in a hazardous manner. If an employee believes that he or she is being asked to perform work in an unsafe environment, that employee is authorized to decline the request. Employees are encouraged to communicate their health and safety concerns to the Chief Health and Safety Officer, Branch Office Health and Safety Coordinators, Project Managers, and/or Site Safety Officers to implement changes to work procedures where needed to reduce injury and illness exposures in the workplace. Additionally, the Chief Health and Safety Officer, Branch Office Health and Safety Coordinators, Project Managers, and/or Site Safety Officers have the authority to halt operations because of non-compliance with the provisions of this Plan. It is the responsibility of the Site Safety Officer to inspect field project areas for compliance with the Plan.

3.0 PROCEDURES FOR COMPLETING A JSA AND PPE EVALUATION

JSAs (which include PPE evaluations) should be completed for each routine and non-routine project task, as necessary, prior to that task being performed and when there are changes in the steps of the task. The JSA process is to be used for each field activity. By developing JSAs, which includes a PPE evaluation, and using them for employee training, employees will have a better idea of the hazards involved with the various tasks/jobs that they may perform during conduct of activities in the field. JSAs will allow employees to think about the steps required to complete each task, to identify the hazards associated with each step of the task, and to eliminate, reduce or control the identified hazards, including the appropriate PPE to use for hazard mitigation. Employees who are new to a job will receive instructions in hazard avoidance in a logical, organized manner, and employees who are familiar with the job will be reminded of tasks that require more attention to detail in order to complete them safely. Safety observations can be made by using the completed JSA as a guide during the safety audit review

process described in the **Behavior-Based Safety Program** in **Appendix 13** or as part of the incident investigation procedures in **Appendix 3**.

3.1 CREATE THE RIGHT ENVIRONMENT

Personnel who complete JSAs should be employees who have good attention to detail, think logically, and have a good grasp of the procedures required to complete each task/job. JSAs should be completed in advance of the activity being performed, although it is acceptable to fill it out at the site, immediately before the task will be performed. At the beginning of each work day, applicable JSAs should be incorporated into the Kickoff/Tailgate Daily Safety Meeting attended by everyone who will be involved with the task(s), including subcontractors. Items to discuss during the Daily Safety Meeting include the proper steps necessary to complete each task/job, associated hazards with each step, and the procedures to be used to eliminate, reduce or control the identified hazards, including use of appropriate PPE. The hazard assessment is meant to determine if hazards are present, or are likely to be present, that necessitate the use of PPE or other hazard mitigation measures. PPE will be selected that best protects affected employees from the hazards identified. Written certification that the hazard assessment has been completed is required per **1910.132(d)(2)** and is accomplished through completion of the **Job Safety Analysis and Personal Protective Equipment Worksheet**, which is included as **Form A12-1** in **Appendix 100** of the CHSP. Worksheets will be kept with the Site-Specific Health and Safety Plan (SSHASP) or on file in designated corporate health and safety file cabinets and/or each branch office, as appropriate. Employees need to know that the purpose of the JSA is to study the job and make it standardized and safer. Workers are welcome to add to the JSA whenever they feel a hazard exists that has not been identified as part of the task and has not already been addressed in the JSA.

3.2 JSA COMPLETION

Steps in completing a JSA are described in the following paragraphs.

Identify Job Steps

When completing a JSA Worksheet (**Form A12-1)**, list each job step of the task in the left-hand column of the worksheet. The wording for each job step should begin with an action word such as “remove,” “open,” or “weld.” The action is completed by naming the item to which the action (verb) applies; for example, “remove extinguisher,” “aim hose,” or “squeeze lever.”

Identify Potential Hazards and Sources of Hazards

The second step in preparation of the worksheet is to identify the hazards and hazard sources for each step. Employees and subcontractors MUST be actively involved in the hazard identification process, as appropriate. The hazards and hazard sources are listed in the second column from the left. Also discussed in this column are the possible consequences/injuries that may result from the identified hazards. Examples of hazards are “falling objects,” “electric shock,” or “trench collapse.” Examples of hazard sources are “overhead equipment,” “working around high voltage,” or “working in trenches.” Example consequences are “head injuries,” “electrocution,” or “trapped in trench/suffocation.”

The JSA should identify hazards that are present or could be present along with any problems that have occurred in the past. The purpose of the JSA is to identify hazards produced by the environment (tools, workstation, and site) as well as hazards connected with the job procedure. The following list of questions will serve as initial training in identifying hazards.

1. Is there a danger of striking against, being struck by, or otherwise being injured by contacting an object?
2. Can the worker be caught in, on, or between objects?
3. Can the worker slip or trip? Could they fall on the same level or to another?

4. Can the worker strain themselves by pushing, pulling, or lifting?
5. Is the environment hazardous (toxic gasses, vapors, mists, fumes, dusts or heat)?
6. Can the tools cause a problem, can they cut, fail or malfunction?
7. Can things splash or be thrown toward the employee?
8. Could dangers be created if the task steps are completed out of sequence?
9. Are there gages or other instruments that must be watched and reacted to properly if the job is to be done safely?

Develop Recommendations for Hazard Mitigation/Control

For each identified hazard, a method for hazard mitigation or control is identified in the third column from the left. Hazard mitigations or controls must be specific and concrete. General precautions like "Be alert," "Use caution," or "Be careful" are not useful. Mitigations/controls should precisely state what to do and how to do it. This recommendation "make certain the wrench does not slip or cause loss of balance" is only partially helpful. It does not tell how to prevent the wrench from slipping. An effective mitigation control tells both "what" and "how" as illustrated by the following example: "Set wrench securely. Test its grip by exerting a slight pressure on it. Brace yourself against something immovable, or take a solid stance with feet wide apart, before exerting pressure. This prevents loss of balance if the wrench slips."

Develop Recommendations for PPE

The next step in the development of a JSA is determination of the required PPE. PPE should focus on potentially affected body parts as identified in the consequences section, and required PPE are recorded in the fourth column from the left on **Form A12-1**. Types of PPE to consider include the following:

- **Respiratory Protection:** Positive pressure, pressure demand respirators and air purifying respirators may be necessary when concentrations of contaminants in air have the potential to be above related action levels. (**NOTE:** Air purifying respirators may only be used if oxygen levels are above 19.5%, otherwise supplied air is required; all work will cease if oxygen levels are above 23.5%.) Personnel who are not part of the medical surveillance program, or who do not have the proper training will not be allowed to wear respirators. Refer to **Appendix 25, Respiratory Protection Program** for additional information and restrictions regarding the use of respirators.
- **General Work Clothing:** Drilling activities require clothing to be close fitting and comfortable, but without loose ends, straps, drawstrings, belts, or otherwise unfastened parts that might catch on rotating or moving components of equipment. Long pants and long-sleeve shirts (short-sleeve shirts will be allowed in hot weather and as activities permit) may be required at all times.
- **Chemical Protective Clothing:** Chemical protective clothing such as Tyvek® or TyChem® coveralls may be required when additional skin protection is necessary. Specific chemicals may necessitate specific types of material, and a qualified worker must make this determination.
- **Safety Headgear:** Head protection shall be nonconductive to prevent limited electrical shock and shall meet the requirements of ANSI Standard Z89.1. Required when working near roadways, while heavy equipment (including drill rigs) is operational, and when there are other overhead hazards.
- **Safety Footwear:** Foot protection shall meet the minimum requirements of ASTM Standards F2412 and F2413, which are equivalent to ANSI Standard Z41.1 (which has been retired). Depending on project-specific conditions and hazards, safety footwear may need to meet safety toe standards, provide metatarsal protection, protect the user from conductive hazards (Cd), electrical hazards (EH), static

dissipative hazards (SD), and/or be puncture resistant (PR). Safety toe footwear is required for all site personnel and visitors during any field activities that could involve crushing hazards.

- **High Visibility Safety Vests or Clothing:** Must be fluorescent orange, yellow, or green with high-visibility reflective tape. Required when working near roadways and while heavy equipment (including drill rigs) is operational.
- **Safety Glasses:** All eye protection shall meet ANSI Z87.1 standards. Prescription glasses shall be an approved safety type with side shields, or safety glasses that fit over the prescription glasses must be used. Eye protection should be worn at all times during field work, and splash goggles should be worn when splashes present a significant hazard to eyes.
- **Gloves:** Specific gloves should be selected based on the activities being performed. Puncture resistant (i.e., leather) gloves shall be worn for protection against cuts and abrasions that could occur while handling tools or other sharp objects or when working around drill rigs. Chemical-resistant gloves shall be worn during activities that could result in contact with hazardous chemicals, groundwater, or other contamination.
- **Hearing Protection:** Ear plugs will be available to site personnel if necessary. Hearing protection is required when working around heavy equipment, or any other time high noise levels are anticipated.
- **Fall Protection:** Guardrail systems, safety net systems, or personal fall arrest systems will be required when walking/working on a surface with an unprotected side or edge (either horizontal or vertical) that is 6 feet or more above a lower level.
- **Other PPE:** Non-routine activities may require PPE that is not listed above.

Employees will be provided with the proper, clean, and reliable PPE for the job at no charge to the employee. Efforts will be made (when practical) to provide the employees with a selection of PPE types so they can choose the best PPE for their needs and comfort. Employees are responsible for inspecting their PPE before each use. If it is damaged or defective, or even appears so, it is not to be used, and the employee is to obtain replacement PPE. INTERA must pre-approve the use of any employee-provided PPE.

Assign Risk Hazard Rank

The next step in the JSA process is to determine the hazard classification for each job step with the appropriate mitigation procedures or controls in place. The hazard classification is determined as follows:

- Once the potential hazards and hazard sources are identified, evaluate the probability of the hazards from A – almost certain, to E – rare, using the Overall Hazard Classification chart provided on **Form A12-1** in **Appendix 100**.
- Following this step, evaluate the consequence of the hazards from 1 – minor, to 5 – catastrophic, using the Overall Hazard Classification chart provided on **Form A12-1**.
- With the identified probability and consequence, use the matrix on **Form A12-1** to determine the Hazard Classification and note these determinations on the **Form A12-1**.

Hazard classification for each job step is recorded in the far right-hand column of the form. **NOTE:** any job step with a hazard classification above 2 should not be performed without putting additional mitigation or control measures in place.

3.3 PROPER TASK INSTRUCTION

After the JSA has been completed, it should be readily available to all workers for review during Kickoff/Tailgate Safety Meetings. JSAs will also be available at the job site if questions arise regarding how to perform the task

safely and efficiently. JSAs should be reviewed daily and at the beginning of each task and are not to be used only for occasional reference, such as when an incident occurs.

When conducting training on task-specific JSAs and PPE:

1. Have a plan. By reading the JSA, the trainer can obtain the knowledge to do the task correctly and safely. Convey to the employee how much skill you expect him/her to have and how soon you expect them to have that skill.
2. Have everything ready. The right equipment, materials, PPE and supplies should be in place before you begin teaching the employee so the steps will occur in an orderly, organized fashion. Have the workplace arranged as the employee will see it when they work and as they are expected to keep it.

Project-specific JSAs **MUST** be included in the SSHASP and be readily available in the field as hard copies. Task-specific training will be performed by the Project Manager or Site Safety Officer during the daily Tailgate Safety Meeting prior to the first time the task is conducted during a given field event. Retraining will occur anytime task duties change during the field event or when new employees report to duty. Training will be documented for each employee by signing and dating the last page of each JSA. Copies of signed JSAs must be provided to the Chief Health and Safety Officer at the end of each field event.

NOTE: the JSA form, which is denoted as **Form A12-1** in this document, is identified as **Form 3** in the SSHASP.

4.0 TRAINING

INTERA employees who work at field sites, who are working in areas where job hazards may exist, or who may be required to use and wear PPE will be trained in the contents of this Plan. Training to the **Job Safety Analysis and Personal Protective Equipment Plan** is accomplished through reading and acknowledgement. Each employee will receive a copy of the CHSP at the commencement of employment and when the Program is updated, as necessary. The **Job Safety Analysis and Personal Protective Equipment Plan** is included in the CHSP as **Appendix 12**. Employees working in an area where job hazards may exist or who are identified as having to use and wear PPE are required to sign the Acknowledgment page at the back of the **Job Safety Analysis and Personal Protective Equipment Plan** confirming that they have read, understood, are familiar with, and will comply with the standards that have been established in the Plan. Signing of an Acknowledgement page may also be required upon receipt of revisions to the Plan depending on the nature of the revision. Signed acknowledgement pages will be kept on file in designated corporate health and safety file cabinets and at each branch office, as appropriate. Training records are kept for the term of employment plus 30 years.

Completed JSAs will be included in the SSHASP. Employees will review the completed JSAs to understand why specific types of PPE were chosen for the work activities. The types of PPE selected for specific work activities will also be be discussed in the SSHASP, which employees must read and sign prior to commencing work (refer to the **Site Personnel Acknowledgement Form** in **Appendix 100**). Signed **Site Personnel Acknowledgement Forms** will be kept on file in designated corporate health and safety file cabinets and at each branch office, as appropriate.

In addition, employees that are working in areas where job hazards exist or who use and/or need to wear PPE will be trained before start of work at each site where job hazard exist or where the use of PPE is required as specified by **29 CFR 1910.132**. Site-specific job safety training and PPE training will be documented using the **Kickoff/Tailgate Safety Meeting Form** at the beginning of each project. Daily review of site requirements for JSAs and PPE will also be recorded on the **Kickoff/Tailgate Safety Meeting Form** along with additional training in the event that PPE requirements change. The **Kickoff/Tailgate Safety Meeting Form** is included in **Appendix 100** of this CHSP. PPE training will include the following:

- When PPE is necessary;

- What PPE is necessary;
- How to properly don, doff, adjust and wear PPE;
- Limitations of the PPE; and
- The proper care, maintenance, useful life, and disposal of the PPE.

Retraining is required under the following circumstances:

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

In addition to the initial and site-specific PPE training as described above, annual PPE training and review is provided for employees that may be exposed to hazardous substances as part of their OSHA 40-hour HAZWOPER training and annual 8-hour refresher training for general site workers. PPE training records will be kept on file in designated corporate health and safety file cabinets and at each branch office, as appropriate.

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ACKNOWLEDGMENT

I acknowledge that I have been trained to the **INTERA Job Safety Analysis and Personal Protective Equipment Plan** and all the associated forms and attachments, as applicable. I know where the Plan is on the INTERA Intranet and have saved a copy for myself, if desired. I have had the opportunity to review the Plan and ask questions. I understand that it is my responsibility to read, understand, become familiar with, and comply with the standards that have been established. I further understand that INTERA reserves the right to modify, supplement, rescind, or revise provisions of this Plan as regulatory or other requirements change, and that I will be provided with the new version.

Employee Name	Employee Signature	Date

This training was administered by INTERA's Chief Health and Safety Officer: ____Noreen A. Baker, P.G.____

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ATTACHMENT B

Behavior-Based Safety Program

2021 INTERA Corporate Health and Safety Program

Appendix 13: Behavior-Based Safety Program

INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS

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LIST OF FORMS*

Form A13-1: Behavior-Based Safety Encounter Form

ACKNOWLEDGMENT

Akmt A13: Behavior-Based Safety Program Acknowledgment Page: 2021

*Forms are provided in **Appendix 100** of the Corporate Health and Safety Program.

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1.0 PURPOSE

The purpose of this **Behavior-Based Safety Program** is to maintain a superior organizational safety culture and to communicate and promote this culture of safety throughout INTERA. A behavior-based safety (BBS) approach promotes people-focused interventions, incorporating one-on-one or group observations of employees performing work tasks, setting goals for improving task safety and giving feedback on safety-related behavior. This Program is an integral part of the overall INTERA Corporate Health and Safety Program (CHSP). The BBS Program is designed to:

- Engage, motivate, assist, reinforce, and sustain safe behaviors;
- Examine motivation underlying behaviors in order to increase safe behavior;
- Be an on-going effort continually promoting sustainable, positive results;
- Emphasize increasing safe behaviors, and
- Understand causes of incidents and near misses and correct them through behavior of appropriate people.

The **Behavior-Based Safety Program** is a safety audit process that helps personnel identify and choose a safe behavior over an unsafe one. This process is designed to open the communication lines between personnel to reinforce safe behaviors and correct unsafe behaviors in order to eliminate incidents, including accidents and illnesses. Safety in the workplace is based on the following components:

- A specific person's physical capabilities, experience, and training.
- The environment the specific person works in, including engineering controls, equipment available for the task, and the job task itself.
- The specific person's behavior while performing the task.

The **Behavior-Based Safety Program** is based on behavioral observations by someone not involved in the task, a review of the observations (both safe and unsafe behaviors), positive reinforcement on the safe behaviors, non-threatening feedback on the unsafe behaviors, and improvement goals. These observations provide direct, measurable information on safe work practices, and personnel should be aware that they may be observed at any time.

2.0 RESPONSIBILITY

The Chief Health and Safety Officer, **Noreen Baker**, is designated as the Program Administrator and, as such, is responsible for this Program and has the authority to make necessary decisions regarding hiring personnel and purchasing the equipment necessary to implement and operate the Program. Branch Office Health and Safety Coordinators are the designated representatives of the Chief Health and Safety Officer, and along with the Chief Health and Safety Officer, are responsible for implementation and operation of this Program in each branch office. The Chief Health and Safety Officer will review the Program annually and will amend these instructions as necessary.

INTERA employees whose work includes performing field activities at client sites will be trained to this Program. The Chief Health and Safety Officer or Branch Office Health and Safety Coordinator will be responsible for ensuring that these employees are trained in the provisions of this Program.

All INTERA personnel have the authority to stop an activity if it is being performed in a hazardous manner. If an employee believes that he or she is being asked to perform work in an unsafe environment, that employee is authorized to decline the request. Employees are encouraged to communicate their health and safety concerns

to the Chief Health and Safety Officer, Branch Office Health and Safety Coordinators, Project Managers, and/or Site Safety Officers to implement changes to work procedures where needed to reduce injury and illness exposures in the workplace. Additionally, the Chief Health and Safety Officer, Branch Office Health and Safety Coordinators, Project Managers, and/or Site Safety Officers have the authority to halt operations because of non-compliance with the provisions of this Program. It is the responsibility of the Site Safety Officer to inspect field project areas for compliance with the Program.

3.0 GUIDANCE FOR PERFORMING BEHAVIOR-BASED SAFETY ENCOUNTERS

Employees performing behavior-based observations will be trained on how to accurately and effectively use the **Behavior-Based Safety Encounter Form** (**Form A13-1**) of **Appendix 100**. Initial training is provided in the following guidelines. Additional training will take place in the office or on-the-job and will be conducted by an experienced employee, Project Manager, Site Safety Officer, or by third-party training consultants. Employees performing observations:

- shall inform the person that they are being observed and shall remain clearly visible during observation,
- shall look for both safe and at-risk behaviors,
- shall complete the **Behavior-Based Safety Encounter Form** (**Form A13-1** in **Appendix 100**) by completing the appropriate sections for the task being performed,
- shall consider what behaviors mean when observing, reporting, and delivering feedback,
- shall consider feedback training and role play and/or mentoring and coaching when appropriate,
- shall give prompt and effective feedback based on the observation summarizing positive safety behaviors that were observed then one or two areas that require change.

Behavior-Based Safety Encounter Forms are available as **Form A13-1** in **Appendix 100**. The steps for a person conducting a BBS Encounter are as follows:

1. Identify a person doing a job task for observation.
2. Familiarize yourself with the potential risks of this task.
3. Observe the work being performed and ask yourself these questions:
    a. Is the person wearing the proper Personal Protective Equipment (PPE) for the task?
    b. Is the person following a logical sequence of work?
    c. Is the person performing any safe or unsafe acts?
    d. Are the working conditions safe?
4. After the person has finished the task (do not interrupt), approach him or her to discuss your observations.
5. Recognize and complement the person for specific safe behaviors.
6. Involve the person in a discussion of the task (ask questions, listen). Ask these questions:
    a. What PPE is required for this task?
    b. Is there a Job Safety Analysis or a Standard Operation Procedure (SOP) for this task?
    c. Is there anything we can do to make your job safer and do you have safety concerns?
7. Review behaviors and conditions that could be improved and ask the person to make a personal commitment to improve at least one aspect of his or her work.

8. Thank the person for taking the time to participate in your Behavior-Based Safety Encounter.
9. Document the encounter. Behaviors to be improved only need to be documented on the form if it is necessary to inform someone other than the person involved in the encounter. Action items, if any, resulting from BBS encounter should be documented on the last page of **Form A13-1** along with the date the action items is completed.

NOTE: the BBS Encounter form, which is denoted as **Form A13-1** in this document, is identified as **Form 4** in the SSHASP.

Completed **Behavior-Based Safety Encounter Forms** will be kept in the SSHASP and will be kept on file in designated corporate health and safety file cabinets and at each branch office, as appropriate. Whenever possible, at least ten **Behavior-Based Safety Encounters** will be completed each year. **Behavior-Based Safety Encounter Forms** will be reviewed annually to ensure that safe behaviors are being continued. Completed forms will also be used to gather data and perform trend analysis. If the trend analyses indicate a need for improvement, an action plan will be developed and communicated to employees by personal communication, safety meetings, or emails. The action plan should be specific and focused on the safety elements in need of improvement.

4.0 TRAINING

INTERA employees whose work includes performing field activities at client sites will be trained to this Program. Training to the **Behavior-Based Safety Program** is accomplished through reading and acknowledgement. Each employee will receive a copy of the CHSP at commencement of employment, and when the Program is updated, as necessary. The **Behavior-Based Safety Program** is included in the CHSP as **Appendix 13**. Each employee is required to sign the Acknowledgment page at the back of the **Behavior-Based Safety Program** confirming that they have read, understood, are familiar with, and will comply with the standards that have been established in the Program. Signing of an Acknowledgement page may also be required upon receipt of revisions to the Program depending on the nature of the revision. Signed acknowledgement pages will be kept on file in designated corporate health and safety file cabinets and at each branch office, as appropriate. Training records are kept for the term of employment plus 30 years.

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ACKNOWLEDGMENT

I acknowledge that I have been trained to the INTERA Behavior-Based Safety Program and all the associated forms and attachments, as applicable. I know where the Plan is on the INTERA Intranet, and have saved a copy for myself, if desired. I have had the opportunity to review the Plan and ask questions. I understand that it is my responsibility to read, understand, become familiar with, and comply with the standards that have been established. I further understand that INTERA reserves the right to modify, supplement, rescind, or revise provisions of this Plan as regulatory or other requirements change, and that I will be provided with the new version.

Employee Name	Employee Signature	Date

This training was administered by INTERA' Chief Health and Safety Officer: Noreen A. Baker, P.G.

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ATTACHMENT C

Heat and Cold Stress Casualty Prevention Program

HEAT & COLD STRESS

CASUALTY PREVENTION PLAN

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1.0 HEAT STRESS CASUALTY PREVENTION PLAN

The increase in ambient air temperature and decreased body ventilation caused by protective outerwear creates an increase in the potential for injury, specifically, heat stress. Site personnel will be instructed in the identification of heat stress, the first-aid treatment procedures for the worker, and the prevention of heat stress casualties.

1.1 Sources of Heat Stress

Any process or job site that is likely to raise the workers deep core temperature (often listed as higher than 100.4 degrees F (38°C)) raises the risk of heat stress. Operations involving high air temperatures, radiant heat sources, high humidity, direct physical contact with hot objects, or strenuous physical activities have a high potential for inducing heat stress in employees. Outdoor operations conducted in hot weather especially those that require workers to wear semi-permeable or impermeable protective clothing, are also likely to cause heat stress among exposed workers.

Age, weight, degree of physical fitness, degree of acclimatization, metabolism, dehydration, use of alcohol or drugs, and a variety of medical conditions such as hypertension all affect a person's sensitivity to heat. However, even the type of clothing worn must be considered. Prior heat injury predisposes an individual to additional injury. Individual susceptibility varies. In addition, environmental factors include more than the ambient air temperature. Radiant heat, air movement, conduction, and relative humidity all affect an individual's response to heat.

1.2 Identification and Treatment of Heat Stress

Heat stress disorders include heat stroke (which can result in death), heat exhaustion (which can result in loss of consciousness, but responds well to treatment), heat cramps, heat rashes, and heat fatigue. The following sections list specifics on each condition, and how to treat the condition.

1.2.1 Heat Stroke

Heat Stroke is the most serious heat related disorder and occurs when the body's temperature regulation fails and body temperature rises to critical levels. The condition is caused by a combination of highly variable factors, and its occurrence is difficult to predict. Heat stroke is a medical emergency that may result in death.

Symptoms: The primary signs and symptoms of heat stroke are confusion; irrational behavior; loss of consciousness; convulsions; a lack of sweating (usually); hot, dry skin; and an abnormally high body temperature (between 107ºF and 110ºF). Unconsciousness follows quickly and death is imminent if exposure continues. The attack will usually occur suddenly.

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

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

1.2.2 Heat Exhaustion

Heat exhaustion can be a precursor to heat stroke. However, unlike heat stroke, heat exhaustion responds readily to prompt treatment.

Symptoms: Usually begins with headache, nausea, vertigo, muscle weakness, thirst, and giddiness. Vomiting is common and the bowels may move involuntarily. The worker is very pale, his skin is clammy, and he may perspire profusely. The pulse is weak and fast, and breathing is shallow. Heat collapse may occur unless he lies down. This may pass, but sometimes it remains and death could occur.

First Aid: Immediately remove the worker to in a shady or cool area with good air circulation (in Zone 2, the Contamination Reduction Zone, if at a contaminated site). Remove all protective outer wear. Treat the worker for shock (make him lie down, raise his feet 6-12 inches and keep him warm, but loosen all clothing). If the worker is conscious, it may be helpful to give him sips of a salt-water solution (one teaspoon of salt to one glass of water). If the worker does not respond quickly to first aid, obtain professional medical assistance.

1.2.3 Heat Collapse

Heat collapse is often associated with heat exhaustion. In heat collapse, the brain does not receive enough oxygen because blood pools in the extremities. As a result, the exposed individual may lose consciousness. This reaction is similar to that of heat exhaustion and does not affect the body's heat balance. However, the onset of heat collapse is rapid and unpredictable and can be dangerous especially if workers are operating machinery or controlling an operation that should not be left unattended. The worker may also be injured when he or she faints.

Symptoms: Rapid loss of consciousness, other symptoms are similar to heat exhaustion or heat stroke.

First Aid: Check to see if the worker is breathing. If he or she is breathing, position the person on his or her back. Raise the worker's legs at least 12 inches above the ground.
Remove all protective outer wear as gently as possible. Loosen any restrictive clothing or belts. If the worker does not regain consciousness within one minute, call 911. Check the person's airway to make sure it is not obstructed. Check again to see if the person is breathing, coughing, or moving. These are signs of positive circulation. If these signs are absent, start CPR until emergency personnel arrive. If the worker regains consciousness, follow first aid guidance under heat exhaustion.

1.2.4 Heat Cramps

Heat Cramps are usually caused by performing hard physical labor in a hot environment. These cramps have been attributed to an electrolyte imbalance caused by sweating. Cramps appear to be caused by the lack of water replenishment. Because sweat is a hypotonic solution (±0.3% NaCl), excess salt can build up in the body if the water lost through sweating is not replaced. Thirst cannot be relied on as a guide to the need for water; instead, water must be taken every 15 to 20 minutes in hot environments. Under extreme conditions, such as working for 6 to 8 hours in heavy protective gear, a loss of sodium may occur.

Symptoms: Muscle cramps, often in the legs, but could occur in any portion of the body.

First Aid: Recent studies have shown that drinking commercially available carbohydrate-electrolyte replacement liquids is effective in minimizing physiological disturbances during recovery.

1.2.5 Heat Rashes

Heat Rashes are the most common problem in hot work environments where the skin is persistently wetted by unevaporated sweat.

Symptoms: Prickly heat is manifested as red papules and usually appears in areas where the clothing is restrictive. As sweating increases, these papules give rise to a prickling sensation. Heat rash papules may become infected if they are not treated.

First Aid: In most cases, heat rashes will disappear when the affected individual returns to a cool environment.

1.3 Prevention of Heat Stress

Acclimatize workers by exposing them to work in a hot environment for progressively longer periods. NIOSH (1986) suggests that workers who have had previous experience in jobs where heat levels are high enough to produce heat stress may acclimatize with a regimen of 50% exposure on day one, 60% on day two, 80% on day three, and 100% on day four. For new workers who will be similarly exposed, the regimen should be 20% on day one, with a 20% increase in exposure each additional day.

Replace Fluids by providing cool (50°-60°F) water or any cool liquid (except alcoholic beverages) to workers and encourage them to drink small amounts frequently, e.g., one cup every 20 minutes. Ample supplies of liquids should be placed close to the work area. Although some commercial replacement drinks contain salt, this is not necessary for acclimatized individuals because most people add enough salt to their summer diets.

Reduce the physical demands by reducing physical exertion such as excessive lifting, climbing, or digging with heavy objects. Spread the work over more individuals, use relief workers or assign extra workers. Provide external pacing to minimize overexertion.

Provide recovery areas such as air-conditioned enclosures, rooms, or work trucks and provide intermittent rest periods with water breaks.

Reschedule hot jobs for the cooler part of the day, and routine maintenance and repair work in hot areas should be scheduled for the cooler seasons of the year.

A work/rest guideline will be implemented for personnel required to wear Level C protection. The maximum wearing time guidelines are as follows:

Ambient Temperatures	Maximum Wearing Time
Above 90º F	½ hour
80º - 90º F	1 hour
70º - 80º F	2 hours
60º - 70º F	3 hours
50º - 60º F	4 hours
40º - 50º F	5 hours
30º - 40º F	6 hours
Below 30º F	8 hours

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

1.3.1 Personal Protective Equipment to Minimize Heat Stress

Reflective clothing, which can vary from vests and jackets to suits that completely enclose the worker from neck to feet, can reduce the radiant heat reaching the worker. However, since most reflective clothing does not allow air exchange through the garment, the reduction of radiant heat must more than offset the corresponding loss in evaporative cooling. For this reason, reflective clothing should be worn as loosely as possible. In situations where radiant heat is high, auxiliary cooling systems can be used under the reflective clothing.

Auxiliary body cooling ice vests, though heavy, may accommodate as many as 72 ice packets, which are usually filled with water. Carbon dioxide (dry ice) can also be used as a coolant. The cooling offered by ice packets lasts only 2 to 4 hours at moderate to heavy heat loads, and frequent replacement is necessary. However, ice vests do not tether the worker and thus permit maximum mobility. Cooling with ice is also relatively inexpensive.

Wetted clothing such as terry cloth coveralls or two-piece, whole-body cotton suits are another simple and inexpensive personal cooling technique. It is effective when reflective or other impermeable protective clothing is worn. This approach to auxiliary cooling can be quite effective under conditions of high temperature, good air flow, and low humidity.

1.4 Heat Stress Monitoring

Monitor workers who are at risk of heat stress, such as those wearing semi-permeable or impermeable clothing when the temperature exceeds 70°F, while working at high metabolic loads (greater than 500 kcal/hour). Personal monitoring can be done by checking the heart rate, recovery heart rate, oral temperature, or extent of body water loss.

Heart rate (HR) should be measured by the radial pulse for 30 seconds as early as possible in the resting period. The HR at the beginning of the rest period should not exceed 110 beats per minute. If the HR is higher, the next work period should be shortened by or 33%, while the length of the rest period stays the same. If the pulse rate is 100 beats per minute at the beginning of the next rest period, the following work cycle should be shortened by 33%.

The recovery heart rate can be checked by comparing the pulse rate taken at 30 seconds (P1) with the pulse rate taken at 2.5 minutes (P3) after the rest break starts. The two pulse rates can be interpreted using the following criteria.

Heart rate recovery pattern	P3	Difference between P1 and P3
Satisfactory recovery	<90	--
High recovery (Conditions may require further study)	90	10
No recovery (May indicate too much stress)	90	<10

Body temperature should be measured orally with a clinical thermometer as early as possible in the resting period, and before the worker drinks water. Oral temperature (TO) at the beginning of the rest period should not exceed 99^{o} F. If it does, the next work period should be shortened by 10 minutes (or 33%), while the length of the rest period stays the same. However, if the TO exceeds 99.7^{o} F at the beginning of the next period, the following work cycle should be further shortened by 33%. TO should be measured again at the end of the rest period to make sure it has dropped below 99^{o} F.

1.5 Heat Stress Training

Workers should be properly trained on the above Heat Stress program, and should be aware of the following:

- Knowledge of the hazards of heat stress;
- Recognition of predisposing factors, danger signs, and symptoms;
- Awareness of first-aid procedures for, and the potential health effects of, heat stroke;
- Employee responsibilities in avoiding heat stress;
- Dangers of using drugs, including therapeutic ones, and alcohol in hot work environments;
- Use of protective clothing and equipment; and
- Purpose and coverage of environmental and medical surveillance programs and the advantages of worker participation in such programs.

1.6 Heat Stress References

https://www.osha.gov/SLTC/emergencypreparedness/guides/heat.html

2.0 COLD STRESS CASUALTY PREVENTION PLAN

Anyone working in a cold environment may be at risk of cold stress. Some workers may be required to work outdoors in cold environments and for extended periods, which creates an increase in the potential for cold stress injury. Site personnel will be instructed in the identification of cold stress, the first-aid treatment procedures for the worker, and the prevention of cold stress casualties.

2.1 Sources of Cold Stress

What constitutes extreme cold and its effects can vary across different areas of the country. In regions that are not used to winter weather, near freezing temperatures are considered "extreme cold." A cold environment forces the body to work harder to maintain its temperature. Whenever temperatures drop below normal and wind speed increases, heat can leave your body more rapidly. Wind chill is the temperature your body feels when air temperature and wind speed are combined. For example, when the air temperature is 40°F, and the wind speed is 35 mph, the effect on the exposed skin is as if the air temperature was 28°F. Cold stress occurs by driving down the skin temperature and eventually the internal body temperature (core temperature). This may lead to serious health problems, and may cause tissue damage, and possibly death.

Risk factors that contribute to cold stress include wetness/dampness, dressing improperly, and exhaustion, predisposing health conditions such as hypertension, hypothyroidism, and diabetes, and poor physical conditioning.

2.1 Identification and Treatment of Cold Stress

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

As a general rule, the greatest incremental increase in wind chill occurs when a wind of 5 mph increases to 10 mph. Additionally, water conducts heat 240 times faster than air. Thus, the body cools suddenly when chemical-protective equipment is removed if the clothing underneath is soaked in perspiration. Special protection of the hands is required to maintain manual dexterity for the prevention of accidents. Additional caution shall be exercised when workers are exposed to vibration, since blood circulation in extremities may already be impaired. Eye protection shall be worn by workers employed out of doors in a snow and/or ice terrain.

Trauma sustained in freezing or sub-zero conditions requires special attention because an injured worker is predisposed to secondary cold injury. Provisions must be made to prevent hypothermia and secondary freezing of damaged tissues, in addition to providing for first aid treatment.

2.1.1 Hypothermia

Hypothermia occurs when body heat is lost faster than it can be replaced and the normal body temperature (98.6°F) drops to less than 95°F. Hypothermia is most likely at very cold temperatures, but it can occur even at cool temperatures (above 40°F), if a person becomes chilled from rain, sweat, or submersion in cold water.

Symptoms: In the mild symptoms of hypothermia, the exposed worker is still alert, but he or she may begin to shiver and stomp the feet in order to generate heat. As the body temperature continues to fall, symptoms will worsen and shivering will stop. The worker may lose coordination and fumble with items in

the hand, become confused and disoriented, he or she may be unable to walk or stand, pupils become dilated, pulse and breathing become slowed, and loss of consciousness can occur. A person could die if help is not received immediately.

First Aid: Call 911 immediately in an emergency; otherwise seek medical assistance as soon as possible. Move the person to a warm, dry area. Remove wet clothes and replace with dry clothes, cover the body (including the head and neck) with layers of blankets; and with a vapor barrier (e.g. tarp, garbage bag). Do not cover the face.

If medical help is more than 30 minutes away, give warm sweetened drinks if alert (no alcohol), to help increase the body temperature. Never try to give a drink to an unconscious person. Place warm bottles or hot packs in armpits, sides of chest, and groin. Call 911 for additional rewarming instructions.

If a person is not breathing or has no pulse, call 911 for emergency medical assistance immediately. Treat the worker as per instructions for hypothermia, but be very careful and do not try to give an unconscious person fluids. Check him/her for signs of breathing and for a pulse. Check for 60 seconds. If after 60 seconds the affected worker is not breathing and does not have a pulse, trained workers may start rescue breaths for 3 minutes. Recheck for breathing and pulse, check for 60 seconds. If the worker is still not breathing and has no pulse, continue rescue breathing. Only start chest compressions per the direction of the 911 operator or emergency medical services. Reassess patient's physical status periodically.

2.1.2 Frostbite

Frostbite is an injury to the body that is caused by freezing of the skin and underlying tissues. The lower the temperature, the more quickly frostbite will occur. Frostbite typically affects the extremities, particularly the feet and hands. Amputation may be required in severe cases.

Symptoms: Reddened skin develops gray/white patches. Numbness in the affected body part, and the body part feels firm or hard. In severe cases, blisters may occur in the affected part.

First Aid: Follow the recommendations described above for hypothermia. Do not rub the affected area to warm it because this action can cause more damage. Do not apply snow/water. Do not break blisters. Loosely cover and protect the area from contact. Do not try to rewarm the frostbitten area before getting medical help; for example, do not place in warm water. If a frostbitten area is rewarmed and gets frozen again, more tissue damage will occur. It is safer for the frostbitten area to be rewarmed by medical professionals. Give warm sweetened drinks, if the person is alert. Avoid drinks with alcohol.

2.1.3 Trench Foot

Trench Foot or immersion foot is caused by prolonged exposure to wet and cold temperatures. It can occur at temperatures as high as 60°F if the feet are constantly wet. Non-freezing injury occurs because wet feet lose heat 25-times faster than dry feet. To prevent heat loss, the body constricts the blood vessels to shut down circulation in the feet. The skin tissue begins to die because of a lack of oxygen and nutrients and due to the buildup of toxic products.

Symptoms: Redness of the skin, swelling, numbness, blisters

First Aid: Call 911 immediately in an emergency; otherwise seek medical assistance as soon as possible. Remove the shoes, or boots, and wet socks. Dry the feet.

2.2 Prevention of Cold Stress

Engineering controls can be used to warm the work area. For example, radiant heaters may be used to warm workers in outdoor stations. If possible, shield work areas from drafts or wind to reduce wind chill.

Safe work practices should be used to help prevent cold stress. For example, it is easy to become dehydrated in cold weather. Workers should be provided with plenty of warm sweetened liquids (avoid alcoholic drinks). If possible, heavy work should be scheduled during the warmer part of the day. Workers should be assigned to tasks in pairs (buddy system), so that they can monitor each other for signs of cold stress. Workers should be allowed to interrupt their work, if they are extremely uncomfortable. Workers should be allowed frequent breaks in warm areas (including inside a heated truck). Acclimatize new workers and those returning after time away from work, by gradually increasing their workload, and allowing more frequent breaks in warm areas, as they build up a tolerance for working in the cold environment.

Dressing properly is extremely important to preventing cold stress. The type of fabric worn also makes a difference. Cotton loses its insulation value when it becomes wet. Wool, silk and most synthetics, on the other hand, retain their insulation even when wet. The following are recommendations for working in cold environments:

Wear at least three layers of loose fitting clothing. Layering provides better insulation. Do not wear tight fitting clothing. An inner layer of wool, silk or synthetic helps keep moisture away from the body. A middle layer of wool or synthetic helps provide insulation even when wet. An outer wind and rain protection layer helps allows some ventilation to prevent overheating. Wear a hat or hood to help keep your whole body warmer. Hats reduce the amount of body heat that escapes from your head. Use a knit mask to cover the face and mouth (if needed). Use insulated gloves to protect the hands (water resistant if necessary). Wear insulated and waterproof boots (or other footwear).

2.3 Cold Stress Training

Workers should be properly trained on the above Heat Stress program, and should be aware of the following:

- Knowledge of the hazards and symptoms of cold stress.
- Monitor your physical condition and that of your coworkers.
- Dress properly for the cold.
- Stay dry in the cold because moisture or dampness (e.g. from sweating) can increase the rate of heat loss from the body.
- Keep extra clothing (including underwear) handy in case you get wet and need to change.
- Drink warm sweetened fluids (no alcohol).
- Use proper engineering controls, safe work practices, and personal protective equipment (PPE) provided by your employer.

2.4 Cold Stress References

https://www.osha.gov/SLTC/emergencypreparedness/guides/cold.html
http://www.cdc.gov/niosh/topics/coldstress/

ATTACHMENT D

Health and Safety Requirements for Drilling Operations

HEALTH AND SAFETY REQUIREMENTS FOR DRILLING OPERATIONS

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Attachments:

HEALTH AND SAFETY REQUIREMENTS FOR DRILLING OPERATIONS

1.0 INTRODUCTION & POLICY

INTERA Inc. (INTERA) considers the prevention of illness, injury, and accidents in the work place to have greater importance than any other facet of the work. Safety will always take precedence over expediency or shortcuts, and every attempt will be made to reduce the possibility of injury, illness, or accident occurrence in the performance of drilling operations.

All personnel, including INTERA subcontractors, lower tier subcontractors, consultants, and service personnel, who perform any task in relation to the drilling efforts or are visitors to the drilling site(s) must adhere to the provisions of these requirements

As personnel safety is of the highest priority in performance of the work at this site, INTERA personnel will suspend drilling operations when an unsafe practice or condition is observed. Drilling will not proceed until the unsafe practice or condition is corrected. The subcontractor shall not be compensated for efforts required to correct any unsafe practice or condition created by his/her actions.

All applicable Federal, State, County and City safety regulations and practices shall be strictly adhered to at all times. These regulations and practices shall include, but are not solely limited to, the wearing of approved safety hats, shoes, glasses, hearing protection, and etc. No unauthorized personnel, private vehicles, cameras, firearms, personal pets, illicit drugs, or alcoholic beverages will be allowed on the designated project area.

The contractor shall be responsible for monitoring of subcontractor personnel required by OSHA, e.g. silica and heavy metals. All subcontractor personnel shall adhere to the INTERA operational health and safety regulations. **The "Statement of understanding" contained in the back of the INTERA Health and Safety Regulations for Drilling Operations must be signed by all Subcontractor personnel (including any lower tier) prior to working on this project.**

2.0 RESPONSIBILITIES AND AUTHORITIES

2.1 GENERAL

All personnel, including subcontractors, and site visitors shall receive **daily** safety instruction and information regarding potential safety hazards at the site. Daily on-site safety briefings shall be conducted by the Site Health and Safety Officer. Such daily training will be documented in the project records. All visitors will be escorted by a representative during their presence at the drilling site(s).

All personnel, including INTERA and lower-tier subcontractors, (including replacement and/or additional personnel) working on the drilling project must have met the minimum training requirements and have proof of their training as set forth in the site-specific health and safety plan developed for the project. Each individual's training must be documented prior to that person performing any work on the project. The following responsibilities and authorities are assigned with respect to compliance and implementation of these minimum requirements:

2.2 PERSONNEL

- The **Project Manager** shall be responsible for assigning a qualified field supervisor to the project who is cognizant of the required tasks and knowledgeable of drilling techniques and drilling safety procedures. The Project Manager is also responsible for providing adequate logistical support to ensure maximum safety during the drilling operations.

- The **Site Manager** shall be responsible for the day-to-day field operations and compliance with these requirements. The Site Manager shall fully coordinate the field drilling activities with the on-site Health and Safety technician and other responsible field personnel to assure that all drilling tasks are performed in the safest manner possible. Any violation of the provisions of these requirements will be reported immediately to the INTERA Corporate Health and Safety Officer and to the Project Manager. Should any variance from standard drilling procedures be required in completion of the designated drilling tasks, the Site Manager shall obtain concurrence from the Project Manager and the INTERA Health and Safety Officer prior to implementation.

- The **Site Health and Safety Officer** is responsible for the on-site monitoring of industrial and environmental safety, monitoring for compliance with the health and safety requirements, and any site-specific health and safety plan(s). The Site Health and Safety Officer shall take immediate corrective action when a safety violation is observed or reported.

- It shall be the responsibility of all **Field Personnel** working on a drilling project to promote safety at all times in the performance of their assigned tasks. All field personnel shall be aware of suspected site-specific hazards and shall be adequately trained to respond to such hazards in a safe and timely manner. In addition, it is the responsibility of all field personnel to report any real or suspected unsafe situation, act, or questionable practice immediately to the Site Health and Safety Officer or Field Supervisor.

A INTERA representative shall be on site at all times when drilling operations are in progress.

2.3 SUBCONTRACTOR AND SUBCONTRACTOR PERSONNEL:

The subcontractor is responsible for the safety of his/her operations as well as those operations of his/her subcontractor(s), who are also subject to all provisions of these minimum requirements. Any injury/illness that occurs as a direct result of work being performed under a subcontract or purchase order requires the subcontractor to notify INTERA **immediately** as well as submitting an accident report covering the incident. The accident report is to be submitted to the INTERA Corporate Health and Safety Officer within 24 hours of the accident. The subcontractor is required to participate in any INTERA internal investigation of such accident(s). The subcontractor is responsible to notify OSHA in accordance with 29CFR1904, as applicable.

The subcontractor must have a written and functional safety program to protect site workers, the general public, and the environment. The scope of the subcontractor program will be determined by the size and complexity of the project and the recognizable hazards of the work to be performed. Before work commences, this safety management program and implementation plan must be reviewed and approved, in writing, by the INTERA Health and Safety Officer.

2.3.1 The Drill Rig (Driller) Operator:

- The subcontractor shall designate, in writing, the on-site person who is in full charge of subcontractor's operations. The drill rig operator shall:
- consider safety as the primary importance and have and exercise the required authority to enforce safety at all times.
- be the leader in using proper personal safety gear and set an example in adhering to the rules and regulations that are set forth for the project.
- enforce the use of proper personal protective safety equipment (PPE) and take appropriate corrective action when proper PPE equipment is not being used or being used improperly by other subcontractor personnel.
- understand that proper maintenance of tools and equipment and general "housekeeping" on and around the drill rig will provide an appropriate environment to promote and enforce safety.
- visually inspect the rig and ancillary equipment **daily,** and preferably at the start of each drilling shift, to insure that the required safety devices, e.g., emergency engine shut-down switches and back-up alarms, are installed and are functional.
- inspect the rig to insure that applicable safety placards are installed at potential safety hazard locations as recommended by the manufacturer.
- inspect the drill rig at least daily for structural damage, excessive wire rope and rigging wear, improper wire rope spooling, loose bolts and nuts, proper tension in chain drives, loose or missing guards or protective covers, fluid leaks, and damaged or non-functioning pressure gauges and pressure relief valves. Any discrepancy will be corrected prior to operation of the rig.
- document all inspections, including daily, weekly, or periodic on the daily drilling report form at the time of inspection.
- have had adequate training on that rig type and is thoroughly familiar with the rig's controls, capabilities, limitations, and operating parameters.
- assure that all crew members are aware of the location and are capable of operating all emergency shut-down devices.
- monitor all gauges and warning lights and that control levers are functioning properly while the rig is operating.
- assure that all new drill rig workers are informed of safe operating practices on and around the drill rig.
- assure that each new employee understands the safety requirements and practices and shall document the new employee's acceptance of the requirements.
- observe the mental, emotional, and physical capability of each worker to perform the assigned work in a proper and safe manner. No person who is obviously impaired to a point of being detrimental to safety or task performance will be allowed to work on the rig or remain on the immediate drill site.
- assure that there is a fully stocked first-aid kit and two 10-lb U.L.-listed, Class ABC rated, fire extinguishers (that meets DOT standards) on the rig at all times.
- be trained to proficiency and capable of using first-aid kits, fire extinguishers and all other safety devices and equipment. At least one member of the drill crew shall possess a valid certificate of First Aid/CPR training from the U.S. Bureau of Mines, American Red Cross, or equivalent training. Training shall be documented.
- maintain a current, posted list of addresses and telephone numbers of emergency assistance units (ambulance services, police, hospitals, etc.) and shall inform other members of the drill crew of the existence, location and proper use of the list.

3.0 Individual Protective Equipment

- Any personal protective equipment (PPE) provided must meet NIOSH/ANSI specifications
- Clothing must be close fitting and comfortable, but without loose ends, straps, draw strings or belts or otherwise unfastened parts that might catch on rotating or moving component of the drill.
- Safety Head Gear. Approved safety hats (hard hats) will be worn properly at all times by everyone working or visiting within the posted perimeter of the drill site. Head protection shall be non-conductive to prevent from limited electrical shock and shall meet requirements of ANSI Standard Z89.1. It is recommended that safety hats be worn anytime when within 100 feet of an active rig.
- Safety Shoes or Boots. Safety shoes or boots shall be worn by all drilling personnel and all visitors to the drill site that observe drilling operations within close (within posted perimeter of drill site) proximity of the drill rig. Foot protection shall meet the requirements of ANSI Standard Z41.1, Class 75.
- Safety Glasses. All drilling personnel and visitors to the drill site are required to wear approved safety glasses with side shields or goggles while the drill rig is in operation or other drilling functions are being performed. Prescription glasses shall be an approved safety type or goggles must be used. Additional eye protection is required for work more hazardous to eyes, e.g. welding, cutting, grinding, or handling of chemicals. All eye protection shall meet ANSI Z87.1 standards.
- Gloves. All drilling personnel shall wear gloves for protection against cuts and abrasion which could occur while handling wire rope or cable and from contact with sharp edges and burrs on drill rods, drill pipe and other drilling or sampling tools.
- Hearing Protection. All drill crew personnel, site workers, and drill site visitors shall wear noise reducing ear protection when appropriate. In accordance with USDOE Order 5480.4, hearing protection is mandatory on DOE sites when the time-weighted-average (TWA) noise level reaches or exceeds 85 dBA.
- Other Protective Equipment. For some drilling operations, the prevailing environment or regulations may dictate that other protective equipment be used. When drilling is performed in chemically- or radiologically-contaminated areas, special protective equipment and clothing will be used as required by the site-specific Health and Safety Plan for each given task.

4.0 Housekeeping On and Around the Drill Rig

- Suitable storage facilities shall be provided so that tools, materials and supplies can be conveniently and safely handled without creating a safety hazard for personnel on the drill site or in the adjacent area.
- Storing or transporting tools, materials, or supplies within or on the mast (derrick) of the drill rig is prohibited within the project site or area.
- Drill pipe, drill rods, casing, augers and similar drilling tools shall be properly stacked and secured on racks or sills to prevent spreading, rolling, or sliding.
- Penetration or other driving hammers shall be placed at a safe location on the ground or secured on the rig to prevent movement when not in use.
- Work areas, platforms, walkways, scaffolding and other access ways shall be kept free of materials, debris, obstructions, and substances such as ice, grease, or oil that could cause a surface to become slick or otherwise hazardous.
- All hand controls, control linkages, warning and operation lights and lenses shall be kept

free of excess oil, grease, ice, or other foreign material that may interfere with safe operation.

- Gasoline or other motor fuels or flammable liquids will not be stored in any container that does not meet current regulations for storage of the specific fuel or flammable liquid. Fueling of engines shall be done only from U.L.-approved safety cans or other approved bulk fueling system(s). Any engine to be refueled shall be shut off and sufficiently cooled before and during the refueling operation.
- All gasoline engines, when operated in fire danger areas or other areas as specified in the project SOW, will be equipped with exhaust spark arresters.
- All tanks, including fuel, water (potable and non-potable), hydraulic oil, etc., shall be labeled and placarded as to tank contents.
- All wiping clothes, oily rags, and other such materials used for maintenance shall be stored in an approved fire-resistant metal container until properly disposed of.

5.0 Maintenance Safety

- Shut down the drill rig and/or auxiliary equipment engine(s) to make repairs or adjustments or to lubricate fittings (except repairs or adjustments that can only be made with the engine(s) running. In such cases, a qualified operator shall remain at the shut-down control station during the maintenance). Take precautions to prevent accidental starting of an engine during maintenance by removing, locking, and tagging out the ignition key or ignition control(s).
- Block the rig carrier wheels and/or lower the leveling jacks or both and set parking brakes before working under a drill rig.
- When possible and appropriate, release all pressure on the hydraulic systems, the drilling fluid circulation system and the air pressure systems of the drill rig prior to performing maintenance or repairs. Use lockout/tagout controls.
- Welding or cutting on or near a fuel tank or other flammable material is prohibited. If fuel tank repairs, requiring cutting or welding, are required, the tank(s) shall be removed from the project before repairs are attempted.
- Do not use gasoline or other volatile or flammable liquids as a cleaning agent on or around a drill rig.
- Replace all caps, filler plugs, protective guards or panels, high pressure hose clamps and safety chains or cables that have been removed for maintenance before returning the drill rig to service.
- Personnel shall remain clear of all rotating equipment.
- All exposed drive shafts, drive chains and sprockets, drive belts, and similar power transmitting components shall have guards installed, as per OSHA and equipment manufacturer standards, during drilling operations.
- All exposed exhaust pipe(s) and/or systems shall be guarded or insulated adequately to protect personnel from burns and prevent fire hazards.
- All air and fluid circulation hose connections shall be secured with safety chains or clamped to prevent whipping in the event of a break or failure.
- Each crew member shall promptly report any worn, defective, or unsafe items which are observed to the driller or on-site subcontractor supervisor.
- Pipelines, tanks, and other storage facilities (for fuel, oil, gas, mud, foamers, etc.) shall be inspected frequently and kept from leaking. Any spills or leaks will be cleaned up immediately.
- A spill-containment plan shall be addressed in the subcontractor's written safety program for

the project.

6.0 Safe Use of Hand Tools

- When a hand tool becomes damaged, the tool shall either be repaired before further usage or removed and tagged out of service.
- Hand tools shall be used only for the express purpose for which they were designed.
- Keep all tools cleaned and stored in an orderly, safe manner when not in use.
- Never use pipe wrenches as substitute for a rod holding device.
- Replace pipe wrench hook and heel jaws when they become visibly worn.
- When breaking tool joints manually on a hard surface or on a drilling platform, position hands so that fingers will not be injured between the wrench handle and the hard surface or the platform, should the wrench slip or the joint suddenly release.

7.0 Clearing the Work Area

- Prior to drilling, adequate site clearing and leveling shall be performed to accommodate the drill rig, ancillary equipment, and supplies and provide a safe working area. Drilling shall not be commenced when tree limbs, dry vegetation, unstable ground or site obstructions may cause unsafe tool handling or potential fire hazards.

8.0 Start Up

- All drill rig personnel and visitors shall be instructed to stand clear of the drill rig or auxiliary equipment immediately prior to and during starting of an engine.
- Make sure all gear boxes are in neutral, all drawworks clutches and hoist levers are disengaged or in the neutral position, all hydraulic levers are in the correct non-actuating positions,and the cathead rope is not on the cathead spool before starting a drill rig engine or engaging the power train.

9.0 Safety During Drilling Operations

- No personnel, other than the assigned rig crew, shall be allowed on or under an operating rig deck for any reason. No personnel shall attempt to make any type of inspection of the subcontractor's equipment unless a subcontractor representative is present during the inspection.
- The drill rig shall not be moved from hole to hole with the mast (derrick) in the raised position.
- Before raising the mast (derrick), always check for overhead wires and obstructions. An observer shall be posted at a strategic location to ensure adequate clearance is maintained (see section 2.3.9).
- The mast shall not be raised or lowered during wind speeds that exceed the rig manufacturer's maximum wind load design or when visibility is restricted.
- Before raising or lowering the mast (derrick), the area shall be inspected for potential safety hazards. All unnecessary drill rig personnel and visitors shall be cleared from the areas immediately to the rear, front and the sides of the mast. Once the mast is raised into position, the mast or derrick locks will be secured. The rig shall not be operated unless mast locks are functional and are locked. Prior to lowering, mast hydraulic system(s) will be

checked for proper operation.

- Before the mast (derrick) of a drill rig is raised and drilling is commenced, the drill rig must be first leveled and stabilized with leveling jacks and/or solid cribbing. The drill rig shall be releveled immediately if settling occurs after the initial set-up.
- The operator of a drill rig shall operate a drill rig only from the driller's control station. **The operator shall remain at the control station at all times when the rig is in operation.**
- Throwing or intentional dropping of tools shall not be permitted.
- If it is necessary to drill within an enclosed area, make certain that exhaust gases are conducted out of the area and sufficient ventilation is provided.
- All unattended boreholes must be adequately covered or otherwise protected to prevent drill rig personnel, site visitors, or animals from stepping or falling into the hole. All open boreholes shall be covered, protected or backfilled adequately and according to local or state regulations on completion of the drilling project.
- When using a mast or derrick ladder, face the ladder and grasp either the side rails or the rungs with both hands while ascending or descending. The three-point system of 2 hands and 1 foot or two feet and 1 hand being in contact while climbing is mandatory. Always ensure that shoe soles are clean and dry before attempting climbing or descending the mast.
- When climbing to a mast or derrick platform that is higher than 20 feet (6 m), an approved safety climbing device shall be used. Anyone working on a derrick board, platform, or mast shall wear an approved safety belt or harness securely fastened by an approved safety lanyard.
- When working on a mast or derrick platform, do not guide drill rods or pipe into racks or other supports by taking hold of a moving hoisting line, traveling block, or other moving hoisting equipment. Rack only one pipe stand at a time. Always stay clear of moving hoisting line, traveling block, elevators, or hoisting plugs.
- Loose tools and similar items shall not be left on the derrick platform or on structural members of the derrick.
- Any working platform over 4 feet (1.2 m) above ground surface shall have 4-inch toe boards, a mid railing, and top safety railing 42 inches high installed that will withstand 200 lbs. lateral force.
- Before manually lifting any object, personnel shall ensure sure that the load is within their personal lifting capacity.
- Personnel shall not ride the hoisting line, catline, traveling block, the traveling block hook, the elevators, or any suspended equipment as a means of ascending or descending to or from the derrick.
- Assure that equipment furnished for use on the site is maintained in safe operating condition and operated only by qualified personnel. Cranes, pressure vessels, and large earth moving equipment shall have valid certificates and logs of inspection and maintenance.
- The location of the nearest phone or radio to contact emergency services shall be prominently posted. Site-specific emergency preparedness actions will be recognized and communicated to rig personnel by the subcontractor supervisor.
- **Daily** safety meetings shall be held to inform employees and other subcontractors of progress of work, changes, hazards anticipated and inspection deficiencies or good examples of employee protection. A daily "toolbox meeting" will be used to assure that good communications are maintained. A record must be kept of the subject(s) discussed and any suggestions made. Attendance will be recorded of those participants at the meeting.
- Horseplay, practical jokes, and scuffling are strictly forbidden on the drill site at all times.
- All rig steps, ladders, stairways, platforms, and walkways shall be keep free of mud, snow, ice, tools, and other materials that may cause slipping.

10.0 Overhead and Buried Utilities

- Overhead and buried utilities shall be located, noted, and emphasized on all boring location plans and boring assignment sheets. **INTERA uses a "double barrier" system for surveying underground utilities. No borehole will be drilled until the exact location to be drilled is surveyed by an independent utility locator service and their findings verified by a INTERA Utility Line Locator.**
- When overhead electrical power lines exist at or near a drilling site or project, personnel shall consider all wires to be energized and dangerous.
- Visually inspect the drill site for sagging power lines before entering the site. Do not lift power lines to gain entrance or exit. Call the responsible utility and ask them to lift or raise the lines or de-energize (turn off) the power.
- An observer or "spotter" shall be posted at a sufficient distance from the rig to adequately monitor for safe clearance (minimum of 20 feet) during the raising and lowing of the rig mast when operating in the vicinity of overhead power lines or other overhead obstructions.
- Before raising the drill rig mast (derrick) in the vicinity of power lines, walk completely around the drill rig. Determine what the minimum distance from any point on the drill rig to the nearest power line will be when the mast is raised and/or lowered. Do not raise the mast or operate the drill rig if this distance is less than 20 feet (6 m). INTERA policy for operating boomed or drilling equipment with mast, tower, or derrick in proximity of overhead power lines requires that a minimum clearance of 20 feet be maintained. The INTERA 20-foot minimum clearance requirement may only be reduced to the OSHA minimum powerline clearance requirement with approval of the INTERA technical monitor or designee. Any such approval will be granted only after a thorough inspection, which must determine that no safety hazard will be created or will exist by the application of the OSHA requirement. **UNDER NO CIRCUMSTANCES WILL MINIMUM OSHA POWERLINE CLEARANCE REQUIREMENTS BE VIOLATED UNLESS THE LINES ARE DE-ENERGIZED, GROUNDED, AND TAGGED OUT BY THE RESPONSIBLE UTILITY COMPANY OR THEIR DESIGNEE.** Any such variance will be fully documented by the grantor. In addition, a INTERA SAFE WORK PERMIT must be issued before any work is performed under the variance.

11.0 Safe Use of Electricity

- All wiring shall be installed in accordance with the National Electrical Code using high quality connections, fixtures and wire, insulated and protected with consideration of the drilling environment. Makeshift wiring and equipment shall not be permitted.
- All portable electrical equipment used by personnel shall have GFCI (ground fault circuit interrupt) protection.
- **Only qualified electricians will attempt repairs on electrical lines or installation of complex electrical devices.**
- All lights positioned above working areas shall be enclosed in cages or similar enclosures to prevent loose or detached lamps or vapor-tight enclosures from falling on workers. All light bulbs shall be heavy-duty, outdoor type, and shatterproof type.
- Electrical cables shall be guarded and located so as to prevent damage by drilling operations or by the movement of personnel, tools or supplies.
- All plug receptacles shall be the three-prong, U-blade, grounded type and have adequate current carrying capacity for the electrical tools that may be used and shall be GFCI

protected.
- All electric tools shall have three-prong, U-blade, ground wire plugs and cords.
- Do not use electrical tools with lock-on devices.
- All electrical welders, generators, control panels and similar devices will be adequately grounded.
- Electrical control panels, fuse boxes, transformers and similar equipment shall have a secure, protective enclosure. Only weatherproof boxes and fittings shall be used for exterior application. Panels, fuses, and breakers shall be labeled to indicate their function.
- Poles used to hold wiring and lights shall not be used for any other purpose.
- Power shall be turned off and locked out before changing fuses or light bulbs.

12.0 Safe Use of Wire Line Hoists, Wire Rope and Hoisting Hardware

- Any required hoisting operations which are not performed with the drill rig equipment, e.g., crane operations, shall be conducted in accordance with applicable OSHA requirements.
- All wire ropes and fittings shall be visually inspected in accordance with the manufacturer's recommendations and applicable OSHA requirements during use and thoroughly inspected at least once a week for: abrasion, broken wires, wear, reduction in rope diameter, reduction in wire diameter, fatigue, corrosion, damage from heat, improper reeving, jamming, crushing, bird caging, kinking, core protrusion, or damage to lifting hardware. Any discrepancies shall be corrected before operations continue.
- All manufactured cable-end fittings and connections shall be installed according to the manufacturer's instructions and loaded according to the manufacturer's specifications. This includes cable clamps and thimbles. All cable ends shall be wired or taped down.
- If a ball-bearing type hoisting plug is used to hoist drill rods, drill pipe, or casing, the bearings shall be inspected and lubricated daily to assure that the hoisting plug rotates freely under load.
- Wire rope size shall be properly matched to sheave groove size. Non-rotating wire rope is suggested for light rig application.
- Minimize shock and side loading of wire rope. Apply loads smoothly and steadily.
- Avoid sudden loading in cold weather.
- Never use frozen catline ropes. Keep ropes protected from adverse weather.
- Protect wire rope from sharp corners or edges. Avoid *pile-up* or uneven spooling of wire rope.
- Replace faulty guides and rollers.
- Replace worn sheaves and sheave bearings with parts equal to or exceeding original manufacturer specification(s).
- Replace damaged safety latches on safety hooks before using.
- Know the safe load capacity of the hoisting equipment being used. Never exceed this limit.
- Know and do not exceed the rated capacity of hooks, rings, links, swivels, hoisting plugs, elevators, shackles and other lifting aids. Never exceed the manufacturer's rated load capacity for any reason.
- Do not guide wire rope on hoist drums with hands or feet.
- Keep hands and other extremities away from hoists, wire rope, hoisting hooks, sheaves and pinch points as slack is being taken up and when the load is being hoisted.
- Following the installation of new wire rope, lift a light load first to allow the wire rope to adjust.

- Never leave a load suspended when the hoist is unattended.
- Never hoist the load over the head, body, or feet of any personnel.
- Inspect daily, or at the start of each shift, all rotating cable attachments, e.g. safety hooks, deadman anchors, and hoisting apparatus, for freedom of movement.

13.0 Safe Use of Catheads and Rope Hoists

- Keep the cathead spool clean and free of rust and oil and grease.
- Check the cathead periodically, with the engine not running, for rope wear grooves.
- Never wrap the rope from the cathead (or any other rope, wire rope or cable on the drill rig) around a hand, wrist, arm, foot, ankle, leg, or any other part of the body.
- Do not use a rope that is any longer than necessary. A rope that is too long can form a ground loop or otherwise become entangled with the operator's legs.
- Do not use more rope wraps than are required to hoist a load, or than can be safely released.
- Do not leave a cathead unattended with the rope wrapped on the cathead spool when cathead power is engaged.
- Position all other hoist lines to prevent contact with the operating cathead rope.
- The cathead operator must be able to operate the cathead standing on a level surface with firm footing and without distraction or disturbance.

14.0 Safe Use of Augers

The following general procedures shall be used when starting a boring with continuous flight or hollow-stem augers:

- Prepare to start an auger boring with the drill rig level, the clutch or hydraulic rotation control disengaged, the transmission in low gear, and the engine running at low RPM.
- Apply an adequate amount of downward pressure prior to rotation to seat the auger head below the ground surface.
- Observe the auger head while slowly engaging the clutch or rotation control. Stay clear of the auger.
- Slowly rotate the auger and auger head while continuing to apply down pressure. Keep one hand on the clutch or the rotation control at all times until the auger has penetrated one foot or more below ground surface.
- If the auger head slides out of alignment, disengage the clutch or hydraulic rotation control and repeat the hole starting process.
- An auger guide can facilitate the starting of a straight hole through hard ground or pavement.
- Use only the manufacturer's recommended method of securing the auger to the power coupling. Do not touch the coupling or the auger with hands, feet, wrenches or any tools during rotation.
- Whenever possible, use tool hoists to handle auger sections.
- Never place hands or fingers under the bottom of an auger section when hoisting the auger over the top of an auger section in the ground or other hard surfaces such as the drill rig platform.
- Never place feet under the auger section that is being hoisted.
- When rotating augers, stay clear of the auger and other rotating components of the drill rig. **Never reach behind or around a rotating auger for any reason whatever. A minimum of 18 inches clearance shall be maintained between personnel, clothing, footwear and**

other personal apparel and the rotating augers, kellys, heads, drillrod or other rotating components of the drill rig.

- Use a long-handled shovel to move auger cuttings away from the auger, ensuring that the shovel blade does not come in contact with the rotating auger. Never use hands or feet to move cuttings away from the auger.
- Never attempt to remove cuttings from rotating augers. Augers should be cleaned only when the auger drive is in neutral and rotation of the augers has ceased.
- Auger speed shall be only that speed necessary for penetration and cuttings removal. High-speed auger rotation shall not be used for penetration or cuttings removal unless approved by the on-site INTERA field supervisor. In such cases, all unnecessary personnel will be removed from the rig operating area.
- Free-standing auger(s) shall be secured to prevent accidental falling.

15.0 Safety During Rotary and Core Drilling Operations

- Water swivels, Chiksan joints, and hoisting plugs shall be lubricated and checked for *frozen* bearings before use. A swivel guide cable and anchor chain shall be used to prevent swivel hose whip in case of swivel failure.
- Pressure relief valves shall be installed and operable on all circulation systems. Protective covers shall be installed on shear-type relief valves.
- Direct-reading pressure gauges shall be installed on all air and drilling fluid delivery lines. Gauges shall be operable at all times and must represent the true pressure of the medium being transported in the line(s). This shall include all ancillary equipment, e.g., grout mixers, auxiliary circulation pumps, and other such equipment.
- Drill rod chuck jaws shall be checked periodically and replaced when necessary.
- Drill rod movement shall not be braked or retarded by using the drill rod chuck jaws.
- Drill rods or drill pipe shall not be held or lowered into the hole with pipe wrenches. Use slips, clamps, spiders, or other suitable holding devices.
- In the event of a plugged bit or other circulation (fluid or air) blockage, the pressure in the piping and hose(s) between the pump, or air compressor, and the obstruction shall be relieved or bled down before breaking the first tool joint. Line pressure shall be relieved prior to breaking any tool joint connection.
- When drill rods or drill pipe are hoisted from the borehole, they shall be cleaned for safe handling with a rubber pipe wiper or other suitable apparatus. Do not use hands to clean or strip drilling fluids from downhole tools as they are being hoisted.
- If work must progress over a portable drilling mud pit, do not attempt to stand on narrow sides or cross members. The mud pit shall be equipped with rough surfaced, fitted cover panels of adequate strength to support the combined weight of drill rig personnel.
- Drill rods and drill pipe shall not be lifted and leaned unsecured against the mast. A suitable method shall be provided for securing the upper ends of the drill rod or drill pipe sections for safe vertical storage or the tools must be laid down.
- Only personnel necessary to perform hoisting or tripping operations shall be on the rig during these operations.
- Remain well clear of moving rotary tables, kellys, quillrods, pull-down chains, drive lines, drive chains, and other rotating components at all times.
- When air rotary or air coring operations are in progress, all discharges, e.g., dust, cuttings, and fluids shall be contained. All shrouds, curtains, diverter head(s), cyclone separator(s), blooie line(s), and other necessary containment equipment will be used at all times. Any variance from these requirements must be approved in writing by INTERA before any such

variance is implemented.
- All rig air-delivery systems used in environmental drilling applications will be equipped with oil-separating, 10 micron in-line filter(s) to remove oil that might be discharged into the air stream by the compressor(s). These filters shall be inspected daily and serviced as applicable.

16.0 Off-Road Movement of Drilling Equipment and/or Components

- Before off-road movement of a drill rig, visually survey the route of travel, inspecting the proposed route for unstable road bed(s) and bridges, depressions, stumps, gullies, ruts, and similar obstacles which might impede safe movement of the equipment.
- The braking system of the drill rig carrier shall always be tested for adequate operation before movement.
- Inspect the complete drive-train, including drive shafts, U-joints, carrier bearings, flanges, etc. of the rig truck or carrier at least weekly.
- Use caution when traversing slopes. Conservatively evaluate side hill capability of drill rigs, as the arbitrary addition of drilling tools may raise the center of gravity. When possible, travel directly uphill or downhill. Increase tire pressures before traveling in hilly terrain (however, do not exceed rated tire pressure).
- Properly secure all drilling equipment and tools, including drill rod, drill pipe, casing, and other tubular material before transport.
- Use only those routes that have been designated for rig travel and movement.

17.0 Hazardous Materials and Waste

- The subcontractor shall provide material safety data sheets (MSDS) for all hazardous materials used in the drilling operation(s) as per 29CFR1910.1200. Personnel must be trained in accordance with 29 CFR 1910.120 for handling any such hazardous materials as well as any site-specific requirements pertinent to the particular task being undertaken.
- Chemicals, corrosives, and etc. shall be properly labeled, placarded, and stored.
- Any waste generated by drilling operations shall be handled as per site-specific project requirements.
- All cuttings, dust, fluids, and other waste generated by drilling activities must be contained and disposed of as per site-specific project requirements. In no case where drilling is being performed in a posted radiological and hazardous waste area shall dust, cuttings, fluids, or other subsurface waste be discharged to the atmosphere, unless engineering controls are used to separate particulate matter from the discharged air. Engineering controls may include, but are not solely limited to, the use of cyclone separator(s), HEPA (high efficiency particulate air) filters, or other suitable, approved controls.
- All spills and leaks, including but not solely limited to, oils, fuels, grease, motor coolants, drilling additives, or other potentially hazardous wastes, will be cleaned up immediately and properly disposed of. The cause of such spills or leaks shall be determined and appropriate corrective action taken before drilling is resumed. Such events will be reported by the subcontractor to INTERA as per direction of the applicable Health and Safety Plan and/or Statement of Work governing the project tasks.
- A subcontractor shall not perform any work identified in the site-specific project Health and Safety Plan or Project Statement of Work (SOW) requiring a SAFE WORK PERMIT (SWP) or RADIATION WORK PERMIT (RWP), until such permit is issued by INTERA. This

includes, but is not solely limited to, such tasks as welding, working in a confined space area, cutting, grinding, or other related activities where heat, open flame, and/or sparks may be generated. All provisions of the issued permit(s) shall be adhered to while working on the project.

18.0 Statement of Understanding

All personnel, including INTERA and subcontractor, are required to read and fully understand the provisions of these minimum requirements. The INTERA field supervisor shall document that all INTERA personnel working on the drilling project have read and understand the requirements. The subcontractor and each subcontractor employee working on the project shall sign the attached <u>STATEMENT OF UNDERSTANDING</u> before commencing any work on the project.

ATTACHMENT A
STATEMENT OF UNDERSTANDING
DRILLING HEALTH AND SAFETY REQUIREMENTS
FOR DRILLING OPERATIONS

I, the undersigned, as an employee of the Subcontractor doing business as _____, have received and have read the INTERA Health and Safety Requirements for Drilling Operations. Further, I understand all provisions of these requirements.

	Name (please print)	Signature	Date	Position
1.				
2.				
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ATTACHMENT B
EQUIPMENT SAFETY INSPECTION CHECKLIST
FOR SMALL AUGER, ROTARY, AND CORE RIGS

Contractor:_____Rig Type:_____Rig no._____Date:__/__/__
Safety Inspector:_____Project:_____

I. Rig Carrier
( ) Overall Appearance
( ) Oil Leaks
( ) Fuel Leaks
( ) Fire Extinguisher
( ) Back-up Alarm
( ) Exhaust System
( ) Wheel Chocks
( ) Outrigger Jacks
( ) Fuel Tank Placard(s)
( ) Portable fuel containers
( ) Other:_____

II. Mast
( ) Crown Block
( ) Hinge Pins
( ) Lock Pins/Devices
( ) Lights/Wiring
( ) Safety Climbing Device
( ) Safety Belts/Harness
( ) Racking Board
( ) Ladders
( ) Deadman Anchors
( ) Standpipe
( ) Swivel Hose
( ) Safety Chains/Clamps
( ) Mast Rams/Cylinders
( ) Other:_____
( ) Other:_____

III. Rig Engine(s)
( ) Fuel Tank(s)
( ) Exhaust System
( ) Electrical System
( ) Belt/Drive Line Guards
( ) Emergency Shut-down System(s)
( ) Heat Shields
( ) Fluid Leaks
( ) Gauges
( ) Clutches
( ) Other:_____
( ) Other:_____

IV. Power Train/Drill Unit
( ) Chain/belt Guards
( ) Fluid Leaks
( ) Driveline Guards
( ) Hydraulic Hoses
( ) Safety Chains/lanyards
( ) Gauges
( ) Loose Bolts
( ) Rotary Table
( ) Drive Head
( ) Auger Drive
( ) Other:_____
( ) Other:_____

V. Pump(s)/Compressor(s)
( ) Sheaf Relief Valve Cover(s)
( ) Pressure Relief Valve(s)
( ) Flowline Safety Clamps/chains
( ) Belt/Chain Guards
( ) Vibrator Line Anchor
( ) Other:_____
( ) Other:_____

VI. Hoists/Catheads
( ) Chain Guard(s)
( ) Spool/Drum wear-cracks
( ) Safety Devices\Spool Divider
( ) Clutch(es)
( ) Brake(s)
( ) Hydraulics
( ) Wireline Drum-coring
( ) Drive Hammer(s)
( ) Other:_____
( ) Other:_____

VII. Wireline/Catline
( ) Wear/broken strands
( ) Spooling
( ) Cable Clamps and Thimbles
( ) Cable Ends
( ) Catline Rope Condition
( ) Other:_____

VIII. Hoisting Equipment
( ) Hoisting Plug(s)
( ) Lifting Iron(s)
( ) Elevators
( ) Weight Indicator
( ) Safety Hook(s)
( ) Spider(s)
( ) Slips
( ) Foot Clamps
( ) Other:_____
( ) Other:_____

IX. Downhole Equipment
( ) Drillpipe
( ) Drillcollars
( ) Core Rod
( ) Core Barrel(s)
( ) Augers
( ) Samplers
( ) Other:_____
( ) Other:_____

X. Safety Equipment
( ) Placards/Warning Signs
( ) Applicable OSHA Postings
( ) First Aid Kit(s)
( ) Applicable Regulation Posting
( ) Emergency Medical Posting(s)
( ) Emergency Procedures
( ) Other:_____
( ) Other:_____

XI. Personal Protective Equipment
( ) Hard Hats
( ) Safety Glasses
( ) Safety boots/shoes
( ) Other:_____
( ) Other:_____

XII. Other Items
( ) _____
( ) _____

COMMENTS:_____

ATTACHMENT E

Heavy/Light Equipment/INTERA Automobile Insurance Certificate

HEALTH AND SAFETY REQUIREMENTS
FOR HEAVY AND LIGHT EQUIPMENT

General

1. Ensure operators have demonstrated skills and/or have attended training on the safe operation of heavy/light equipment.
2. Operate equipment according to Department of Transportation (DOT) regulations.
3. Meet manufacturer's minimum requirements for safe operation of equipment.
4. Daily inspect heavy/light equipment before use. Identify defective equipment, remove it from service, and do not use it until repaired.
5. Before operating heavy/light equipment, inspect work areas, and provide safeguards for identified hazards.
6. Ensure operator's manual is accessible for all heavy/light equipment.
7. Before operating heavy/light equipment greater than 20 horsepower with an operator's seat (excluding trucks), ensure it is equipped with approved roll over protection safety (ROPS), if required.
8. Ensure heavy/light equipment with an operator's seat and equipped with roll over protection safety (ROPS) is equipped with a seat belt.
9. When operating heavy/light equipment, wear a seat belt where provided.
10. Before exiting operator's seat from all heavy/light equipment, lower attachments to the ground and apply parking brake.
11. When riding on heavy/light equipment, ride only on designated positions.
12. Do not use heavy/light equipment as a lifting device unless the equipment and rigging have been load-tested.
13. Ensure all equipment operated during poor visibility or inclement weather is equipped with proper lighting and appropriate safety devices (e.g., windshield wipers, defroster).
14. If it created a hazard to persons in the immediate work area, do not operate equipment.
15. Operate all heavy/light equipment within manufacturer's recommended operating parameters.
16. When digging, drilling, driving objects, or trenching close to energized circuits, locate underground utilities (e.g., electrical lines, telephone, water, natural gas, and other piping systems) and take measures to prevent damage.
17. Be careful when using ladders, handrails, steps, etc., to climb on or off heavy/light equipment.
18. Chock all vehicles with dual wheels. Chock medium-and heavy-duty vehicles (one ton or greater) and, on extremely hilly and mountainous terrain, chock smaller vehicles (1/2 ton pickups and ¾ ton service vehicles).
19. Wear footwear appropriate for the environment and for the equipment being used.

Operation of Light Equipment (Mowers, Tractors, chain Saws, Tamps, Etc.)

1. For manual opening of tailgates on dump trucks, install and use handgrips.
2. Ensure farm tractors used with bush hogs are equipped with heavy-metal mesh guards for personal protection.
3. When engaged in a winching operation with light equipment, be positioned safely (e.g., behind the door).
4. When working in the bucket of an aerial lift, wear a fall protection harness.
5. When operating a chain saw, wear eye and face protection and, except when working from a bucket truck or wood pole, wear chaps.
6. When operating a weedeater with a blade (brushsaw), wear leggings or chaps and eye and face protection.
7. When operating a tamp (except for pole tamps), wear foot protection including toe and metatarsal guards.
8. Use the following required personal protective equipment:
    a. Hard hats
    b. Hearing protection
    c. Safety glasses
    d. Work gloves

Operation of Heavy Equipment (Bulldozers, Motor Graders, Packers, Core Drills, Etc.)

1. When engaged in a winching operation, use heavy equipment equipped with heavy-metal mesh guards for protection.
2. Ensure all heavy equipment is equipped with back-up alarms and warning devices.
3. Ensure all heavy equipment is equipped with a fire extinguisher.
4. When clearing wooded areas, use heavy equipment equipped with closed clearing cab.
5. Safety glasses and heard hat are not required in the enclosed cab of bulldozers.
6. Use the following required personal protective equipment:
    a. Hard hats
    b. Hearing protection
    c. Safety glasses

ATTACHMENT A
EQUIPMENT SAFETY INSPECTION CHECKLIST
FOR LIGHT EQUIPMENT

Safety Inspector: _____ Site/Project: _____ Date: __/__/__
License Plate: _____ Make/Model/Color: _____

Insert a check mark ✓ if ok, or an ✗ if there is an item deficiency.

Date							
Tire inflation							
Lug nuts							
Exhaust System							
Brakes							
Parking brake							
Engine lubricants							
Engine Coolants							
Steering							
Windshield							
Windshield Wipers							
Heater / Defroster							
Head / tail lights							
Turn indicators							
Instrument gauges							
Initials of Operator							

DESCRIPTION OF DEFICIENCIES: _____

_____

REMEDY FOR DEFICIENCIES: _____

_____

COMMENTS: _____

_____

ATTACHMENT B
EQUIPMENT SAFETY INSPECTION CHECKLIST
FOR HEAVY EQUIPMENT

Safety Inspector: _____ Site/Project: _____ Date: __/__/__
Equipment Type: _____ Equipment Number: _____

Insert a check mark ✓ if ok, an × if there is an item deficiency, or "NA" if the item does not apply.

FROM THE GROUND

Bucket or Blade	Excessive Wear or Damage, Cracks	
Bucket or Blade Cylinder & Linkage	Excessive Wear, Damage, Leaks, Lubricate	
Stick, Cylinder	Wear, Damage, Leaks, Lubricate	
Boom, Cylinders	Wear, Damage, Leaks, Lubricate	
Underneath Machine	Final Drive Leaks, Swing Drive Leaks, Damage	
Track Sag	Tightness, Wear	
Pivot Shafts	Oil Leaks	
Carbody	Cracks, Damage	
Undercarriage	Wear, Damage, Tension	
Steps and Handholds	Condition and Cleanliness	
Batteries & Hold Downs	Cleanliness, Loose Bolts & Nuts	
Windshield Wipers & Washers	Wear, Damage, Fluid Level	
Fire Extinguisher	Charge, Damage	
Engine Coolant	Fluid Level	
Primary/Secondary Fuel Filters	Leaks, Drain Water Separator	
Air Filter	Restriction Indicator	
Hydraulic Oil Tank	Fluid Level, Damage, Leaks	
Hydraulic Oil	Filter Leaks	
Radiator	Fin Blockage, Leaks	
Hydraulic Oil Cooler	Fin Blockage, Leaks	
AC Condenser	Fin Blockage, Leaks	
Lights and Mirrors	Damage	
Engine Oil Filter	Filter Leaks	
Hydraulic Oil Filter	Filter Leaks	
Overall Machine	Loose/Missing Nuts, Bolts, Guards, Cleanliness	

ENGINE COMPARTMENT

Engine Oil	Fluid Level	
Gear Oil	Fluid Level, Leaks	
Fuel Tank	Fuel Level, Damage, Leaks	
All Hoses	Cracks, Wear Spots, Leaks	
All Belts	Tightness, Wear, Cracks	
Overall Engine Compartment	Trash or Dirt Buildup, Leaks	

INSIDE THE CAB

Seat	Adjustment	
Seat belt & Mounting	Damage, Wear, Adjustment, Age	
Horn, Travel Alarm, Lights	Proper Function	
Indicators	Proper Function	
Monitor Panel	Proper Function	
Switches	Proper Function	
Travel Controls	Correct Operation	
Mirrors Adjustment	Adjustment, Cracks/Broken	
Heating and Cooling System	Proper Function	
Overall Cab Interior	Overall Cab Interior Cleanliness	

COMMENTS: _____

Client#: 914933 INTERINC22

ACORD™ CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY) 6/02/2021

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer any rights to the certificate holder in lieu of such endorsement(s).

PRODUCER	CONTACT NAME: Danelle Touchstone	
USI Insurance Services LLC -CL 4630 North Loop 1604 West Suite 410 San Antonio, TX 78249	PHONE (A/C, No, Ext): 210-524-2094	FAX (A/C, No): 610-537-1904
	E-MAIL ADDRESS: danelle.touchstone@usi.com	

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER A : Lloyd's of London	NONAIC
INSURER B : Hartford - WC Multiple Issuing Cos	00914
INSURER C : Sentinel Insurance Company Ltd.	11000
INSURER D :	
INSURER E :	
INSURER F :	

INSURED
INTERA Inc.
9600 Great Hills Trl
Suite 300W
Austin, TX 78759

COVERAGES **CERTIFICATE NUMBER:** **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSR	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	X COMMERCIAL GENERAL LIABILITY CLAIMS-MADE / X OCCUR X Pollution Liability X BI/PD DED $10,000 GEN'L AGGREGATE LIMIT APPLIES PER: POLICY / X PRO-JECT / X LOC OTHER:			ENVP000025421	06/01/2021	06/01/2022	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG 	$1,000,000 $300,000 $25,000 $1,000,000 $2,000,000 $2,000,000 $
C	AUTOMOBILE LIABILITY X ANY AUTO OWNED AUTOS ONLY / SCHEDULED AUTOS X HIRED AUTOS ONLY / X NON-OWNED AUTOS ONLY			65UECZR3402	06/01/2021	06/01/2022	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident) 	$1,000,000 $ $ $ $
A	UMBRELLA LIAB / OCCUR X EXCESS LIAB / X CLAIMS-MADE DED / RETENTION $			ENVX000020621	06/01/2021	06/01/2022	EACH OCCURRENCE AGGREGATE 	$6,000,000 $6,000,000 $
B	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? Y / N: N (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	N / A		65WBOL6H7Y	06/01/2021	06/01/2022	X PER STATUTE / OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	 $1,000,000 $1,000,000 $1,000,000
A	Professional Liab Each Wrongful Act Deductible			ENVP000025421	06/01/2021	06/01/2022	$2,000,000 $1,000,000 $100,000	

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

CERTIFICATE HOLDER

INSUREDS COPY

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

ATTACHMENT F

OSHA Sloping and Benching Regulations [Reserved]

ATTACHMENT G

Hazard Communication Program

2021 INTERA Corporate Health and Safety Program

Appendix 7: Hazard Communication Program

INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS

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TABLE OF CONTENTS

LIST OF ATTACHMENTS

ACKNOWLEDGMENT

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1.0 PURPOSE

The purpose of this **Hazard Communication (HazCom) Program** is to identify the procedures that are used to protect the health of employees while performing the services provided by INTERA. This Program should not be considered as encompassing of all potential hazards or of all safe practices and conditions that should be followed and maintained, but as a general guidance document providing direction in situations involving hazardous substances in the workplace. Additional safe practices and conditions that should be followed are also presented in site-specific health and safety plans and in applicable appendices to this Corporate Health and Safety Program (CHSP). This Program is an integral component of the overall INTERA CHSP. This written **Hazard Communication Program** has been developed in accordance with the requirements of **29 CFR 1910.1200**.

2.0 POLICY

This **HazCom Program** has been implemented to inform INTERA employees about hazardous substances in the workplace, the potential harmful effects of these substances, and the appropriate control measures. The management of INTERA has developed the **HazCom Program** to provide a safe workplace for its employees and subcontractors both in the office and in the field. This **HazCom Program** applies to INTERA employees and subcontractors, and follows the elements of the OSHA HAZCOM regulations found in **29 CFR 1910.1200**. The expense associated with training and recordkeeping will be borne by the company.

3.0 RESPONSIBILITY

The Chief Health and Safety Officer, **Noreen Baker**, is designated as the Program Administrator and, as such, is responsible for this Program and has the authority to make necessary decisions regarding hiring personnel and purchasing the equipment necessary to implement and operate the Program. Branch Office Health and Safety Coordinators serve as designated representatives of the Chief Health and Safety Officer, and along with the Chief Health and Safety Officer, are responsible for implementation and operation of this Program in INTERA branch offices. The Chief Health and Safety Officer will review the Program annually and will amend these instructions as necessary.

All INTERA employees will be trained to this Program. The Chief Health and Safety Officer and/or Branch Office Health and Safety Coordinators will be responsible for ensuring that employees are trained in the provisions of this Program. Details regarding employee training are provided in **Section 6.0** of this document.

All INTERA personnel have the authority to stop an activity if it is being performed in a hazardous manner. If an employee believes that he or she is being asked to perform work in an unsafe environment, that employee is authorized to decline the request. Employees are encouraged to communicate their health and safety concerns to the Chief Health and Safety Officer, Branch Office Health and Safety Coordinators, Project Managers, and/or Site Safety Officers so that changes to work procedures may be implemented where needed to reduce the potential for injuries or illnesses in the workplace. Additionally, the Chief Health and Safety Officer, Branch Office Health and Safety Coordinators, Project Managers, and/or Site Safety Officers have the authority to halt operations because of non-compliance with the provisions of this Program. It is the responsibility of the Site Safety Officer to inspect field project areas for compliance with the Program.

Specific responsibilities are detailed in the following paragraphs.

Program Administrator

The Program Administrator is responsible for administering the **HazCom Program**. Duties of the program administrator include:

- Coordinating with Project Managers, Site Safety Officers, and Branch Office Health and Safety Coordinators to keep the following up to date:

  - Container labels,
  - Workplace Safety Data Sheets (SDSs) in binders and/or online folders (i.e., SDSs for each office and for inclusion in SSHASPs for field work), and
  - Workplace hazardous chemical lists (HCLs) (i.e., HCLs for each office and site-specific HCLs for inclusion in SSHASPs);
- Review of new SDSs for pertinent health and safety information to relay to affected employees;
- Arranging for and/or conducting training;
- Coordinating the transfer of HAZCOM information between INTERA and contractor/client, as appropriate;
- Maintaining records required by the **HazCom Program**;
- Evaluating the **HazCom Program**;
- Updating the **HazCom Program**, as needed; and
- Halting any operation in the company where there is danger of serious personal injury.

The Program Administrator for INTERA is the Chief Health and Safety Officer. Certain administrative activities that are the responsibility of the Program Administrator, such as providing copies of the CHSP and the HazCom Program to new employees, may be delegated to INTERA administrative staff and/or Branch Office Health and Safety Coordinators, as appropriate.

Administrative Staff

INTERA administrative staff are responsible for providing new employees with copies of the CHSP, which includes the **Hazard Communication Program** as **Appendix 7**. The administrative staff may also be responsible for other administrative activities as delegated by the Program Administrator.

Project Managers (PM)

Project Managers are responsible for ensuring that the **HazCom Program** is implemented on their particular projects. In addition to being knowledgeable about the particular hazards associated with their project, Project Managers must also confirm that the known hazards have been addressed in the SSHASP and that the SSHASP has been provided to those working on the project so that they aware of and prepared for the hazards. Duties of the Project Manager include:

- Identifying and evaluating potential hazards for the project, including those associated with non-routine tasks;
- Ensuring that employees working on their project have received appropriate hazard communication training;
- Being aware of hazards and corresponding protective measures associated with the project and relaying those to the site safety officer (SSO) and site personnel;
- Monitoring work areas and operations, in coordination with the SSO, to identify new or changed hazards;
- Coordinating with the Program Administrator and the SSO on how to address issues that arise regarding the HazCom Program, and
- Halting any operation on their project where there is danger of serious personal injury.

Site Safety Officer

Duties of the Site Safety Officer include:

- Identifying and evaluating potential hazards for the project, including those associated with non-routine tasks;
- Identifying special precautions related to non-routine tasks and communicating to affected employees;
- Inspecting field project areas for compliance with the **HazCom Program**;
- Maintaining SDS data for individual field projects and relaying SDS locations and special information to site personnel;
- Requesting copies of hazard information from other contractors, employers, and/or the Host/Client employer on multi-employer sites and making the hazard information available to INTERA personnel as an attachment to the SSHASP;
- Provide copies of INTERA SDSs to other contractor, employers, and/or the Host/Client employer on multi-employer sites;
- Monitoring work areas and operations, in coordination with the PM, to identify new or changed hazards;
- Coordinating with the Program Administrator and the PM on how to address any issues that arise regarding the HazCom Program, and
- Halting any operation in the company where there is danger of serious personal injury.

Employees

Each employee has the responsibility to notify his/her Manager when he/she is unsure of the hazards associated with a particular project. Employees must also:

- Know the location of SDSs and have a copy of the written **HazCom Program**;
- Be able to identify the Program Administrator;
- Before entering a work area, the employee will ascertain what hazards they may be exposed to and then take appropriate action to protect themselves;
- Inform the Project Manager, their Supervisor, or Program Administrator if the actual hazards encountered are significantly different from those identified in the training and instruction received;
- Inform the Project Manager, the Site Safety Officer, or the Program Administrator if hazardous products are received without labels, damaged labels, or without SDS support documentation;
- Send appropriate SDS copies to the Site Safety Officer and Program Administrator, and
- Inform the Project Manager, their Supervisor, or the Program Administrator of any hazards that they feel are not adequately addressed in the workplace or of other concerns that they have regarding the HazCom Program.
- Reference the SDS, as necessary, when using hazardous products or working around hazardous substances.

Subcontractors

The Project Manager or SSO will provide the following information to all subcontractors:

- List of hazardous chemicals to which they may be exposed while in the workplace;

- Locations of hazardous chemicals;
- Measures to minimize the possibility of exposure;
- Location of SDSs and labeling requirements for hazardous chemicals, and
- Procedures to follow if they are exposed.

The Project Manager or SSO will expect and collect from subcontractors:

- SDS, labeling, and hazard information on hazardous chemicals brought on site, and
- Copies of subcontractor written policies and procedures for hazard communication, when appropriate.

4.0 TERMS AND DEFINITIONS

The following terms and definitions are applicable to the INTERA **HazCom Program**:

Exposure or exposed: means that an employee is subjected in the course of employment to a chemical that is a physical or health hazard, and includes potential (e.g. accidental or possible) exposure. "Subjected" in terms of health hazards includes any route of entry (e.g. inhalation, ingestion, skin contact or absorption.)

Field Activities: activities that require employees to work outside of the office environment.

Hazardous Chemical: means any chemical which is classified as a physical hazard or a health hazard, a simple asphyxiant, combustible dust, pyrophoric gas, or hazard not otherwise classified.

Hazardous Substances: means any substance defined under **29 CFR 1910.120(a)(3)**, exposure to which results or may result in adverse effects on the health or safety of an employee.

Health Hazard: means a chemical which is classified as posing one of the following hazardous effects: acute toxicity (any route of exposure); skin corrosion or irritation; serious eye damage or eye irritation; respiratory or skin sensitization; germ cell mutagenicity; carcinogenicity; reproductive toxicity; specific target organ toxicity (single or repeated exposure); or aspiration hazard. The criteria for determining whether a chemical is classified as a health hazard are detailed in **Appendix A** to **§1910.1200 - Health Hazard Criteria**.

Physical Hazard: means a chemical that is classified as posing one of the following hazardous effects: explosive; flammable (gases, aerosols, liquids, or solids); oxidizer (liquid, solid or gas); self-reactive; pyrophoric (liquid or solid); self-heating; organic peroxide; corrosive to metal; gas under pressure; or in contact with water emits flammable gas. See **Appendix B** to **§1910.1200 - Physical Hazard Criteria**.

Safety Data Sheet (SDS): means written or printed material concerning a hazardous chemical that is prepared in accordance with **29 CFR 1910.1200(g)**. The SDS is a detailed information bulletin that is prepared by the manufacturer or importer of a chemical and includes information such as hazard identification, first aid measures, fire-fighting measures, handling and storage, exposure control and personal protection, physical and chemical properties, toxicological information, and regulatory information. Prevously these data sheets were referred to as Material Safety Data Sheets (MSDSs) but these should now be replaced with SDSs.

Multi-employer Worksites: worksites where there are two or more different employers working in close proximity on the same site. These sites require the exchange of hazard information, including SDSs among the employers, as well as exchanging hazard information with the Host employer.

Office Activities: activities performed while employees are in the offices of the corporation, or its clients, subcontractors, or vendors.

5.0 HAZCOM PROGRAM ELEMENTS

5.1 CHEMICAL PURCHASE REQUIREMENTS

Hazardous chemicals/substances purchased by INTERA shall be accompanied with a vendor furnished SDS. SDSs will be kept in designated 3-ring binders as follows:

- SDS binders will contain SDSs relating to hazardous chemicals present in the office setting and to hazardous chemicals present at off-site field projects;
- SDSs will be obtained for hazardous chemicals brought to off-site field projects by INTERA, by INTERA subcontractors, or by other site personnel to which INTERA field staff may be exposed as well as for any known or suspected site contaminants.
- SDS binders will be maintained for each INTERA office, as appropriate.
- SDS binders will be stored in the main copy room/supply room in each office, in the office of the Branch Office Health and Safety Coordinator, or in the office of Chief Health and Safety Officer, whichever is most convenient.

SDS binders will serve as the source of SDSs for inclusion in Site-Specific Health and Safety Plans (SSHASPs) for specific field projects, as necessary. As a best practice, SDSs will be kept for **30 years**. Information in the SDSs along with additional exposure records for each employee will be maintained to satisfy the OSHA requirement that some record of the identity (chemical name if known) of the substance or agent, where it was used, and when it was used is retained for at least 30 years (**1910.1020(d)(1)(ii)(B)**.

INTERA employees who purchase hazardous chemicals must ensure that a current SDS is either already included in the appropriate INTERA SDS binder or that one is provided with the chemical at the time of purchase. For new hazardous chemicals, the SDS should be obtained and submitted to the Chief Health and Safety Officer or to the Branch Office Health and Safety Coordinator within ten (10) working days of the purchase.

The HazCom Program **does not** apply to consumer products such as Windex and printer toner and ink cartridges where the employer can show that the product is used in the workplace for the purpose intended by the chemical manufacturer or importer of the product and the use results in a duration and frequency of exposure which is not greater than the range of exposures that could reasonably be experience by consumers when used for the intended purpose (**29 CFR 1910.1200(b)(6)(ix)**). In addition, the HazCom Program does not appy to any drug when it is in solid, final form for direct administration to the patient (e.g., tablets or pills); drugs which are packaged by the chemical maufacturer for sale to consumers in a retail establishment (e.g., over-the-counter drugs); and drugs intended for personal consumption by employees while in the workplack (e.g., first aid supplies) (**29 CFR 1910.1200(b)(6)(vii)**).

5.2 CHEMICAL LABELING REQUIREMENTS

The INTERA employee responsible for purchasing a specific hazardous or toxic chemical will also be responsible for ensuring that all containers of the hazardous or toxic chemical entering the workplace are properly labeled. The manufacturer's original label shall include the following according to the Globally Harmonized System of Classification and Labeling of Chemicals (GHS):

1. Product identifier;
2. Signal word (either "Warning" or "Danger");
3. Standardized Hazard Statement corresponding to health, physical, and environmental hazard classes;
4. Hazard pictogram(s);

5. Precautionary statement(s), and
6. Name, address, and telephone number of chemical manufacturer, importer, or other responsible party.

Unlabeled containers are not acceptable and will not be used. Original labels shall not be defaced or removed. All labels will be legible, in English, and prominently displayed on the container. If the hazardous chemical is to be transferred to a separate container, the new container shall be properly labeled in accordance with the original label. Additional details regarding proper labeling of containers is provided in **Attachment A7-A** to this **HazCom Program** including information on labeling systems used prior to conversion to GHS.

5.3 REQUIREMENTS FOR SAFETY DATA SHEETS

Filing System:

SDSs shall be stored in loose-leaf binders that are available to employees as described above in **Section 5.1**. Each binder shall include a Hazardous Chemical List (HCL), which is an index that lists hazardous chemicals in alphabetical order by product name. SDS binders are available to employees during normal business. Site-specific SDSs must be included as an attachment to the SSHASP, and a copy of the SSHASP shall be kept in each field vehicle and in each field office where hazardous chemicals are in use in the field.

The Program Administrator will be responsible for maintaining the overall SDS system with support from Branch Office Health and Safety Coordinators, as delegated, and will review incoming data sheets for new and significant health and safety information and will make sure that the new information is provided to the affected employees. The Site Safety Officer is responsible for maintaining SDS data for individual field projects.

SDS Binders:

Each SDS Binder shall include:

- An HCL that lists hazardous chemicals in alphabetical order by product name for all SDSs in the office and for all SDSs used in field projects, as applicable, and
- A current SDS for each hazardous chemical used in the office or in the field.

NOTE: SDSs must be kept for 30 years.

SDS Contents:

According to GHS, each SDS shall include:

Section 1. Identification;

Section 2. Hazard(s) identification;

Section 3. Composition/information on ingredients;

Section 4. First-aid measures;

Section 5. Fire-fighting measures;

Section 6. Accidental release measures;

Section 7. Handling and storage;

Section 8. Exposure controls/personal protection;

Section 9. Physical and chemical properties;

Section 10. Stability and reactivity;

Section 11. Toxicological information;

Section 12. Ecological information;

Section 13. Disposal considerations;

Section 14. Transport information;

Section 15. Regulatory information; and

Section 16. Other information, including date of preparation or last revision.

5.4 NON-ROUTINE TASKS

The Project Manager, the Site Safety Officer, and/or the employee are responsible for identifying non-routine project tasks. Non-routine tasks are those that have not been described in the SSHASP and for which a Job Safety Analysis (JSA) has not yet been written. Before any non-routine task is performed, employees shall be advised of any special precautions that may be required and a JSA will be prepared to document hazards associated with the non-routine task along with corresponding hazard mitigation procedures. In the event such tasks are required, the Site Safety Officer will provide the following information about the non-routine task:

- Specific chemicals and hazards that may be encountered during conduct of the non-routine task;
- Intended/proper use of the chemical;
- Personal protective equipment (PPE) required;
- Safety measures to be taken;
- Measures that have been taken to minimize the hazards including ventilation and respirator use;
- Presence of other employees, subcontractors, and/or client/host personnel, and
- Emergency procedures.

5.5 HAZARDOUS CHEMICAL LIST

The Hazardous Chemical List or HCL is essentially an index of SDSs for all on-site hazardous chemicals, either in the office or in the field. The HCLs for each branch office are available from the respective Branch Office Health and Safety Coordinator as well as from the front of the office-specific SDS binders, which are kept in the main copy room/supply room in each office, in the office of the Branch Office Health and Safety Coordinator, or in the office of Chief Health and Safety Officer, whichever is most convenient in each office. Similarly, HCLs related to field projects can be found in Attachment H of the SSHASP for each project.

5.6 CLIENT AND MULTI-EMPLOYER SITES

In some cases, INTERA personnel may bring hazardous chemicals to a Host/Client's facility or location where INTERA is one of several employers. In these cases, INTERA shall:

- inform the Host/Client/other employers of the hazardous chemicals INTERA is bringing on site;
- provide access to the INTERA HazCom Program, appropriate SDSs and HCLs, and labeling information on the hazardous chemicals INTERA is bringing on site, and
- provide information on the precautionary measures that INTERA employees must take when working with the hazardous chemicals.

When working at a Host/Client's facility or on a multi-employer site, INTERA employees have the right to view SDSs of hazardous chemicals to which they may be exposed. The INTERA Site Safety Officer on multi-employer sites will request copies of hazard information from other employers and/or the Host/Client employer to make available as an attachment to the SSHASP.

INTERA may also opt to rely on the Host/Client's Hazard Communication Program to meet the requirements of OSHA's Hazard Communication standard. In these cases, the responsibility for hazard communication will be specified through contractual or other means.

5.7 PROCESS SAFETY MANAGEMENT OF HIGHLY HAZARDOUS CHEMICALS

Process safety management of highly hazardous chemicals is required to prevent or minimize the consequences of catastrophic releases of toxic, reactive, flammable or explosive chemicals as defined by **29 CFR 1910.119**. Process safety management of highly hazardous chemicals applies to the following:

- A process which involves a chemical at or above the specified threshold quantities listed in **Appendix A** of **29 CFR 1910.119** (Appendix A is provided as **Attachment A7-B** at the end of this Program);
- A process which involves a Category 1 flammable gas (as defined in **1910.1200(c)**) or a flammable liquid with a flashpoint below 100 °F (37.8 °C) on site in one location, in a quantity of 10,000 pounds (4535.9 kg) or more except for:
    - Hydrocarbon fuels used solely for workplace consumption as a fuel (e.g., propane used for comfort heating, gasoline for vehicle refueling), if such fuels are not a part of a process containing another highly hazardous chemical covered by this standard; or,
    - Flammable liquids with a flashpoint below 100°F (37.8°C) stored in atmospheric tanks or transferred which are kept below their normal boiling point without benefit of chilling or refrigeration.

For sites where highly hazardous chemicals are present, a written plan of action will be developed and included in the SSHASP. The written plan of action will include the elements as required by **29 CFR 1910.119(c)**, **(d)**, **(e)** and **(f)**. Employees involved in processes related to the highly hazardous chemical will be trained according to **29 CFR 1910.119(g)**. Training will be documented, as appropriate, and will be kept on file in designated corporate health and safety file cabinets and at each branch office, as appropriate.

6.0 TRAINING

Initial Training

All INTERA employees will be trained on the elements of the **HazCom Program**, their responsibilities under the Program, and on the applicable regulatory requirements. Initial training to the **HazCom Program** is accomplished through reading and acknowledgement of this Program. Each employee will receive a copy of the CHSP at commencement of employment. The Program is included in the CHSP as **Appendix 7**. Each employee is required to sign the Acknowledgment page at the back of this **HazCom Program** confirming that they have read, understood, are familiar with, and will comply with the standards that have been established in the Program. Signing of an Acknowledgement page may also be required in response to revisions to the **HazCom Program** depending on the nature of the revision. Signed acknowledgement pages will be kept on file in designated corporate health and safety file cabinets and at each branch office, as appropriate. Training records are kept for the term of employment plus 30 years.

Specific elements of HazCom Program training shall include:

- Information on any operations in the work area where hazardous chemicals are present (this information typically applies to field projects and will be discussed in applicable SSHASPs and/or during Kickoff Safety Meetings but may on occasion apply to office settings in the event that hazardous chemicals need to be stored temporarily in an office either before or after conduct of field activities; the Project Manager or SSO will inform the Branch Office Health and Safety Coordinator and/or the CHSO if this situation occurs

who will then send out a notification email to applicable office staff informing them of the presence of the hazardous chemical);

- The location and availability of the written **Hazard Communication Program** (**Appendix 7** of the CHSP, issued to all employees on commencement of work);
- The location and availability of the HCL (located at the front of each SDS binder);
- The location of the safety data sheets (SDS binders are in each INTERA office or in field trucks/field offices for field projects, as appropriate);
- Methods and observation techniques used to determine the presence or release of hazardous chemicals in the work area such as monitoring, visual appearance or odor of hazardous chemical when being released and the proper spill response (information is typically provided in SSHASPs or will be discussed in the employee notification email for hazardous chemicals that may be stored in offices);
- The physical, health hazard, simple asphyxiation, combustible dust, and pyrophoric gas hazards, as well as hazards not otherwise classified, of the hazardous chemicals in the work area (provided on SDSs, SSHASPs, or in employee notification emails, as appropriate);
- How to decrease or prevent exposure to these chemicals through the use of control/work practices and PPE (information provided in **Appendix 12** of the CHSP, SSHASPs, or in employee notification emails, as appropriate);
- Emergency procedures to follow if exposed to hazardous chemicals or if a release of hazardsous chemicals is detected (information provided in **Appendix 2** of the CHSP, SSHASPs, or in employee notification emails, as appropriate);
- Proper labeling requirements for containers (**Section 5.2**); and
- Explanation on how to read and interpret labels and SDSs (**Section 5.3**).

Additional training to the **HazCom Program** as described below is not required for employees that are not involved in projects where hazardous chemicals are present and who work in offices where hazardous chemicals are not present.

Additional training is required whenever a new chemical hazard is introduced into the work area. Employees expected to come in contact with the new health hazard (hazardous chemical) will be informed of its presence, will be instructed on its safe use, and will be trained on the hazards associated with the new hazardous chemical. Site-specific HazCom information for field projects will be included in SSHASPs, and training will be documented using the **Kickoff/Tailgate Safety Meeting Form** during conduct of each field project. The **Kickoff/Tailgate Safety Meeting Form** is provided in **Appendix 100** of the CHSP. Training for chemical hazards in an office will be included in and documented by an employee notification email whenever a new chemical hazard is introduced into the work area.

Additional chemical-specific training will be provided, as appropriate, for specific hazardous chemicals such as asbestos, lead, hydrogen sulfide, and benzene (refer to **Appendices 27 through 30** of the CHSP).

Additional training with regard to the content and use of safety data sheets is also provided to employees who conduct field activities at sites that may contain hazardous chemicals as part of their OSHA 40-hour HAZWOPER training and annual 8-hour refreshers in accordance with OSHA regulation **29 CFR 1910.120** for general site workers (refer to **Appendix 24 – Hazardous Waste Operations and Emergency Response Plan**).

HazCom training will be documented, as appropriate, and will be kept on file in designated corporate health and safety file cabinets and at each branch office, as appropriate. Training records are kept for the term of employment plus 30 years.

7.0 HAZCOM PROGRAM EVALUATION

The Program Administrator will conduct periodic evaluations of the workplace to ensure that the provisions of this **HazCom Program** are being implemented. Evaluations will include consultations with employees and their managers, site inspections, and a review of records.

Evaluation of the Program will be documented, as appropriate, and addressed by the Program Administrator. Documentation will include problems identified, if any, along with steps to be taken to correct deficiencies in the HazCom Program and target dates for the implementation of those corrections.

8.0 DOCUMENTATION AND RECORDKEEPING

A written copy of this **HazCom Program** is provided to all employees as **Appendix 7** of the CHSP, which is provided to employees upon commencement of employment and after each revision. A replacement copy of the CHSP or of the HazCom Program will be supplied to any employee upon request.

Training records will be kept on file in designated corporate health and safety file cabinets and at each branch office, as appropriate. These records will be updated as new employees are trained and as existing employees receive additional training.

9.0 MISCELLANEOUS

Non-English Speaking Employees

Care must be taken to communicate hazard information to employees who may have difficulty with hazard information written in English. INTERA does not have this issue with the current work force, but should this situation arise in the future, the anticipated remedy will be to either provide these employees with a bilingual manager to translate the English hazard information, or if possible, to obtain hazard information in an alternate language.

ATTACHMENTS

LABELING SYSTEMS

Containers of hazardous chemicals shall be properly labeled. Labels or other forms of warning must be legible, in English, and prominently displayed on the container. A proper label is one that contains the name of the product (as it appears on the Safety Data Sheet [SDS]), as well as any physical and health hazards, including target organs (e.g., lung irritant).

The manufacturer's name and address shall also be included on the label. Most INTERA operations will rely on the manufacturer's label to meet regulatory requirements. Therefore, labels that have been placed on a container by the product's manufacturer shall not be removed, defaced, or covered. If the manufacturer's label is missing, illegible, or damaged, a label providing the required information shall be affixed.

As described below, there are currently five types of labels used in industry today. The final label described, the Global Harmonization System label, should ultimately be the only label in use.

1. ***American National Standard Institute (ANSI)***: Uses mostly words to describe the hazard along with some graphics, colors and geometric shapes. The hazard level is printed in the top of the label:

   DANGER = serious hazard

   WARNING = less hazardous but still severe

   CAUTION = moderate hazard but still of concern

2. ***Department of Transportation (DOT)***: Prints the class or division of hazard on the label. The color of the label denotes a different hazard (e.g., flammable gas or liquids are red, explosives are orange, etc.). The DOT Hazard Class list is presented below:

   Class 1: Explosives

   Class 2: Gases

   Class 3: Flammable Liquids

   Class 4: Flammable Solids

   Class 5: Oxidizers and Organic Peroxides

   Class 6: Toxic Materials and Infectious Substances

   Class 7: Radioactive Materials

   Class 8: Corrosive Materials

   Class 9: Miscellaneous

3. ***National Fire Protection Agency (NFPA)***: Uses four color-coded diamonds. Each color signifies a particular hazard and a number or letter within each color diamond denotes the level of hazard. The NFPA ratings are typically skewed in favor of fire safety meaning they assign a greater risk to flammable materials and immediate risks than to long term risks.

   Blue – This diamond contains the Health hazard associated with a chemical. A number ranging from 0 to 4 denotes the level of hazard associated with the chemical, as detailed below.

   0-Normal material

   1-Slightly hazardous

   2-Hazardous

   3-Extreme danger

   4-Deadly

Red – This diamond contains the Fire hazard associated with the chemical. A number ranging from 0 to 4 denotes the flash point of the chemical, as detailed below. This is an indicator of how readily a material will burn, so the lower the flash point of a material, the easier it will burn.

0-Will not burn

1-Above 200 ºF

2-Between 200 ºF and 100 ºF

3-Below 100 ºF

4-Below 73 ºF

Yellow – This diamond contains the Reactivity hazard associated with the chemical. A number ranging from 0 to 4 denotes the reactivity of the chemical, as detailed below.

0-Stable

1-Unstable if heated

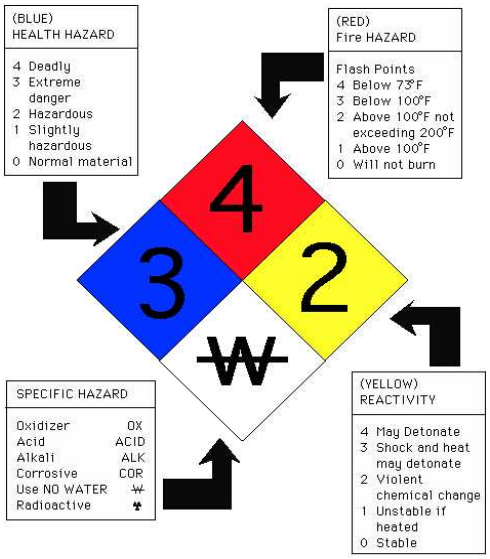
2-Violent chemical change

3-Shock or heat may detonate

4-May detonate

White – This diamond contains specific additional information about the chemical. The information may provide insight into the way a fire-fighting team approaches the chemical or how the material should be handled. A few examples of specific hazards are listed below.

OXY	Oxidizer
ACID	Acid
ALK	Alkali
COR	Corrosive
☢	Radioactive
W	Use NO WATER



The NFPA classification is illustrated in this diagram:

4. ***Hazardous Materials Identification System (HMIS)***: This system uses a color and numbering system similar to the NFPA, but as shown in the figure below, uses a table instead of a diamond. This system also provides a section with a personal protection code in order to assist personnel with choosing the correct level of protective gear.

5. ***Global Harmonization System (GHS)***: GHS labels include: a product identifier; a signal word (either Category 1 “Warning” or Category 2 “Danger”); standardized hazard statements corresponding to health, physical, and environmental hazard classes; hazard symbols/hazard pictograms; precautionary statements, and the name, address, and telephone number of the chemical manufacturer, importer, or other responsible party. The GHS hazard pictograms, along with their names and associated hazards are indicated below. Pictograms are on a white background with a red diamond.

 Exploding bomb	**Usage** • Unstable explosives • Self-reactive substances and mixtures • Organic peroxides
 Flame	**Usage** • Flammable gases • Flammable aerosols • Flammable liquids • Flammable solids • Self-reactive substances and mixtures • Pyrophoric liquids, category 1 • Pyrophoric solids, category 1 • Self-heating substances and mixtures • Substances and mixtures, which in contact with water, emit flammable gases • Organic peroxides
 Flame over circle	**Usage** • Oxidizing gases • Oxidizing liquids • Oxidizing solids
 Gas cylinder	**Usage** • Compressed gases • Liquefied gases • Refrigerated liquefied gases • Dissolved gases

 Corrosion	**Usage** • Corrosive to metal • Skin corrosion • Serious Eye Damage
 Skull and crossbones	**Usage** • Acute toxicity (severe)
 Exclamation mark	**Usage** • Acute toxicity (harmful) • Skin irritation • Eye irritation • Skin sensitization • Respiratory tract irritation • Narcotic effects
 Health hazard	**Usage** • Respiratory sensitization • Mutagen • Carcinogen • Reproductive toxicity • Target organ toxicity • Aspiration hazard
 Environment	**Usage** • Acute hazards to the aquatic environment • Chronic hazards to the aquatic environment

29 CFR 1910.119 APPENDIX A

This Appendix contains a listing of toxic and reactive highly hazardous chemicals which present a potential for a catastrophic event at or above the threshold quantity.

CHEMICALNAME	CAS*	TQ**
Acetaldehyde	75-07-0	2500
Acrolein (2-Popenal)	107-02-8	150
Acrylyl Chlorde	814-68-6	250
Allyl Chlorid	107-05-1	1000
Allylamine	107-11-9	1000
Alkylaluminum	Varies	5000
Ammonia, Anhydrous	7664-41-7	10000
Ammonia solutions (greater than 44% ammonia by weight)	7664-41-7	15000
AmmoniumP erchlorate	7790-98-9	7500
Ammonium Permanganate	7787-36-2	7500
Arsine (also called Arsenic Hydride)	7784-42-1	100
Bis (Chloromethyl) Ether	542-88-1	100
Boron Trichloride	10294-34-5	2500
Boron Trifluoride	7637-07-2	250
Bromine	7726-95-6	1500
Bromine Chloride	13863-41-7	1500
Bromine Pentafluoride	7789-30-2	2500
Bromine Trifluoride	7787-71-5	15000
3-Bromopropyne (also calledPropargylBromide)	106-96-7	100
Butyl Hydroperoxide (Tertiary)	75-91-2	5000
Butyl Perbenzoate (Tertiary)	614-45-9	7500
Carbonyl Chloride (see Phosgene)	75-44-5	100
Carbonyl Fluoride	353-50-4	2500
Cellulose Nitrate(concentration greater than 12.6% nitrogen	9004-70-0	2500
Chlorine	7782-50-5	1500
Chlorine Dioxide	10049-04-4	1000
Chlorine Pentrafluoride	13637-63-3	1000
Chlorine Trifluoride	7790-91-2	1000
Chlorodiethylaluminum (also called Diethylaluminum Chloride)	96-10-6	5000
1-Chloro-2, 4-Dinitrobenzene	97-00-7	5000
Chloromethyl Methyl Ether	107-30-2	500
Chloropicrin	76-06-2	500
Chloropicrin and Methyl Bromide mixture	None	1500
Chloropicrin and Methyl Chloride mixture	None	1500
Cumene Hydroperoxide	80-15-9	5000
Cyanogen	460-19-5	2500
Cyanogen Chloride	506-77-4	500
Cyanuric Fluoride	675-14-9	100
Diacetyl Peroxide (concentration greater than 70%)	110-22-5	5000
Diazomethane	334-88-3	500
Dibenzoyl Peroxide	94-36-0	7500
Diborane	19287-45-7	100
Dibutyl Peroxide (Tertiary)	110-05-4	5000
Dichloro Acetylene	7572-29-4	250
Dichlorosilane	4109-96-0	2500
Diethylzinc	557-20-0	10000
Diisopropyl Peroxydicarbonate	105-64-6	7500
Dilauroyl Peroxide	105-74-8	7500
Dimethyldichlorosilane	75-78-5	1000
Dimethylhydrazine,1,1-	57-14-7	1000
Dimethylamine, Anhydrous	124-40-3	2500

CHEMICALNAME	CAS*	TQ**
2,4-Dinitroaniline	97-02-9	5000
Ethyl Methyl Ketone Peroxide (also Methyl Ethyl Ketone Peroxide; concentration greater than 60%)	1338-23-4	5000
Ethyl Nitrite	109-95-5	5000
Ethylamine	75-04-7	7500
Ethylene Fluorohydrin	371-62-0	100
Ethylene Oxide	75-21-8	5000
Ethyleneimine	151-56-4	1000
Fluorine	7782-41-4	1000
Formaldehyde (Formalin)	50-00-0	1000
Furan	110-00-9	500
Hexafluoroacetone	684-16-2	5000
HydrochloricAcid, Anhydrous	7647-01-0	5000
HydrofluoricAcid, Anhydrous	7664-39-3	1000
Hydrogen Bromide	10035-10-6	5000
Hydrogen Chloride	7647-01-0	5000
Hydrogen Cyanide, Anhydrous	74-90-8	1000
Hydrogen Fluoride	7664-39-3	1000
Hydrogen Peroxide (52% by weight or greater)	7722-84-1	7500
Hydrogen Selenide	7783-07-5	150
Hydrogen Sulfide	7783-06-4	1500
Hydroxylamine	7803-49-8	2500
Iron, Pentacarbonyl	13463-40-6	250
Isopropylamine	75-31-0	5000
Ketene	463-51-4	100
Methacrylaldehyde	78-85-3	1000
Methacryloyl Chloride	920-46-7	150
Methacryloyloxyethyl Isocyanate	30674-80-7	100
Methyl Acrylonitrile	126-98-7	250
Methylamine, Anhydrous	74-89-5	1000
Methyl Bromide	74-83-9	2500
Methyl Chloride	74-87-3	15000
Methyl Chloroformate	79-22-1	500
Methyl Ethyl Ketone Peroxide (concentration greater than 60%)	1338-23-4	5000
Methyl Fluoroacetate	453-18-9	100
Methyl Fluorosulfate	421-20-5	100
Methyl Hydrazine	60-34-4	100
Methyl Iodide	74-88-4	7500
Methyl Isocyanate	624-83-9	250
Methyl Mercaptan	74-93-1	5000
Methyl Vinyl Ketone	79-84-4	100
Methyltrichlorosilane	75-79-6	500
Nickel Carbonly (Nickel Tetracarbonyl)	13463-39-3	150
Nitric Acid (94.5% by weight or greater)	7697-37-2	500
Nitric Oxide	10102-43-9	250
Nitroaniline (para Nitroaniline)	100-01-6	5000
Nitromethane	75-52-5	2500
Nitrogen Dioxide	10102-44-0	250
Nitrogen Oxides (NO; NO(2); N2O4; N2O3)	10102-44-0	250
Nitrogen Tetroxide (also called Nitrogen Peroxide)	10544-72-6	250
Nitrogen Trifluoride	7783-54-2	5000
Nitrogen Trioxide	10544-73-7	250
Oleum (65% to 80% by weight; also called Fuming Sulfuric Acid)	8014-95-7	1000
Osmium Tetroxide	20816-12-0	100
Oxygen Difluoride (Fluorine Monoxide)	7783-41-7	100
Ozone	10028-15-6	100
Pentaborane	19624-22-7	100
Peracetic Acid (concentration greater 60% Acetic Acid; also called Peroxyacetic Acid)	79-21-0	1000

CHEMICALNAME	CAS*	TQ**
Perchloric Acid (concentration greater than 60% by weight)	7601-90-3	5000
Perchloromethyl Mercaptan	594-42-3	150
Perchloryl Fluoride	7616-94-6	5000
Peroxyacetic Acid (concentration greater than 60% Acetic Acid; also called Peracetic Acid)	79-21-0	1000
Phosgene (also called Carbonyl Chloride)	75-44-5	100
Phosphine (Hydrogen Phosphide)	7803-51-2	100
Phosphorus Oxychloride (also called Phosphoryl Chloride)	10025-87-3	1000
Phosphorus Trichloride	7719-12-2	1000
Phosphoryl Chloride (also called Phosphorus Oxychloride)	10025-87-3	1000
Propargyl Bromide	106-96-7	100
Propyl Nitrate	627-3-4	2500
Sarin	107-44-8	100
Selenium Hexafluoride	7783-79-1	1000
Stibine (Antimony Hydride)	7803-52-3	500
Sulfur Dioxide (liquid)	7446-09-5	1000
Sulfur Pentafluoride	5714-22-7	250
Sulfur Tetrafluoride	7783-60-0	250
Sulfur Trioxide (also called Sulfuric Anhydride)	7446-11-9	1000
Sulfuric Anhydride (also called Sulfur Trioxide)	7446-11-9	1000
Tellurium Hexafluoride	7783-80-4	250
Tetrafluoroethylene	116-14-3	5000
Tetrafluorohydrazine	10036-47-2	5000
Tetramethyl Lead	75-74-1	1000
Thionyl Chloride	7719-09-7	250
Trichloro (chloromethyl) Silane	1558-25-4	100
Trichloro (dichlorophenyl) Silane	27137-85-5	2500
Trichlorosilane	10025-78-2	5000
Trifluorochloroethylene	79-38-9	10000
Trimethyoxysilane	2487-90-3	1500

Footnote* Chemical Abstract Service Number
Footnote** Threshold Quantity in Pounds (Amount necessary to be covered by this standard.)

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ACKNOWLEDGMENT

I acknowledge that I have been trained to the **INTERA Hazard Communication Program** and all the associated forms and attachments, as applicable. I know where the Program is on the INTERA Intranet, and have saved a copy for myself, if desired. I have had the opportunity to review the Program and ask questions. I understand that it is my responsibility to read, understand, become familiar with, and comply with the standards that have been established. I further understand that INTERA reserves the right to modify, supplement, rescind, or revise provisions of this Program as regulatory or other requirements change, and that I will be provided with the new version.

Employee Name	Employee Signature	Date

This training was administered by INTERA's Chief Health and Safety Officer: ____Noreen A. Baker, P.G.____

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ATTACHMENT H

Hazardous Chemical List and Safety Data Sheets

HAZARDOUS CHEMICAL LIST

Project Name & Task: Kirtland Airforce Base Bulk Fuel Facility Water Authority Data Gap Well

SSHASP Date: November 2021 Project Number: ABWA.C009.KAFB

Chemical Name	Manufacturer Name	Location
Ethylene Dibromide (EDB)		
ph7		
ph4		
ph10		
ORP		
Conductivity Standard		
HCl (6-10%)		
Liquinox		
Sample Preservatives		

SAFETY DATA SHEET

Revision Date 23-Jan-2018 **Revision Number** 4

1. Identification

Product Name **1,2-Dibromoethane**

Cat No. : **AC112790000; AC112790010; AC112790025; AC112790100; AC112790250; AC112795000**

CAS-No 106-93-4
Synonyms EDB; Ethylene dibromide

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

Company

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

Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

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

2. Hazard(s) identification

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

Acute oral toxicity	Category 3
Acute dermal toxicity	Category 3
Skin Corrosion/Irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2
Carcinogenicity	Category 1B
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Respiratory system.	

Label Elements

Signal Word
Danger

Hazard Statements

Causes skin irritation
Causes serious eye irritation
May cause respiratory irritation
May cause cancer
Toxic if swallowed or in contact with skin

Precautionary Statements
Prevention
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Wear eye/face protection
Avoid breathing dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Response
IF exposed or concerned: Get medical attention/advice
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Skin
IF ON SKIN: Wash with plenty of soap and water
Call a POISON CENTER or doctor/physician if you feel unwell
Remove/Take off immediately all contaminated clothing
Wash contaminated clothing before reuse
If skin irritation occurs: Get medical advice/attention
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
If eye irritation persists: Get medical advice/attention
Ingestion
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician
Rinse mouth
Storage
Store locked up
Store in a well-ventilated place. Keep container tightly closed
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
Toxic to aquatic life with long lasting effects
WARNING. Cancer and Reproductive Harm - https://www.p65warnings.ca.gov/.

3. Composition/Information on Ingredients

Component	CAS-No	Weight %
Ethylene dibromide (1,2-Dibromoethane)	106-93-4	99

4. First-aid measures

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

Skin Contact	Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. Immediate medical attention is required.
Inhalation	Remove from exposure, lie down. Remove to fresh air. If not breathing, give artificial respiration. Immediate medical attention is required.
Ingestion	Call a physician immediately. Clean mouth with water.
Most important symptoms and effects	Difficulty in breathing. Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting
Notes to Physician	Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media	Water spray. Carbon dioxide (CO_2). Dry chemical. Chemical foam.
Unsuitable Extinguishing Media	No information available
Flash Point	> 104 °C / > 219.2 °F
Method -	No information available
Autoignition Temperature	No information available
Explosion Limits	
Upper	No data available
Lower	No data available
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical
Keep product and empty container away from heat and sources of ignition.

Hazardous Combustion Products
Carbon monoxide (CO). Carbon dioxide (CO_2). Hydrogen halides.
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	Ensure adequate ventilation. Use personal protective equipment as required.
Environmental Precautions	Do not flush into surface water or sanitary sewer system.
Methods for Containment and Clean Up	Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). Keep in suitable, closed containers for disposal.

7. Handling and storage

Handling	Do not breathe mist/vapors/spray. Do not get in eyes, on skin, or on clothing. Handle product only in closed system or provide appropriate exhaust ventilation.
Storage	Keep in a dry, cool and well-ventilated place. Refer product specification and/or product label for specific storage temperature requirement. Keep container tightly closed. Protect from direct sunlight. Do not store in metal containers.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Ethylene dibromide (1,2-Dibromoethane)	Skin	(Vacated) TWA: 20 ppm Ceiling: 30 ppm (Vacated) STEL: 50 ppm (Vacated) Ceiling: 100 ppm TWA: 20 ppm	IDLH: 100 ppm TWA: 0.045 ppm Ceiling: 0.13 ppm	

Legend

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

Engineering Measures Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

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

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

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

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

9. Physical and chemical properties

Physical State	Liquid
Appearance	Colorless
Odor	sweet
Odor Threshold	No information available
pH	No information available
Melting Point/Range	9 - 10 °C / 48.2 - 50 °F
Boiling Point/Range	131 - 132 °C / 267.8 - 269.6 °F
Flash Point	> 104 °C / > 219.2 °F
Evaporation Rate	No information available
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	11 mmHg @ 25 °C
Vapor Density	6.5 (Air = 1.0)
Specific Gravity	2.173
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	> 340°C
Viscosity	No information available
Molecular Formula	C2 H4 Br2
Molecular Weight	187.86

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Decomposes in contact with water. heat sensitive. Light sensitive. Decomposes on exposure to light.

Conditions to Avoid Exposure to light. Incompatible products. Exposure to moisture.

Incompatible Materials Strong bases, Ammonia, Metals

Hazardous Decomposition Products Carbon monoxide (CO), Carbon dioxide (CO_2), Hydrogen halides

Hazardous Polymerization No information available.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Ethylene dibromide (1,2-Dibromoethane)	LD50 = 117 mg/kg (Rat)	LD50 = 300 mg/kg (Rabbit)	LC50 = 3.08 mg/L (Rat) 2 h

Toxicologically Synergistic Products No information available

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

Irritation No information available

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
Ethylene dibromide (1,2-Dibromoethane)	106-93-4	Group 2A	Reasonably Anticipated	A3	X	A3

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Respiratory system

STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting

Endocrine Disruptor Information

Component	EU - Endocrine Disrupters Candidate List	EU - Endocrine Disruptors - Evaluated Substances	Japan - Endocrine Disruptor Information
Ethylene dibromide (1,2-Dibromoethane)	Group III Chemical	Not applicable	Not applicable

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

12. Ecological information

Ecotoxicity

The product contains following substances which are hazardous for the environment. Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Ethylene dibromide (1,2-Dibromoethane)	Not listed	LC50: = 18 mg/L, 48h (Lepomis macrochirus) LC50: 27.6 - 37.4 mg/L, 96h flow-through (Oryzias latipes)	EC50 = 735 mg/L 5 min	Not listed

Persistence and Degradability Persistence is unlikely

Bioaccumulation/ Accumulation No information available.

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

Component	log Pow
Ethylene dibromide (1,2-Dibromoethane)	1.93

13. Disposal considerations

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

Component	RCRA - U Series Wastes	RCRA - P Series Wastes
Ethylene dibromide (1,2-Dibromoethane) - 106-93-4	U067	-

14. Transport information

DOT

UN-No UN1605
Proper Shipping Name ETHYLENE DIBROMIDE
Hazard Class 6.1
Packing Group I

TDG

UN-No UN1605
Proper Shipping Name ETHYLENE DIBROMIDE
Hazard Class 6.1
Packing Group I

IATA

UN-No UN1605
Proper Shipping Name ETHYLENE DIBROMIDE, FORBIDDEN FOR IATA TRANSPORT
Hazard Class 6.1
Packing Group I

IMDG/IMO

UN-No UN1605
Proper Shipping Name ETHYLENE DIBROMIDE
Hazard Class 6.1
Packing Group I

15. Regulatory information

United States of America Inventory

Component	CAS-No	TSCA	TSCA Inventory notification - Active/Inactive	TSCA - EPA Regulatory Flags
Ethylene dibromide (1,2-Dibromoethane)	106-93-4	X	ACTIVE	-

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

TSCA 12(b) - Notices of Export Not applicable

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

Component	CAS-No	DSL	NDSL	EINECS	PICCS	ENCS	AICS	IECSC	KECL
Ethylene dibromide (1,2-Dibromoethane)	106-93-4	X	-	203-444-5	X	X	X	X	KE-05-0447

U.S. Federal Regulations

SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Ethylene dibromide (1,2-Dibromoethane)	106-93-4	99	0.1

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

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Ethylene dibromide (1,2-Dibromoethane)	X	1 lb	-	-

Clean Air Act

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Ethylene dibromide (1,2-Dibromoethane)	X		-

OSHA - Occupational Safety and Health Administration Not applicable

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

Component	Hazardous Substances RQs	CERCLA EHS RQs
Ethylene dibromide (1,2-Dibromoethane)	1 lb	-

California Proposition 65 This product contains the following Proposition 65 chemicals.

Component	CAS-No	California Prop. 65	Prop 65 NSRL	Category
Ethylene dibromide (1,2-Dibromoethane)	106-93-4	Carcinogen Developmental Male Reproductive	0.2 µg/day 3 µg/day	Developmental Carcinogen

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Ethylene dibromide (1,2-Dibromoethane)	X	X	X	X	X

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

DOT Severe Marine Pollutant	N
U.S. Department of Homeland Security	This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade	No information available

16. Other information

Prepared By	Regulatory Affairs Thermo Fisher Scientific Email: EMSDS.RA@thermofisher.com
Revision Date	23-Jan-2018
Print Date	23-Jan-2018
Revision Summary	This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer

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

End of SDS

SAFETY DATA SHEET

pH7 Natural All Purpose Cleaner

Section 1. Identification

GHS product identifier : pH7 Natural All Purpose Cleaner

Product code : 138

Other means of identification : Not available.

Product type : Liquid.

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

Identified uses
General/Multi-Purpose Cleaner

Uses advised against	Reason
For Industrial and Institutional Use Only	-

Supplier's details : Betco Corporation
400 Van Camp Road
Bowling Green, Ohio 43402
www.betco.com
888-462-3826

Emergency telephone number (with hours of operation) : Chemtrec (800) 424-9300 24 hour

Section 2. Hazards identification

OSHA/HCS status : While this material is not considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200), this SDS contains valuable information critical to the safe handling and proper use of the product. This SDS should be retained and available for employees and other users of this product.

Classification of the substance or mixture : Not classified.

GHS label elements

Signal word : No signal word.

Hazard statements : No known significant effects or critical hazards.

Precautionary statements

Prevention : Not applicable.

Response : Not applicable.

Storage : Not applicable.

Disposal : Not applicable.

Hazards not otherwise classified : None known.

Section 3. Composition/information on ingredients

Substance/mixture : Mixture

Other means of identification : Not available.

Section 3. Composition/information on ingredients

Ingredient name	%	CAS number
Alcohols, C9-11, ethoxylated	≤3	68439-46-3

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Get medical attention if irritation occurs.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if symptoms occur.

Skin contact : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.

Ingestion : Wash out mouth with water. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Do not induce vomiting unless directed to do so by medical personnel. Get medical attention if symptoms occur.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : No known significant effects or critical hazards.

Inhalation : No known significant effects or critical hazards.

Skin contact : No known significant effects or critical hazards.

Ingestion : No known significant effects or critical hazards.

Over-exposure signs/symptoms

Eye contact : No specific data.

Inhalation : No specific data.

Skin contact : No specific data.

Ingestion : No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Specific treatments : No specific treatment.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media : None known.

Specific hazards arising from the chemical : In a fire or if heated, a pressure increase will occur and the container may burst.

Section 5. Fire-fighting measures

Hazardous thermal decomposition products : No specific data.

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

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

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Put on appropriate personal protective equipment.

For emergency responders : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

Large spill : Stop leak if without risk. Move containers from spill area. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8).

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
Alcohols, C9-11, ethoxylated	None.

Appropriate engineering controls : Good general ventilation should be sufficient to control worker exposure to airborne contaminants.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

Skin protection

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

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

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use.

Section 9. Physical and chemical properties

Appearance

Physical state : Liquid.

Color : Yellowish.-Green. Clear.

Odor : Lemon-like.

Odor threshold : Not available.

pH : 6.5 to 8.5

Melting point : Not available.

Boiling point : Not available.

Flash point : Closed cup: >150°C (>302°F)

Evaporation rate : Not available.

Flammability (solid, gas) : Not available.

Lower and upper explosive (flammable) limits : Not available.

Vapor pressure : Not available.

Section 9. Physical and chemical properties

Vapor density : Not available.

Relative density : 1.0033

Solubility : Easily soluble in the following materials: cold water and hot water.

Solubility in water : Not available.

Partition coefficient: n-octanol/water : Not available.

Auto-ignition temperature : Not available.

Decomposition temperature : Not available.

Viscosity : Not available.

Flow time (ISO 2431) : Not available.

Section 10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid : No specific data.

Incompatible materials : Not available.

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Alcohols, C9-11, ethoxylated	LD50 Oral	Rat	1378 mg/kg	-

Irritation/Corrosion

Not available.

Sensitization

Not available.

Mutagenicity

Not available.

Carcinogenicity

Not available.

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Not available.

Section 11. Toxicological information

Aspiration hazard

Not available.

Information on the likely routes of exposure : Routes of entry anticipated: Oral, Dermal.
Routes of entry not anticipated: Inhalation.

Potential acute health effects

Eye contact : No known significant effects or critical hazards.

Inhalation : No known significant effects or critical hazards.

Skin contact : No known significant effects or critical hazards.

Ingestion : No known significant effects or critical hazards.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : No specific data.

Inhalation : No specific data.

Skin contact : No specific data.

Ingestion : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

Not available.

General : No known significant effects or critical hazards.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

Product/ingredient name	Result	Species	Exposure
Alcohols, C9-11, ethoxylated	Acute EC50 5.36 mg/l Fresh water	Crustaceans - Ceriodaphnia dubia - Neonate	48 hours
	Acute EC50 2686 µg/l Fresh water	Daphnia - Daphnia magna - Neonate	48 hours
	Acute LC50 8500 µg/l Fresh water	Fish - Pimephales promelas	96 hours

Section 12. Ecological information

Persistence and degradability

Not available.

Bioaccumulative potential

Not available.

Mobility in soil

Soil/water partition coefficient (K_{OC}) : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transport information

	DOT Classification	TDG Classification	Mexico Classification	ADR/RID	IMDG	IATA
UN number	Not regulated.	Not regulated.	Not regulated.	Not regulated.	Not regulated.	Not regulated.
UN proper shipping name	-	-	-	-	-	-
Transport hazard class(es)	-	-	-	-	-	-
Packing group	-	-	-	-	-	-
Environmental hazards	No.	No.	No.	No.	No.	No.

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to Annex II of MARPOL and the IBC Code : Not available.

Section 15. Regulatory information

U.S. Federal regulations : **TSCA 4(a) proposed test rules**: Quaternary ammonium compounds, benzyl-C12-16-alkyldimethyl, chlorides

TSCA 5(a)2 proposed significant new use rules: 5-chloro-2-methyl-2H-isothiazol-3-one

TSCA 8(a) PAIR: citronellal

TSCA 8(a) CDR Exempt/Partial exemption: Not determined

Clean Water Act (CWA) 307: diethyl phthalate

Clean Water Act (CWA) 311: sodium hydroxide; Formaldehyde, solution

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

Name	%	EHS	SARA 302 TPQ		SARA 304 RQ	
			(lbs)	(gallons)	(lbs)	(gallons)
formaldehyde	<0.1	Yes.	500	73.9	100	14.8

SARA 304 RQ : 500000000 lbs / 227000000 kg [59769815.4 gal / 226253363.9 L]

SARA 311/312

Classification : Not applicable.

Composition/information on ingredients

Name	%	Classification
Alcohols, C9-11, ethoxylated	≤3	EYE IRRITATION - Category 2A

State regulations

Massachusetts : None of the components are listed.

New York : None of the components are listed.

New Jersey : None of the components are listed.

Pennsylvania : None of the components are listed.

California Prop. 65

This product does not require a Safe Harbor warning under California Prop. 65.

International regulations

Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

Montreal Protocol

Not listed.

Stockholm Convention on Persistent Organic Pollutants

Not listed.

Rotterdam Convention on Prior Informed Consent (PIC)

Section 15. Regulatory information

Not listed.

UNECE Aarhus Protocol on POPs and Heavy Metals

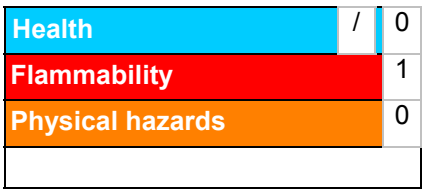
Not listed.

Inventory list

Australia	:	Not determined.
Canada	:	Not determined.
China	:	Not determined.
Europe	:	At least one component is not listed.
Japan	:	**Japan inventory (ENCS)**: Not determined. **Japan inventory (ISHL)**: Not determined.
Malaysia	:	Not determined
New Zealand	:	Not determined.
Philippines	:	Not determined.
Republic of Korea	:	Not determined.
Taiwan	:	Not determined.
Thailand	:	Not determined.
Turkey	:	Not determined.
United States	:	All components are listed or exempted.
Viet Nam	:	Not determined.

Section 16. Other information

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



Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings and the associated label are not required on SDSs or products leaving a facility under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered trademark and service mark of the American Coatings Association, Inc.

The customer is responsible for determining the PPE code for this material. For more information on HMIS® Personal Protective Equipment (PPE) codes, consult the HMIS® Implementation Manual.

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

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Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

Procedure used to derive the classification

Section 16. Other information

Classification	Justification
Not classified.	

History

Date of printing : 5/29/2020

Date of issue/Date of revision : 5/29/2020

Date of previous issue : No previous validation

Version : 1

Key to abbreviations : ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
UN = United Nations

References : Not available.

Indicates information that has changed from previously issued version.

Notice to reader

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

Buffer Solution pH 4.00

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Date of issue: 07/19/2013 Revision date: 12/21/2016 Supersedes: 08/06/2014 Version: 1.3

SECTION 1: Identification

1.1. Identification

Product form : Mixture

Product name : Buffer Solution pH 4.00

Product code : LC12270

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

Use of the substance/mixture : For laboratory and manufacturing use only.

Recommended use : Laboratory chemicals

Restrictions on use : Not for food, drug or household use

1.3. Details of the supplier of the safety data sheet

LabChem Inc
Jackson's Pointe Commerce Park Building 1000, 1010 Jackson's Pointe Court
Zelienople, PA 16063 - USA
T 412-826-5230 - F 724-473-0647
info@labchem.com - www.labchem.com

1.4. Emergency telephone number

Emergency number : CHEMTREC: 1-800-424-9300 or 011-703-527-3887

SECTION 2: Hazard(s) identification

2.1. Classification of the substance or mixture

GHS-US classification

Not classified

2.2. Label elements

Not classified as a hazardous chemical.

2.3. Other hazards

Other hazards not contributing to the classification : None.

2.4. Unknown acute toxicity (GHS US)

Not applicable

SECTION 3: Composition/Information on ingredients

3.1. Substance

Not applicable

3.2. Mixture

Name	Product identifier	%	GHS-US classification
Water	(CAS No) 7732-18-5	98.94	Not classified
Potassium Hydrogen Phthalate	(CAS No) 877-24-7	1.02	Eye Irrit. 2B, H320
Formaldehyde, 37% w/w	(CAS No) 50-00-0	0.04	Flam. Liq. 3, H226 Acute Tox. 4 (Oral), H302 Acute Tox. 4 (Dermal), H312 Acute Tox. 2 (Inhalation:vapour), H330 Skin Corr. 1C, H314 Eye Dam. 1, H318 Carc. 1A, H350 STOT SE 1, H370 Aquatic Acute 2, H401

Full text of hazard classes and H-statements : see section 16

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures general : Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible).

First-aid measures after inhalation : Allow victim to breathe fresh air. Allow the victim to rest.

First-aid measures after skin contact : Remove affected clothing and wash all exposed skin area with mild soap and water, followed by warm water rinse.

First-aid measures after eye contact : Rinse immediately with plenty of water. Obtain medical attention if pain, blinking or redness persist.

First-aid measures after ingestion : Rinse mouth. Do NOT induce vomiting. Obtain emergency medical attention.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/injuries : Not expected to present a significant hazard under anticipated conditions of normal use.

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

No additional information available

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Foam. Dry powder. Carbon dioxide. Water spray. Sand.

Unsuitable extinguishing media : Do not use a heavy water stream.

5.2. Special hazards arising from the substance or mixture

Reactivity : None.

5.3. Advice for firefighters

Firefighting instructions : Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire. Prevent fire-fighting water from entering environment.

Protection during firefighting : Do not enter fire area without proper protective equipment, including respiratory protection.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel

Protective equipment : Safety glasses.

Emergency procedures : Evacuate unnecessary personnel.

6.1.2. For emergency responders

Protective equipment : Equip cleanup crew with proper protection.

Emergency procedures : Ventilate area.

6.2. Environmental precautions

Prevent entry to sewers and public waters. Notify authorities if liquid enters sewers or public waters.

6.3. Methods and material for containment and cleaning up

Methods for cleaning up : Soak up spills with inert solids, such as clay or diatomaceous earth as soon as possible. Collect spillage. Store away from other materials.

6.4. Reference to other sections

See Heading 8. Exposure controls and personal protection.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Provide good ventilation in process area to prevent formation of vapor.

Hygiene measures : Do not eat, drink or smoke when using this product.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Keep container closed when not in use.

Incompatible products : Strong oxidizers.

Incompatible materials : None known.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Potassium Hydrogen Phthalate (877-24-7)
Not applicable

Formaldehyde, 37% w/w (50-00-0)		
ACGIH	ACGIH Ceiling (mg/m³)	0.37 mg/m³
OSHA	OSHA PEL (TWA) (ppm)	0.75 ppm
OSHA	OSHA PEL (STEL) (ppm)	2 ppm
IDLH	US IDLH (ppm)	20 ppm
NIOSH	NIOSH REL (TWA) (ppm)	0.016 ppm
NIOSH	NIOSH REL (ceiling) (ppm)	0.1 ppm 15 min.

Water (7732-18-5)
Not applicable

8.2. Exposure controls

Appropriate engineering controls : Emergency eye wash fountains should be available in the immediate vicinity of any potential exposure.

Personal protective equipment : Safety glasses. Gloves.

Hand protection : Wear protective gloves.

Eye protection : Chemical goggles or safety glasses.

Respiratory protection : Respiratory protection not required in normal conditions.

Other information : Do not eat, drink or smoke during use.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state : Liquid

Color : Colorless

Odor : Odorless

Odor threshold : No data available

pH : 4

Melting point : No data available

Freezing point : No data available

Boiling point : No data available

Flash point : No data available

Relative evaporation rate (butyl acetate=1) : No data available

Flammability (solid, gas) : Non flammable.

Vapor pressure : No data available

Relative vapor density at 20 °C : No data available

Relative density : No data available

Specific gravity / density : 1

Solubility : Soluble in water.

Log Pow : No data available

Auto-ignition temperature : No data available

Decomposition temperature : No data available

Viscosity, kinematic : No data available

Viscosity, dynamic : No data available

Explosion limits : No data available

Explosive properties : Not applicable.

Oxidizing properties : None.

9.2. Other information

No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity

None.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

None.

10.4. Conditions to avoid

Extremely high or low temperatures.

10.5. Incompatible materials

Strong oxidizers.

10.6. Hazardous decomposition products

Formaldehyde. Carbon monoxide. Carbon dioxide.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Likely routes of exposure : Skin and eye contact

Acute toxicity : Not classified

Potassium Hydrogen Phthalate (877-24-7)	
LD50 oral rat	≥ 3200 mg/kg
ATE US (oral)	3200.000 mg/kg body weight

Formaldehyde, 37% w/w (50-00-0)	
LD50 oral rat	500 mg/kg
ATE US (oral)	500.000 mg/kg body weight
ATE US (dermal)	2000.000 mg/kg body weight
ATE US (vapors)	0.578 mg/l/4h

Water (7732-18-5)	
LD50 oral rat	≥ 90000 mg/kg
ATE US (oral)	90000.000 mg/kg body weight

Skin corrosion/irritation : Not classified
pH: 4

Serious eye damage/irritation : Not classified
pH: 4

Respiratory or skin sensitization : Not classified

Germ cell mutagenicity : Not classified

Carcinogenicity : Not classified

Formaldehyde, 37% w/w (50-00-0)	
IARC group	1 - Carcinogenic to humans

Reproductive toxicity : Not classified

Specific target organ toxicity (single exposure) : Not classified

Specific target organ toxicity (repeated exposure) : Not classified

Aspiration hazard : Not classified

Potential Adverse human health effects and symptoms : Based on available data, the classification criteria are not met.

SECTION 12: Ecological information

12.1. Toxicity

Formaldehyde, 37% w/w (50-00-0)	
LC50 fish 1	41 mg/l (LC50; 96 h)
EC50 Daphnia 1	14.7 mg/l (EC50; 24 h)
EC50 Daphnia 2	2 mg/l
Threshold limit algae 1	2.5 mg/l (EC0; 192 h)

12.2. Persistence and degradability

Buffer Solution pH 4.00	
Persistence and degradability	Not established.

Potassium Hydrogen Phthalate (877-24-7)	
Persistence and degradability	Not established.

Formaldehyde, 37% w/w (50-00-0)	
Persistence and degradability	Readily biodegradable in water. Biodegradability in soil: no data available. No test data on mobility of the components available. Photodegradation in the air.
Biochemical oxygen demand (BOD)	0.64 g O_2/g substance
Chemical oxygen demand (COD)	1.06 g O_2/g substance
ThOD	1.068 g O_2/g substance
BOD (% of ThOD)	0.6 (5 days; Literature study)

Water (7732-18-5)	
Persistence and degradability	Not established.

12.3. Bioaccumulative potential

Buffer Solution pH 4.00	
Bioaccumulative potential	Not established.

Potassium Hydrogen Phthalate (877-24-7)	
Bioaccumulative potential	Not established.

Formaldehyde, 37% w/w (50-00-0)	
Log Pow	-0.78 - 0.0
Bioaccumulative potential	Bioaccumulation: not applicable.

Water (7732-18-5)	
Bioaccumulative potential	Not established.

12.4. Mobility in soil

Formaldehyde, 37% w/w (50-00-0)	
Ecology - soil	Toxic to flora.

12.5. Other adverse effects

Effect on the global warming : No known effects from this product.

GWPmix comment : No known effects from this product.

Other information : Avoid release to the environment.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste disposal recommendations : Dispose in a safe manner in accordance with local/national regulations.

Ecology - waste materials : Avoid release to the environment.

SECTION 14: Transport information

Department of Transportation (DOT)

In accordance with DOT

Not regulated

SECTION 15: Regulatory information

15.1. US Federal regulations

All components of this product are listed, or excluded from listing, on the United States Environmental Protection Agency Toxic Substances Control Act (TSCA) inventory

This product or mixture does not contain a toxic chemical or chemicals in excess of the applicable de minimis concentration as specified in 40 CFR §372.38(a) subject to the reporting requirements of section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

Formaldehyde, 37% w/w (50-00-0)	
RQ (Reportable quantity, section 304 of EPA's List of Lists)	100 lb
SARA Section 311/312 Hazard Classes	Immediate (acute) health hazard Delayed (chronic) health hazard
SARA Section 313 - Emission Reporting	0.1 %

15.2. International regulations

CANADA

Buffer Solution pH 4.00	
WHMIS Classification	Uncontrolled product according to WHMIS classification criteria

Potassium Hydrogen Phthalate (877-24-7)	
WHMIS Classification	Class D Division 2 Subdivision B - Toxic material causing other toxic effects

Formaldehyde, 37% w/w (50-00-0)	
Listed on the Canadian DSL (Domestic Substances List)	
WHMIS Classification	Class B Division 3 - Combustible Liquid Class D Division 1 Subdivision A - Very toxic material causing immediate and serious toxic effects Class D Division 2 Subdivision A - Very toxic material causing other toxic effects Class D Division 2 Subdivision B - Toxic material causing other toxic effects Class E - Corrosive Material

Water (7732-18-5)	
WHMIS Classification	Uncontrolled product according to WHMIS classification criteria

EU-Regulations

No additional information available

National regulations

Formaldehyde, 37% w/w (50-00-0)
Listed on the Canadian IDL (Ingredient Disclosure List)

15.3. US State regulations

California Proposition 65 - This product contains, or may contain, trace quantities of a substance(s) known to the state of California to cause cancer, developmental and/or reproductive harm

Formaldehyde, 37% w/w (50-00-0)				
U.S. - California - Proposition 65 - Carcinogens List	U.S. - California - Proposition 65 - Developmental Toxicity	U.S. - California - Proposition 65 - Reproductive Toxicity - Female	U.S. - California - Proposition 65 - Reproductive Toxicity - Male	Non-significant risk level (NSRL)
Yes	Yes	No	No	40 µg/day

SECTION 16: Other information

Revision date : 12/21/2016

Other information : None.

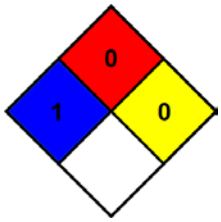
Full text of H-phrases: see section 16:

H226	Flammable liquid and vapor
H302	Harmful if swallowed
H312	Harmful in contact with skin
H314	Causes severe skin burns and eye damage
H318	Causes serious eye damage
H320	Causes eye irritation
H330	Fatal if inhaled
H350	May cause cancer
H370	Causes damage to organs
H401	Toxic to aquatic life

NFPA health hazard : 1 - Exposure could cause irritation but only minor residual injury even if no treatment is given.

NFPA fire hazard : 0 - Materials that will not burn.

NFPA reactivity : 0 - Normally stable, even under fire exposure conditions, and are not reactive with water.



HMIS III Rating

Health : 1 Slight Hazard - Irritation or minor reversible injury possible

Flammability : 0 Minimal Hazard - Materials that will not burn

Physical : 0 Minimal Hazard - Materials that are normally stable, even under fire conditions, and will NOT react with water, polymerize, decompose, condense, or self-react. Non-Explosives.

Personal protection : A

A - Safety glasses

SDS US LabChem

Information in this SDS is from available published sources and is believed to be accurate. No warranty, express or implied, is made and LabChem Inc assumes no liability resulting from the use of this SDS. The user must determine suitability of this information for his application.

MERCURIC CHLORIDE

ALPHA CHEMICALS PTY LTD

Chemwatch Hazard Alert Code: **4**

Chemwatch: **1624**
Version No: **6.1.1.1**
Safety Data Sheet according to WHS and ADG requirements

Issue Date: **07/03/2016**
Print Date: **06/06/2019**
S.GHS.AUS.EN

SECTION 1 IDENTIFICATION OF THE SUBSTANCE / MIXTURE AND OF THE COMPANY / UNDERTAKING

Product Identifier

Product name	MERCURIC CHLORIDE
Chemical Name	mercuric chloride
Synonyms	Hg-Cl2; bichloride of mercury; corrosive sublimate; mercuric bichloride; mercuric (II) chloride; mercury (II) chloride; mercury bichloride; mercury perchloride; dichloromercury; Sulem; tl898; Sulema; TL 898; abavitb; Abavit B; Sublimat; Calochlor; corrosive mercury chloride; CRC; mercuric chloride, [solid]; mercury choloromercurate (II) (HgCl2); mercury dichloride; mercury dichloride (HgCl2); mercury (2+) chloride; NCI-C60173; perchloride of mercury; sublimate; Fungchex; Emisan 6; MC; mercury (II) chloride, powder,UNIVAR; mercuric chloride, crystalline; mercuric chloride; mercury(II) chloride AnalaR
Proper shipping name	MERCURIC CHLORIDE
Chemical formula	Cl2Hg
Other means of identification	Not Available
CAS number	7487-94-7

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

Relevant identified uses	DANGEROUS POISON Manufacture of calomel and mercury chemicals, depolariser in dry batteries. Obsolescent use in embalming, tanning leather, preservative / disinfectant. Reagent in analytical chemistry; intensifier in photography. Browning and etching steel and iron; white reserve in fabric printing; electroplating aluminium, freeing gold from lead; preserving (kyanizing) wood and anatomical specimens.

Details of the supplier of the safety data sheet

Registered company name	**ALPHA CHEMICALS PTY LTD**
Address	4 ALLEN PLACE WETHERILL PARK NSW 2099 Australia
Telephone	61 (0)2 9982 4622
Fax	Not Available
Website	~
Email	shane@alphachem.com.au

Emergency telephone number

Association / Organisation	**ALPHA CHEMICALS PTY LTD**	**CHEMWATCH EMERGENCY RESPONSE**
Emergency telephone numbers	61 (0)418 237 771	+61 1800 951 288
Other emergency telephone numbers	Not Available	+61 2 9186 1132

SECTION 2 HAZARDS IDENTIFICATION

Classification of the substance or mixture

HAZARDOUS CHEMICAL. DANGEROUS GOODS. According to the WHS Regulations and the ADG Code.

CHEMWATCH HAZARD RATINGS

	Min	Max
Flammability	0	
Toxicity	4	
Body Contact	4	
Reactivity	0	
Chronic	2	

0 = Minimum
1 = Low
2 = Moderate
3 = High
4 = Extreme

Poisons Schedule	S7
Classification [1]	Acute Toxicity (Oral) Category 2, Acute Toxicity (Dermal) Category 1, Acute Toxicity (Inhalation) Category 2, Skin Corrosion/Irritation Category 1B, Chronic Aquatic Hazard Category 1, Germ cell mutagenicity Category 2, Reproductive Toxicity Category 2, Specific target organ toxicity - repeated exposure Category 1, Acute Aquatic Hazard Category 1, Serious Eye Damage Category 1
Legend:	*1. Classified by Chemwatch; 2. Classification drawn from HCIS; 3. Classification drawn from Regulation (EU) No 1272/2008 - Annex VI*

Continued...

Label elements

Hazard pictogram(s)	
SIGNAL WORD	**DANGER**

Hazard statement(s)

H300	Fatal if swallowed.
H310	Fatal in contact with skin.
H330	Fatal if inhaled.
H314	Causes severe skin burns and eye damage.
H410	Very toxic to aquatic life with long lasting effects.
H341	Suspected of causing genetic defects.
H361	Suspected of damaging fertility or the unborn child.
H372	Causes damage to organs through prolonged or repeated exposure.

Precautionary statement(s) Prevention

P201	Obtain special instructions before use.
P260	Do not breathe dust/fume/gas/mist/vapours/spray.
P262	Do not get in eyes, on skin, or on clothing.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P281	Use personal protective equipment as required.
P273	Avoid release to the environment.

Precautionary statement(s) Response

P301+P310	IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
P301+P330+P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303+P361+P353	IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304+P340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308+P313	IF exposed or concerned: Get medical advice/attention.
P363	Wash contaminated clothing before reuse.
P302+P350	IF ON SKIN: Gently wash with plenty of soap and water.

Precautionary statement(s) Storage

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

Precautionary statement(s) Disposal

P501	Dispose of contents/container in accordance with local regulations.

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

Substances

CAS No	%[weight]	Name
7487-94-7	>99	Mercuric Chloride

Mixtures

See section above for composition of Substances

SECTION 4 FIRST AID MEASURES

Description of first aid measures

Eye Contact	If this product comes in contact with the eyes: ▸ Immediately hold eyelids apart and flush the eye continuously with running water. ▸ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▸ Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes. ▸ Transport to hospital or doctor without delay. ▸ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

Continued...

Skin Contact	If skin or hair contact occurs: ▸ Immediately flush body and clothes with large amounts of water, using safety shower if available. ▸ Quickly remove all contaminated clothing, including footwear. ▸ Wash skin and hair with running water. Continue flushing with water until advised to stop by the Poisons Information Centre. ▸ Transport to hospital, or doctor.
Inhalation	▸ If fumes or combustion products are inhaled remove from contaminated area. ▸ Lay patient down. Keep warm and rested. ▸ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. ▸ Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary. ▸ Transport to hospital, or doctor, without delay.
Ingestion	▸ For advice, contact a Poisons Information Centre or a doctor at once. ▸ Urgent hospital treatment is likely to be needed. ▸ If swallowed do **NOT** induce vomiting. ▸ If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. ▸ Observe the patient carefully. ▸ Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious. ▸ Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink. ▸ Transport to hospital or doctor without delay.

Indication of any immediate medical attention and special treatment needed

- Moderate adsorption of inorganic mercury compounds through the gastro-intestinal tract (7-15%) is the principal cause of poisoning. These compounds are highly concentrated (as the mercuric (Hg (2+) form) in the kidney; acute ingestion may lead to oliguric renal failure. Severe mucosal necrosis may also result from ingestion.
- Chronic effects range from proteinuria to nephrotic syndrome. Chronic presentation also involves dermatitis, gingivitis, stomatitis, tremor and neuropsychiatric symptoms of erethism.
- Absorbed inorganic mercury does not significantly cross the blood-brain barrier.
- Emesis and lavage should be initiated following acute ingestion.
- Activated charcoal interrupts absorption; cathartics should be administered when charcoal is given.
- The use of British Anti-Lewisite is indicated in severe inorganic poisoning. Newer derivatives of BAL (e.g. dimercaptosuccinic acid, [DMSA] and 2,3-dimercapto-1-propanesulfate [DMPS]) may prove more effective. [Ellenhorn and Barceloux: Medical Toxicology]

BIOLOGICAL EXPOSURE INDEX - BEI

These represent the determinants observed in specimens from a healthy worker exposed at the Exposure Standard (ES or TLV).

Determinant	Index	Sampling Time	Comments
1. Total inorganic mercury in urine	35 ug/gm creatinine	Preshift	B
2. Total inorganic mercury in blood	15 ug/L	End of shift at end of workweek	B

B: Background levels occur in specimens collected from subjects **NOT** exposed.
There are no specific antidotes for chronic poisoning, other than early detection of intoxication and removal from exposure. Urine mercury determination may be an index of absorption. Generally, 0.1 - 0.5 mg Hg/l of urine is considered significant. [I.L.O. Encyclopedia]

SECTION 5 FIREFIGHTING MEASURES

Extinguishing media

- Water spray or fog.
- Foam.
- Dry chemical powder.
- BCF (where regulations permit).
- Carbon dioxide.

|Using water may result in spread of soluble pollutant contamination.

Special hazards arising from the substrate or mixture

Fire Incompatibility	None known.

Advice for firefighters

Fire Fighting	▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear full body protective clothing with breathing apparatus. ▸ Prevent, by any means available, spillage from entering drains or water course. ▸ Use fire fighting procedures suitable for surrounding area. ▸ **Do not** approach containers suspected to be hot. ▸ Cool fire exposed containers with water spray from a protected location. ▸ If safe to do so, remove containers from path of fire. ▸ Equipment should be thoroughly decontaminated after use.
Fire/Explosion Hazard	Decomposition may produce toxic fumes of: hydrogen chloride mercury vapour / mercury metal metal oxides ▸ Non combustible. ▸ Not considered to be a significant fire risk. ▸ Heating may cause expansion or decomposition leading to violent rupture of containers. ▸ May emit corrosive, poisonous fumes. |At elevated temperatures (approx. 300 C), mercuric chloride volatilises, emitting highly toxic vapours.
HAZCHEM	2X

SECTION 6 ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

Continued...

See section 12

Methods and material for containment and cleaning up

Minor Spills	▸ Clean up waste regularly and abnormal spills immediately. ▸ Avoid breathing dust and contact with skin and eyes. ▸ Wear protective clothing, gloves, safety glasses and dust respirator. ▸ Use dry clean up procedures and avoid generating dust. ▸ Vacuum up or sweep up. **NOTE:** Vacuum cleaner must be fitted with an exhaust micro filter (HEPA type) (consider explosion-proof machines designed to be grounded during storage and use). ▸ Dampen with water to prevent dusting before sweeping. ▸ Place in suitable containers for disposal.
Major Spills	▸ **DO NOT** touch the spill material ▸ Clear area of personnel and move upwind. ▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear full body protective clothing with breathing apparatus. ▸ Prevent, by any means available, spillage from entering drains or water course. ▸ Stop leak if safe to do so. ▸ Contain spill with sand, earth or vermiculite. ▸ Collect recoverable product into labelled containers for recycling. ▸ Neutralise/decontaminate residue (see Section 13 for specific agent).

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 HANDLING AND STORAGE

Precautions for safe handling

Safe handling	▸ Avoid all personal contact, including inhalation. ▸ Wear protective clothing when risk of exposure occurs. ▸ Use in a well-ventilated area. ▸ Prevent concentration in hollows and sumps. ▸ **DO NOT** enter confined spaces until atmosphere has been checked. ▸ **DO NOT** allow material to contact humans, exposed food or food utensils. ▸ Avoid contact with incompatible materials. ▸ When handling, **DO NOT** eat, drink or smoke.
Other information	▸ Store in original containers. ▸ Keep containers securely sealed. ▸ Store in a cool, dry, well-ventilated area. ▸ Store away from incompatible materials and foodstuff containers. ▸ Protect containers against physical damage and check regularly for leaks. ▸ Observe manufacturer's storage and handling recommendations contained within this SDS.

Conditions for safe storage, including any incompatibilities

Suitable container	▸ Lined metal can, lined metal pail/ can. ▸ Plastic pail. ▸ Polyliner drum. ▸ Packing as recommended by manufacturer. ▸ Check all containers are clearly labelled and free from leaks. For low viscosity materials ▸ Drums and jerricans must be of the non-removable head type. ▸ Where a can is to be used as an inner package, the can must have a screwed enclosure. For materials with a viscosity of at least 2680 cSt. (23 deg. C) and solids (between 15 C deg. and 40 deg C.): ▸ Removable head packaging; ▸ Cans with friction closures and ▸ low pressure tubes and cartridges may be used. - Where combination packages are used, and the inner packages are of glass, there must be sufficient inert cushioning material in contact with inner and outer packages *. - In addition, where inner packagings are glass and contain liquids of packing group I and II there must be sufficient inert absorbent to absorb any spillage *. - * unless the outer packaging is a close fitting moulded plastic box and the substances are not incompatible with the plastic. All inner and sole packagings for substances that have been assigned to Packaging Groups I or II on the basis of inhalation toxicity criteria, must be hermetically sealed.
Storage incompatibility	Derivative of electronegative metal. ▸ WARNING: Avoid or control reaction with peroxides. All *transition metal* peroxides should be considered as potentially explosive. For example transition metal complexes of alkyl hydroperoxides may decompose explosively. ▸ The pi-complexes formed between chromium(0), vanadium(0) and other transition metals (haloarene-metal complexes) and mono-or poly-fluorobenzene show extreme sensitivity to heat and are explosive. ▸ Avoid reaction with borohydrides or cyanoborohydrides ▸ Metals and their oxides or salts may react violently with chlorine trifluoride and bromine trifluoride. ▸ These trifluorides are hypergolic oxidisers. They ignite on contact (without external source of heat or ignition) with recognised fuels - contact with these materials, following an ambient or slightly elevated temperature, is often violent and may produce ignition. ▸ The state of subdivision may affect the results. Mercury(II) chloride ▸ evolves chlorine and mercury vapours in contact with acids and acid fumes ▸ possibly reacts violently with chlorine nitrate, sodium acetylide ▸ is incompatible with anhydrous ammonia, chloric acid, hydrozoic acid, light metals, methyl isocyanoacetate, sodium peroxyborate, sodium, potassium, trinitrobenzoic acid, urea nitrate ▸ requires segregation from phosphorus, antimony, arsenic, silver salts, alkali metals sulfides, sulfites, acetylene, phosphates, oxalates, acetylene, ammonia, oxalic acid.

Continued...

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters

OCCUPATIONAL EXPOSURE LIMITS (OEL)

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
Australia Exposure Standards	mercuric chloride	Mercury, inorganic divalent compounds (as Hg)	0.003 ppm / 0.025 mg/m3	Not Available	Not Available	Not Available

EMERGENCY LIMITS

Ingredient	Material name	TEEL-1	TEEL-2	TEEL-3
Mercuric Chloride	Mercury(II) chloride; (Mercury bichloride)	0.1 mg/m3	0.14 mg/m3	38 mg/m3

Ingredient	Original IDLH	Revised IDLH
Mercuric Chloride	10 mg/m3	Not Available

Exposure controls

Appropriate engineering controls	Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are: Process controls which involve changing the way a job activity or process is done to reduce the risk. Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment. Ventilation can remove or dilute an air contaminant if designed properly. The design of a ventilation system must match the particular process and chemical or contaminant in use. Employers may need to use multiple types of controls to prevent employee overexposure. Local exhaust ventilation usually required.
Personal protection	
Eye and face protection	▸ Safety glasses with unperforated side shields may be used where continuous eye protection is desirable, as in laboratories; spectacles are not sufficient where complete eye protection is needed such as when handling bulk-quantities, where there is a danger of splashing, or if the material may be under pressure. ▸ Chemical goggles.whenever there is a danger of the material coming in contact with the eyes; goggles must be properly fitted. ▸ Full face shield (20 cm, 8 in minimum) may be required for supplementary but never for primary protection of eyes; these afford face protection. ▸ Alternatively a gas mask may replace splash goggles and face shields. ▸ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available.
Skin protection	See Hand protection below
Hands/feet protection	▸ Elbow length PVC gloves The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application. The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and.has to be observed when making a final choice. Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended. Suitability and durability of glove type is dependent on usage.
Body protection	See Other protection below
Other protection	▸ Overalls. ▸ Eyewash unit. ▸ Barrier cream. ▸ Skin cleansing cream.

Respiratory protection

Particulate. (AS/NZS 1716 & 1715, EN 143:2000 & 149:001, ANSI Z88 or national equivalent)

Required Minimum Protection Factor	Half-Face Respirator	Full-Face Respirator	Powered Air Respirator
up to 10 x ES	P1 Air-line*	- -	PAPR-P1 -
up to 50 x ES	Air-line**	P2	PAPR-P2
up to 100 x ES	-	P3	-
		Air-line*	-
100+ x ES	-	Air-line**	PAPR-P3

* - Negative pressure demand ** - Continuous flow
A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO2), G = Agricultural chemicals, K = Ammonia(NH3), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

- Respirators may be necessary when engineering and administrative controls do not adequately prevent exposures.
- The decision to use respiratory protection should be based on professional judgment that takes into account toxicity information, exposure measurement data, and frequency and likelihood of the

Continued...

- worker's exposure - ensure users are not subject to high thermal loads which may result in heat stress or distress due to personal protective equipment (powered, positive flow, full face apparatus may be an option).
- Published occupational exposure limits, where they exist, will assist in determining the adequacy of the selected respiratory protection. These may be government mandated or vendor recommended.
- Certified respirators will be useful for protecting workers from inhalation of particulates when properly selected and fit tested as part of a complete respiratory protection program.
- Use approved positive flow mask if significant quantities of dust becomes airborne.
- Try to avoid creating dust conditions.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance	White crystals / powder; slightly soluble in water. No odour. Soluble in alcohol, benzene, ether, glycerol, acetic acid. Solubility in water: @ 20 C : 6.9 g/100 cc. and @ 100 C: 48 g/100 cc.

Physical state	Divided Solid	**Relative density (Water = 1)**	5.44 @ 25 deg.C
Odour	Not Available	**Partition coefficient n-octanol / water**	Not Available
Odour threshold	Not Available	**Auto-ignition temperature (°C)**	Not Applicable
pH (as supplied)	Not Applicable	**Decomposition temperature**	Not Available
Melting point / freezing point (°C)	276 (sublimes)	**Viscosity (cSt)**	Not Applicable
Initial boiling point and boiling range (°C)	302 (sublimes)	**Molecular weight (g/mol)**	271.5
Flash point (°C)	Not Applicable	**Taste**	Not Available
Evaporation rate	Not Applicable	**Explosive properties**	Not Available
Flammability	Not Applicable	**Oxidising properties**	Not Available
Upper Explosive Limit (%)	Not Applicable	**Surface Tension (dyn/cm or mN/m)**	Not Applicable
Lower Explosive Limit (%)	Not Applicable	**Volatile Component (%vol)**	Not Available
Vapour pressure (kPa)	0.39 @ 150 deg.	**Gas group**	Not Available
Solubility in water	6.9% @ 20 C	**pH as a solution (1%)**	2-3.2 @ 0.2M
Vapour density (Air = 1)	9.8 @ 300 C	**VOC g/L**	Not Available

SECTION 10 STABILITY AND REACTIVITY

Reactivity	See section 7
Chemical stability	▸ Unstable in the presence of incompatible materials. ▸ Product is considered stable. ▸ Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 TOXICOLOGICAL INFORMATION

Information on toxicological effects

Inhaled	Inhalation of dusts, generated by the material, during the course of normal handling, may produce severely toxic effects; these may be fatal. Persons with impaired respiratory function, airway diseases and conditions such as emphysema or chronic bronchitis, may incur further disability if excessive concentrations of particulate are inhaled. If prior damage to the circulatory or nervous systems has occurred or if kidney damage has been sustained, proper screenings should be conducted on individuals who may be exposed to further risk if handling and use of the material result in excessive exposures. |Acute poisoning has resulted from exposures of 1.2-8.5 mg/m3 with symptoms of chest pains, coughing, difficulty in breathing.
Ingestion	**Severely toxic effects** may result from the accidental ingestion of the material; animal experiments indicate that ingestion of less than 5 gram may be fatal or may produce serious damage to the health of the individual. The material can produce chemical burns within the oral cavity and gastrointestinal tract following ingestion. Following ingestion of mercury compounds, symptoms may appear within the first few minutes and may include pain, profuse vomiting and severe purging; the victim may die within a few hours from peripheral vascular collapse secondary to fluid and electrolyte loss. Primary gastroenteritis may subside spontaneously within a few days but severe haemorrhagic inflammation of the colon (colitis) has occurred as late as 9 days following ingestion. A second phase developing over 1-3 days is characterised by stomatitis (lesions of the mouth parts), membranous colitis and kidney damage (tubular nephritis). This second phase is associated with a slow and prolonged excretion of mercury by salivary glands, the gastrointestinal mucosa and kidneys. Death in this phase usually occurs as a result of kidney failure. The alimentary effects of many mercury compounds are so rapid that the course and outlook is largely determined by events within the first 5-10 minutes. Acute systemic "mercurialism" may be lethal within a few minutes or death may be delayed for 5-12 days. The ionisable salts are corrosive and tissue damage occurs almost immediately in the mouth, throat and oesophagus.
Skin Contact	Skin contact with the material may produce severely toxic effects; systemic effects may result following absorption and these may be fatal. The material can produce chemical burns following direct contact with the skin. Open cuts, abraded or irritated skin should not be exposed to this material

Continued...

	Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected. The material may cause severe inflammation of the skin either following direct contact or after a delay of some time. Repeated exposure can cause contact dermatitis which is characterised by redness, swelling and blistering.
Eye	The material can produce chemical burns to the eye following direct contact. Vapours or mists may be extremely irritating. If applied to the eyes, this material causes severe eye damage.
Chronic	Repeated or long-term occupational exposure is likely to produce cumulative health effects involving organs or biochemical systems. Repeated or prolonged exposure to corrosives may result in the erosion of teeth, inflammatory and ulcerative changes in the mouth and necrosis (rarely) of the jaw. Bronchial irritation, with cough, and frequent attacks of bronchial pneumonia may ensue. Strong evidence exists that this substance may cause irreversible mutations (though not lethal) even following a single exposure. Toxic: danger of serious damage to health by prolonged exposure in contact with skin and if swallowed. This material can cause serious damage if one is exposed to it for long periods. It can be assumed that it contains a substance which can produce severe defects. There is some evidence from animal testing that exposure to this material may result in toxic effects to the unborn baby. Long term exposure to high dust concentrations may cause changes in lung function i.e. pneumoconiosis, caused by particles less than 0.5 micron penetrating and remaining in the lung. Exposure to the material for prolonged periods may cause physical defects in the developing embryo (teratogenesis). Mercury easily crosses the placenta and causes birth defects. Chronic exposure results in excess saliva production, loss of appetite, stomach upset, vague abdominal discomfort and mild diarrhoea.

	TOXICITY	IRRITATION
Mercuric Chloride	dermal (rat) LD50: 41 mg/kg[2]	Eye (rabbit): 0.05 mg/24h SEVERE
	Oral (rat) LD50: 1 mg/kg[2]	Skin (rabbit): 500 mg/24h SEVERE

Legend:	*1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2.* Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances*

MERCURIC CHLORIDE	The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis. The material may cause severe skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin. Repeated exposures may produce severe ulceration. Asthma-like symptoms may continue for months or even years after exposure to the material ends. This may be due to a non-allergic condition known as reactive airways dysfunction syndrome (RADS) which can occur after exposure to high levels of highly irritating compound. Main criteria for diagnosing RADS include the absence of previous airways disease in a non-atopic individual, with sudden onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. Other criteria for diagnosis of RADS include a reversible airflow pattern on lung function tests, moderate to severe bronchial hyperreactivity on methacholine challenge testing, and the lack of minimal lymphocytic inflammation, without eosinophilia. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. On the other hand, industrial bronchitis is a disorder that occurs as a result of exposure due to high concentrations of irritating substance (often particles) and is completely reversible after exposure ceases. The disorder is characterized by difficulty breathing, cough and mucus production. Exposure to the material for prolonged periods may cause physical defects in the developing embryo (teratogenesis). Somnolence, tremor, convulsions, muscle weakness, obstruction and stimulation of respiration, ulceration of the stomach, duodenum and large intestine, nausea, vomiting, necrotic changes, paternal and maternal effects, foetotoxicity and specific developmental abnormalities recorded.

Acute Toxicity	✔	**Carcinogenicity**	✘
Skin Irritation/Corrosion	✔	**Reproductivity**	✔
Serious Eye Damage/Irritation	✔	**STOT - Single Exposure**	✘
Respiratory or Skin sensitisation	✘	**STOT - Repeated Exposure**	✔
Mutagenicity	✔	**Aspiration Hazard**	✘

Legend: ✘ *– Data either not available or does not fill the criteria for classification*
✔ *– Data available to make classification*

SECTION 12 ECOLOGICAL INFORMATION

Toxicity

	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
Mercuric Chloride	LC50	96	Fish	0.016mg/L	4
	EC50	48	Crustacea	0.0015mg/L	4
	EC50	72	Algae or other aquatic plants	0.00328mg/L	4
	BCF	504	Algae or other aquatic plants	81.45mg/L	4
	NOEC	30	Fish	<0.00023mg/L	4

Legend:	*Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 3. EPIWIN Suite V3.12 (QSAR) - Aquatic Toxicity Data (Estimated) 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data*

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Do NOT allow product to come in contact with surface waters or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash-waters.
Wastes resulting from use of the product must be disposed of on site or at approved waste sites.
For Metal:
Atmospheric Fate - Metal-containing inorganic substances generally have negligible vapour pressure and are not expected to partition to air.
Environmental Fate: Environmental processes, such as oxidation, the presence of acids or bases and microbiological processes, may transform insoluble metals to more soluble ionic forms.
Environmental processes may enhance bioavailability and may also be important in changing solubilities.
Aquatic/Terrestrial Fate: When released to dry soil, most metals will exhibit limited mobility and remain in the upper layer; some will leach locally into ground water and/ or surface water

Continued...

ecosystems when soaked by rain or melt ice. A metal ion is considered infinitely persistent because it cannot degrade further. Once released to surface waters and moist soils their fate depends on solubility and dissociation in water. A significant proportion of dissolved/ sorbed metals will end up in sediments through the settling of suspended particles. The remaining metal ions can then be taken up by aquatic organisms. Ionic species may bind to dissolved ligands or sorb to solid particles in water.
For Chloride: Although inorganic chloride ions are not normally considered toxic they can exist in effluents at acutely toxic levels. Incidental exposure to inorganic chloride may occur in occupational settings where chemicals management policies are improperly applied. The toxicity of chloride salts depends on the counter-ion (cation) present; that of chloride itself is unknown. Chloride toxicity has not been observed in humans except in the special case of impaired sodium chloride metabolism, e.g. in congestive heart failure. Healthy individuals can tolerate the intake of large quantities of chloride provided that there is an intake of fresh water following ingestion. Although excessive intake of drinking-water containing sodium chloride at concentrations above 2.5 g/L has been reported to produce hypertension, this effect is believed to be related to the sodium ion concentration. Chloride concentrations in excess of about 250 mg/L can give rise to detectable taste in water. Consumers can, however, become accustomed to concentrations in excess of 250 mg/L.
Mercury may occur in the environment as free mercury, Hg(0), mercury ions in salts and complexes, Hg+ and (Hg2)2+ and as organic mercury compounds. Each species has its own set of physical, chemical and toxicologic properties. In natural systems a dynamic equilibrium between soil and water mercury occurs, determined largely by the physicochemical and biological conditions which pertain.
Mercury ion is transported to aquatic ecosystems via surface run-off and from the atmosphere. It is complexed or tightly bound to both inorganic and organic particles, particularly sediments with high sulfur content. Organic acids such as fulvic and humic acids are often associated with mercury not bound to particles. Methyl mercury is produced by sediment micro-organisms, non-biologically in sediments, and by certain species of fish. The methylation of mercury by micro-organisms is the detoxification response that allows the organism to dispose of the heavy metal ions as small organometallic complexes.
DO NOT discharge into sewer or waterways.
The material is classified as an **ecotoxin*** because the ***Fish LC50 (96 hours)*** is less than or equal to 0.1 mg/l
** Classification of Substances as Ecotoxic (Dangerous to the Environment)*
Appendix 8, Table 1
Compiler's Guide for the Preparation of International Chemical Safety Cards: 1993 Commission of the European Communities

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
Mercuric Chloride	HIGH	HIGH

Bioaccumulative potential

Ingredient	Bioaccumulation
Mercuric Chloride	HIGH (BCF = 4620)

Mobility in soil

Ingredient	Mobility
Mercuric Chloride	LOW (KOC = 23.74)

SECTION 13 DISPOSAL CONSIDERATIONS

Waste treatment methods

Product / Packaging disposal	▸ Containers may still present a chemical hazard/ danger when empty. ▸ Return to supplier for reuse/ recycling if possible. Otherwise: ▸ If container can not be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, then puncture containers, to prevent re-use, and bury at an authorised landfill. ▸ Where possible retain label warnings and SDS and observe all notices pertaining to the product. Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked. A Hierarchy of Controls seems to be common - the user should investigate: ▸ Reduction ▸ Reuse ▸ Recycling ▸ Disposal (if all else fails) This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate. In most instances the supplier of the material should be consulted. ▸ **DO NOT** allow wash water from cleaning or process equipment to enter drains. ▸ It may be necessary to collect all wash water for treatment before disposal. ▸ In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first. ▸ Where in doubt contact the responsible authority. For small quantities: ▸ Dissolve the material (in water or acid solution as appropriate) or convert it to a water soluble state with appropriate oxidising agent. ▸ Precipitate as the sulfide, adjusting the pH to neutral to complete the precipitation. ▸ Filter off sulfide solids for recovery or disposal to approved land-fill. ▸ Destroy excess sulfide in solution with, for example, sodium hypochlorite, neutralise, and flush to sewer (subject to local regulation). ▸ Recycle wherever possible or consult manufacturer for recycling options. ▸ Consult State Land Waste Management Authority for disposal. ▸ Bury residue in an authorised landfill. ▸ Recycle containers if possible, or dispose of in an authorised landfill.

SECTION 14 TRANSPORT INFORMATION

Labels Required

Continued...

Marine Pollutant	
HAZCHEM	2X

Land transport (ADG)

UN number	1624
UN proper shipping name	MERCURIC CHLORIDE
Transport hazard class(es)	Class: 6.1 Subrisk: Not Applicable
Packing group	II
Environmental hazard	Environmentally hazardous
Special precautions for user	Special provisions: Not Applicable Limited quantity: 500 g

Air transport (ICAO-IATA / DGR)

UN number	1624
UN proper shipping name	Mercuric chloride
Transport hazard class(es)	ICAO/IATA Class: 6.1 ICAO / IATA Subrisk: Not Applicable ERG Code: 6L
Packing group	II
Environmental hazard	Environmentally hazardous
Special precautions for user	Special provisions: Not Applicable Cargo Only Packing Instructions: 676 Cargo Only Maximum Qty / Pack: 100 kg Passenger and Cargo Packing Instructions: 669 Passenger and Cargo Maximum Qty / Pack: 25 kg Passenger and Cargo Limited Quantity Packing Instructions: Y644 Passenger and Cargo Limited Maximum Qty / Pack: 1 kg

Sea transport (IMDG-Code / GGVSee)

UN number	1624
UN proper shipping name	MERCURIC CHLORIDE
Transport hazard class(es)	IMDG Class: 6.1 IMDG Subrisk: Not Applicable
Packing group	II
Environmental hazard	Marine Pollutant
Special precautions for user	EMS Number: F-A , S-A Special provisions: Not Applicable Limited Quantities: 500 g

Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

SECTION 15 REGULATORY INFORMATION

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

MERCURIC CHLORIDE(7487-94-7) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Continued...

Australia Dangerous Goods Code (ADG Code) - Dangerous Goods List
Australia Dangerous Goods Code (ADG Code) - List of Emergency Action Codes
Australia Exposure Standards
Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals
Australia Inventory of Chemical Substances (AICS)
Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Appendix E (Part 2)
Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Index
Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 7
Australia Work Health and Safety Regulations 2016 - Hazardous chemicals (other than lead) requiring health monitoring
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
International Air Transport Association (IATA) Dangerous Goods Regulations
International Maritime Dangerous Goods Requirements (IMDG Code)
United Nations Recommendations on the Transport of Dangerous Goods Model Regulations

National Inventory Status

National Inventory	Status
Australia - AICS	Yes
Canada - DSL	Yes
Canada - NDSL	No (Mercuric Chloride)
China - IECSC	Yes
Europe - EINEC / ELINCS / NLP	Yes
Japan - ENCS	Yes
Korea - KECI	Yes
New Zealand - NZIoC	Yes
Philippines - PICCS	Yes
USA - TSCA	Yes
Taiwan - TCSI	Yes
Mexico - INSQ	Yes
Vietnam - NCI	Yes
Russia - ARIPS	Yes
Thailand - TECI	Yes
Legend:	*Yes = All declared ingredients are on the inventory* *No = Not determined or one or more ingredients are not on the inventory and are not exempt from listing(see specific ingredients in brackets)*

SECTION 16 OTHER INFORMATION

Revision Date	07/03/2016
Initial Date	12/05/2005

SDS Version Summary

Version	Issue Date	Sections Updated
5.1.1.1	27/02/2011	Acute Health (swallowed), Chronic Health, Classification, Environmental, Fire Fighter (fire/explosion hazard), Storage (storage incompatibility)
6.1.1.1	07/03/2016	Chronic Health, Classification, Exposure Standard, Synonyms

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

Definitions and abbreviations

PC—TWA: Permissible Concentration-Time Weighted Average
PC—STEL: Permissible Concentration-Short Term Exposure Limit
IARC: International Agency for Research on Cancer
ACGIH: American Conference of Governmental Industrial Hygienists
STEL: Short Term Exposure Limit
TEEL: Temporary Emergency Exposure Limit。
IDLH: Immediately Dangerous to Life or Health Concentrations
OSF: Odour Safety Factor
NOAEL :No Observed Adverse Effect Level
LOAEL: Lowest Observed Adverse Effect Level
TLV: Threshold Limit Value
LOD: Limit Of Detection
OTV: Odour Threshold Value
BCF: BioConcentration Factors
BEI: Biological Exposure Index

end of SDS

SAFETY DATA SHEET

Creation Date 09-Dec-2009 **Revision Date** 19-Jan-2018 **Revision Number** 4

1. Identification

Product Name **Buffer solution pH 10, Carbonate buffer**

Cat No. : **AC258600000; AC258600010; AC258600025; AC258605000**

Synonyms None

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

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

Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

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

2. Hazard(s) identification

Classification
Classification under 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

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

Label Elements
None required

Hazards not otherwise classified (HNOC)
None identified

3. Composition/Information on Ingredients

Component	CAS-No	Weight %

Water	7732-18-5	97.5
Ethylenediaminetetraacetic acid, disodium salt dihydrate	6381-92-6	1.0
Potassium carbonate	584-08-7	0.6
Potassium hydroxide	1310-58-3	0.5
Potassium Borate	12228-88-5	0.4

4. First-aid measures

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

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

Inhalation Remove to fresh air. Get medical attention immediately if symptoms occur.

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

Most important symptoms and effects None reasonably foreseeable.

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Unsuitable Extinguishing Media No information available

Flash Point No information available
Method - No information available

Autoignition Temperature 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
None known.

Hazardous Combustion Products
None known.

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

NFPA

Health	Flammability	Instability	Physical hazards
1	0	0	N/A

6. Accidental release measures

Personal Precautions Use personal protective equipment as required. Ensure adequate ventilation.
Environmental Precautions Should not be released into the environment.

Methods for Containment and Clean Up Sweep up and shovel into suitable containers for disposal.

7. Handling and storage

Handling Wear personal protective equipment/face protection. Avoid contact with skin, eyes or clothing. Avoid ingestion and inhalation. Ensure adequate ventilation.

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

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Potassium hydroxide	Ceiling: 2 mg/m³	(Vacated) Ceiling: 2 mg/m³	Ceiling: 2 mg/m³	Ceiling: 2 mg/m³

Legend

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

Engineering Measures None under normal use conditions.

Personal Protective Equipment

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

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

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

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

9. Physical and chemical properties

Physical State	Liquid
Appearance	Colorless
Odor	Odorless
Odor Threshold	No information available
pH	10
Melting Point/Range	No data available
Boiling Point/Range	No information available
Flash Point	No information available
Evaporation Rate	No information available
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	No information available
Vapor Density	No information available
Specific Gravity	No information available
Solubility	Soluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	No information available

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid None known.

Incompatible Materials None known

Hazardous Decomposition Products None known

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information No acute toxicity information is available for this product

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Water	-	-	-
Potassium carbonate	> 2000 mg/kg (Rat)	Not listed	Not listed
Potassium hydroxide	LD50 = 284 mg/kg (Rat)	Not listed	Not listed

Toxicologically Synergistic Products No information available

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

Irritation No information available

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
Ethylenediaminetetraacetic acid, disodium salt dihydrate	6381-92-6	Not listed	Not listed	Not listed	Not listed	Not listed
Potassium carbonate	584-08-7	Not listed	Not listed	Not listed	Not listed	Not listed
Potassium hydroxide	1310-58-3	Not listed	Not listed	Not listed	Not listed	Not listed
Potassium Borate	12228-88-5	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure None known

STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed No information available

Endocrine Disruptor Information No information available

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

12. Ecological information

Ecotoxicity

.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Potassium carbonate	Not listed	LC50 <510 mg/L/96h (Pimephales promelas)	Not listed	LC50: = 630 mg/L, 48h (Ceriodaphnia dubia)
Potassium hydroxide	Not listed	LC50: = 80 mg/L, 96h static (Gambusia affinis)	Not listed	Not listed

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

Bioaccumulation/ Accumulation No information available.

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

Component	log Pow
Potassium hydroxide	0.83

13. Disposal considerations

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

14. Transport information

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

15. Regulatory information

United States of America Inventory

Component	CAS-No	TSCA	TSCA Inventory notification - Active/Inactive	TSCA - EPA Regulatory Flags
Water	7732-18-5	X	ACTIVE	-
Ethylenediaminetetraacetic acid, disodium salt dihydrate	6381-92-6	-	-	-
Potassium carbonate	584-08-7	X	ACTIVE	-
Potassium hydroxide	1310-58-3	X	ACTIVE	-
Potassium Borate	12228-88-5	-	-	-

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

TSCA 12(b) - Notices of Export Not applicable

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

Component	CAS-No	DSL	NDSL	EINECS	PICCS	ENCS	AICS	IECSC	KECL
Water	7732-18-5	X	-	231-791-2	X	X	X	X	KE-35400
Ethylenediaminetetraacetic acid, disodium salt dihydrate	6381-92-6	X	-	-	X	-	X	X	-

Potassium carbonate	584-08-7	X	-	209-529-3	X	X	X	X	KE-29083
Potassium hydroxide	1310-58-3	X	-	215-181-3	X	X	X	X	KE-29139
Potassium Borate	12228-88-5	-	-	-	-	-	-	-	-

U.S. Federal Regulations

SARA 313 Not applicable

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

CWA (Clean Water Act)

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

Clean Air Act Not applicable

OSHA - Occupational Safety and Health Administration Not applicable

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

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

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

U.S. State Right-to-Know Regulations

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

U.S. Department of Transportation

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

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

Other International Regulations

Mexico - Grade No information available

16. Other information

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

Creation Date 09-Dec-2009
Revision Date 19-Jan-2018
Print Date 19-Jan-2018
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer

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

End of SDS

Safety Data Sheet

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

Effective date: 05/17/2017 **Revision** : 05/17/2017

Trade Name: Liquinox

1 Identification of the substance/mixture and of the supplier

1.1 Product identifier

Trade Name: Liquinox
Synonyms:
Product number: Liquinox

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

1.3 Details of the supplier of the Safety Data Sheet

Manufacturer	Supplier
Alconox, Inc. 30 Glenn Street White Plains, NY 10603 1-914-948-4040	Not Applicable

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:

Alcohol ethoxylate
Sodium alkylbenzene sulfonate
Sodium xylenesulphonate
Lauramine oxide

2.2 Label elements:

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

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.
P332+P313 If skin irritation occurs: Get medical advice/attention.
P501 Dispose of contents and container as instructed in Section 13.

Additional information: None.

Hazard description

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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: 68081-81-2	Sodium Alkylbenzene Sulfonate	Acute Tox. 4; H303 Skin Irrit. 2 ; H315 Eye Irrit. 2; H319	10-25
CAS number: 1300-72-7	Sodium Xylenesulphonate	Eye Irrit. 2; H319	2.5-10
CAS number: 84133-50-6	Alcohol Ethoxylate	Skin Irrit. 2 ; H315 Eye Dam. 1; H318	2.5-10
CAS number: 1643-20-5	Lauramine oxide	Skin Irrit. 2 ; H315 Eye Dam. 1; H318	1-2

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.

4.2 Most important symptoms and effects, both acute and delayed

None

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

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Trade Name: Liquinox

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.
Conditions for safe storage, including any incompatibilities:
Store closed upright and in a cool dry place, should be 15 - 30 deg C or 60 - 90 deg F.

7.2 Specific end use(s):

No additional information.

Safety Data Sheet

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Trade Name: Liquinox

8 Exposure controls/personal protection

8.1 Control parameters :

No applicable occupational exposure limits

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 conditions.

Protection of skin:

Select glove material impermeable and resistant to the substance.

Eye protection:

Safety goggles or glasses, or appropriate eye protection.

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):	Pale yellow liquid	**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:	8.5 as is	**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.	**Decomposition temperature:**	Not determined or not available.
Flammability (solid, gaseous):	Not determined or not available.	**Viscosity:**	a. Kinematic: Not determined or not available. b. Dynamic: Not determined or not available.

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Trade Name: Liquinox	
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 per kg Rat, Oral) - product .

Chronic Toxicity: No additional information.

Skin corrosion/irritation:

Alcohol Ethoxylate: May cause mild to moderate skin irritation.

Sodium Alkylbenzene Sulfonate: Causes skin irritation.

Lauramine oxide: Causes skin irritation.

Serious eye damage/irritation:

Sodium Alkylbenzene Sulfonate: Causes serious eye irritation.

Alcohol Ethoxylate: Causes moderate to severe eye irritation and conjunctivitis.

Sodium xylenesulphonate: Rabbit: irritating to eyes.

Lauramine oxide: Causes serious eye damage.

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

12.1 Toxicity:

Sodium Alkylbenzene Sulfonate: Fish, LC50 1.67 mg/l, 96 hours.

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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.
Lauramine oxide: Fish, LC0 24.3 mg/l, 96h [Killifish (Cyprinodontidae)]
Lauramine oxide: Aquatic invertebrates, (LC50): 3.6 mg/l 96 hours [Daphnia (Daphnia)].
Lauramine oxide: Aquatic plants, EC50 Algae 0.31 mg/l 72 hours [Algae]
Alcohol Ethoxylate: Aquatic invertebrates, (LC50): 4.01 mg/l 48 hours [Daphnia (daphnia)].

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: None
ADR, ADN, DOT, IMDG, IATA

14.2 UN Proper shipping name: None
ADR, ADN, DOT, IMDG, IATA

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.
Comments: None

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

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Trade Name: Liquinox

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.

Germany MAK: Not classified.

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Effective date: 05/17/2017 **Revision** : 05/17/2017

Trade Name: Liquinox

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.

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.
P332+P313 If skin irritation occurs: Get medical advice/attention.
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.

NFPA: 1-0-0

HMIS: 1-0-0

Hydrochloric Acid, 10% v/v

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Date of issue: 07/03/2013 Revision date: 10/24/2017 Supersedes: 09/22/2015 Version: 1.2

SECTION 1: Identification

1.1. Identification

Product form : Mixtures

Product name : Hydrochloric Acid, 10% v/v

Product code : LC15070

1.2. Recommended use and restrictions on use

Use of the substance/mixture : For laboratory and manufacturing use only.

Recommended use : Laboratory chemicals

Restrictions on use : Not for food, drug or household use

1.3. Supplier

LabChem Inc
Jackson's Pointe Commerce Park Building 1000, 1010 Jackson's Pointe Court
Zelienople, PA 16063 - USA
T 412-826-5230 - F 724-473-0647
info@labchem.com - www.labchem.com

1.4. Emergency telephone number

Emergency number : CHEMTREC: 1-800-424-9300 or 011-703-527-3887

SECTION 2: Hazard(s) identification

2.1. Classification of the substance or mixture

GHS-US classification

Skin corrosion/irritation Category 1B	H314	Causes severe skin burns and eye damage
Serious eye damage/eye irritation Category 1	H318	Causes serious eye damage

Full text of H statements : see section 16

2.2. GHS Label elements, including precautionary statements

GHS-US labeling

Hazard pictograms (GHS-US) :

GHS05

Signal word (GHS-US) : Danger

Hazard statements (GHS-US) : H314 - Causes severe skin burns and eye damage

Precautionary statements (GHS-US) : P260 - Do not breathe mist, vapors, spray
P264 - Wash exposed skin thoroughly after handling
P280 - Wear protective gloves, eye protection, protective clothing, face protection
P301+P330+P331 - IF SWALLOWED: rinse mouth. Do NOT induce vomiting
P303+P361+P353 - IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower
P305+P351+P338 - If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P310 - Immediately call a poison center or doctor/physician
P363 - Wash contaminated clothing before reuse
P405 - Store locked up
P501 - Dispose of contents/container to comply with local, state and federal regulations
If inhaled: Remove person to fresh air and keep comfortable for breathing

2.3. Other hazards which do not result in classification

Other hazards not contributing to the classification : None.

2.4. Unknown acute toxicity (GHS US)

Not applicable

SECTION 3: Composition/Information on ingredients

3.1. Substances

Not applicable

3.2. Mixtures

Name	Product identifier	%	GHS-US classification
Water	(CAS-No.) 7732-18-5	95.66	Not classified
Hydrochloric Acid, 37% w/w	(CAS-No.) 7647-01-0	4.34	Acute Tox. 4 (Oral), H302 Skin Corr. 1B, H314 Eye Dam. 1, H318 STOT SE 3, H335 Aquatic Acute 3, H402

Full text of hazard classes and H-statements : see section 16

SECTION 4: First-aid measures

4.1. Description of first aid measures

First-aid measures general : Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible).

First-aid measures after inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a poison center or doctor/physician.

First-aid measures after skin contact : Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. Immediately call a poison center or doctor/physician.

First-aid measures after eye contact : Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center or doctor/physician.

First-aid measures after ingestion : Rinse mouth. Do NOT induce vomiting. Immediately call a poison center or doctor/physician.

4.2. Most important symptoms and effects (acute and delayed)

Symptoms/effects : Causes severe skin burns and eye damage.

Symptoms/effects after inhalation : Possible inflammation of the respiratory tract.

Symptoms/effects after skin contact : Caustic burns/corrosion of the skin.

Symptoms/effects after eye contact : Causes serious eye damage.

Symptoms/effects after ingestion : Nausea. Vomiting. Irritation of the gastric/intestinal mucosa. Diarrhoea.

Chronic symptoms : Affection/discolouration of the teeth.

4.3. Immediate medical attention and special treatment, if necessary

Obtain medical assistance.

SECTION 5: Fire-fighting measures

5.1. Suitable (and unsuitable) extinguishing media

Suitable extinguishing media : Foam. Dry powder. Carbon dioxide. Water spray. Sand.

Unsuitable extinguishing media : Do not use a heavy water stream.

5.2. Specific hazards arising from the chemical

Fire hazard : Not flammable.

Explosion hazard : Not applicable.

Reactivity : Thermal decomposition generates : Corrosive vapors.

5.3. Special protective equipment and precautions for fire-fighters

Firefighting instructions : Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire. Prevent fire-fighting water from entering environment.

Protection during firefighting : Do not enter fire area without proper protective equipment, including respiratory protection.

Other information : Not applicable.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : Try to stop release. Dike and contain spill.

6.1.1. For non-emergency personnel

Protective equipment : Gloves. Safety glasses. Protective clothing. Face-shield.

Emergency procedures : Evacuate unnecessary personnel.

6.1.2. For emergency responders

Protective equipment : Equip cleanup crew with proper protection.

Emergency procedures : Ventilate area.

6.2. Environmental precautions

Prevent entry to sewers and public waters. Notify authorities if liquid enters sewers or public waters.

6.3. Methods and material for containment and cleaning up

Methods for cleaning up : Soak up spills with inert solids, such as clay or diatomaceous earth as soon as possible. Collect spillage. Store away from other materials.

6.4. Reference to other sections

See Heading 8. Exposure controls and personal protection.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Provide good ventilation in process area to prevent formation of vapor. Do not breathe mist, vapors, spray.

Hygiene measures : Wash exposed skin thoroughly after handling. Wash contaminated clothing before reuse.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures : Comply with applicable regulations.

Storage conditions : Keep only in the original container in a cool, well ventilated place away from : incompatible materials. Keep container closed when not in use.

Incompatible products : metals. cyanides. Strong bases. Strong acids.

Incompatible materials : Direct sunlight.

Packaging materials : Do not store in corrodable metal.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Hydrochloric Acid, 37% w/w (7647-01-0)		
ACGIH	ACGIH Ceiling (mg/m³)	2.98 mg/m³
ACGIH	ACGIH Ceiling (ppm)	2 ppm
OSHA	OSHA PEL (Ceiling) (mg/m³)	7 mg/m³
OSHA	OSHA PEL (Ceiling) (ppm)	5 ppm
IDLH	US IDLH (ppm)	50 ppm
NIOSH	NIOSH REL (ceiling) (mg/m³)	7 mg/m³
NIOSH	NIOSH REL (ceiling) (ppm)	5 ppm

Water (7732-18-5)
Not applicable

8.2. Appropriate engineering controls

Appropriate engineering controls : Emergency eye wash fountains should be available in the immediate vicinity of any potential exposure.

8.3. Individual protection measures/Personal protective equipment

Personal protective equipment:

Chemical resistant apron. Face shield. Gloves. Safety glasses. Protective clothing.

Hand protection:

Wear protective gloves

Eye protection:

Chemical goggles or face shield

Skin and body protection:

Wear suitable protective clothing

Respiratory protection:

Wear appropriate mask

Other information:

Do not eat, drink or smoke during use.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	:	Liquid
Color	:	Colorless
Odor	:	Odorless
Odor threshold	:	No data available
pH	:	≤ 0.5
Melting point	:	No data available
Freezing point	:	No data available
Boiling point	:	No data available
Flash point	:	No data available
Relative evaporation rate (butyl acetate=1)	:	No data available
Flammability (solid, gas)	:	Non flammable.
Vapor pressure	:	No data available
Relative vapor density at 20 °C	:	No data available
Relative density	:	No data available
Specific gravity / density	:	1 - 1.1
Molecular mass	:	36.46 g/mol
Solubility	:	Soluble in water. Soluble in ethanol. Soluble in methanol.
Log Pow	:	No data available
Auto-ignition temperature	:	No data available
Decomposition temperature	:	No data available
Viscosity, kinematic	:	No data available
Viscosity, dynamic	:	No data available
Explosion limits	:	No data available
Explosive properties	:	Not applicable.
Oxidizing properties	:	None.

9.2. Other information

No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity

Thermal decomposition generates : Corrosive vapors.

10.2. Chemical stability

Stable under normal conditions. Not established.

10.3. Possibility of hazardous reactions

Reacts violently with (some) bases: release of heat.

10.4. Conditions to avoid

Direct sunlight. Extremely high or low temperatures.

10.5. Incompatible materials

metals. cyanides. Strong bases.

10.6. Hazardous decomposition products

Hydrogen chloride. Thermal decomposition generates : Corrosive vapors.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Likely routes of exposure : Skin and eye contact

Acute toxicity : Not classified

Hydrochloric Acid, 37% w/w (7647-01-0)	
LD50 oral rat	700 mg/kg
LD50 dermal rabbit	5010 mg/kg
ATE US (oral)	700 mg/kg body weight
ATE US (dermal)	5010 mg/kg body weight

Water (7732-18-5)	
LD50 oral rat	≥ 90000 mg/kg
ATE US (oral)	90000 mg/kg body weight

Skin corrosion/irritation : Causes severe skin burns and eye damage.
pH: ≤ 0.5

Serious eye damage/irritation : Causes serious eye damage.
pH: ≤ 0.5

Respiratory or skin sensitization : Not classified

Germ cell mutagenicity : Not classified
Based on available data, the classification criteria are not met

Carcinogenicity : Not classified

Hydrochloric Acid, 37% w/w (7647-01-0)	
IARC group	3 - Not classifiable

Reproductive toxicity : Not classified
Based on available data, the classification criteria are not met

Specific target organ toxicity – single exposure : Not classified

Specific target organ toxicity – repeated exposure : Not classified

Aspiration hazard : Not classified

Potential Adverse human health effects and symptoms : Based on available data, the classification criteria are not met.

Symptoms/effects after inhalation : Possible inflammation of the respiratory tract.

Symptoms/effects after skin contact : Caustic burns/corrosion of the skin.

Symptoms/effects after eye contact : Causes serious eye damage.

Symptoms/effects after ingestion : Nausea. Vomiting. Irritation of the gastric/intestinal mucosa. Diarrhoea.

Chronic symptoms : Affection/discolouration of the teeth.

SECTION 12: Ecological information

12.1. Toxicity

Hydrochloric Acid, 37% w/w (7647-01-0)	
LC50 fish 1	282 mg/l (LC50; 96 h)
EC50 Daphnia 1	< 56 mg/l (EC50; 72 h)

12.2. Persistence and degradability

Hydrochloric Acid, 10% v/v	
Persistence and degradability	Not established.

Hydrochloric Acid, 37% w/w (7647-01-0)	
Persistence and degradability	Biodegradability: not applicable. No test data on mobility of the components available.
Biochemical oxygen demand (BOD)	Not applicable
Chemical oxygen demand (COD)	Not applicable
ThOD	Not applicable

Water (7732-18-5)	
Persistence and degradability	Not established.

12.3. Bioaccumulative potential

Hydrochloric Acid, 10% v/v	
Bioaccumulative potential	Not established.

Hydrochloric Acid, 37% w/w (7647-01-0)	
Log Pow	0.25 (QSAR)
Bioaccumulative potential	Low potential for bioaccumulation (Log Kow < 4).

Water (7732-18-5)	
Bioaccumulative potential	Not established.

12.4. Mobility in soil

Hydrochloric Acid, 37% w/w (7647-01-0)	
Ecology - soil	May be harmful to plant growth, blooming and fruit formation.

12.5. Other adverse effects

Effect on the global warming : No known effects from this product.
GWPmix comment : No known effects from this product.

Other information : Avoid release to the environment.

SECTION 13: Disposal considerations

13.1. Disposal methods

Waste disposal recommendations : Dispose in a safe manner in accordance with local/national regulations.
Ecology - waste materials : Avoid release to the environment.

SECTION 14: Transport information

Department of Transportation (DOT)

In accordance with DOT

Transport document description : UN1789 Hydrochloric acid, 8, II

UN-No.(DOT) : UN1789
Proper Shipping Name (DOT) : Hydrochloric acid
Transport hazard class(es) (DOT) : 8 - Class 8 - Corrosive material 49 CFR 173.136
Packing group (DOT) : II - Medium Danger
Hazard labels (DOT) : 8 - Corrosive

DOT Packaging Non Bulk (49 CFR 173.xxx) : 202
DOT Packaging Bulk (49 CFR 173.xxx) : 242

DOT Special Provisions (49 CFR 172.102)	:	A3 - For combination packaging, if glass inner packaging (including ampoules) are used, they must be packed with absorbent material in tightly closed metal receptacles before packing in outer packaging. A6 - For combination packaging, if plastic inner packaging are used, they must be packed in tightly closed metal receptacles before packing in outer packaging. B3 - MC 300, MC 301, MC 302, MC 303, MC 305, and MC 306 and DOT 406 cargo tanks and DOT 57 portable tanks are not authorized. B15 - Packaging must be protected with non-metallic linings impervious to the lading or have a suitable corrosion allowance. IB2 - Authorized IBCs: Metal (31A, 31B and 31N); Rigid plastics (31H1 and 31H2); Composite (31HZ1). Additional Requirement: Only liquids with a vapor pressure less than or equal to 110 kPa at 50 C (1.1 bar at 122 F), or 130 kPa at 55 C (1.3 bar at 131 F) are authorized. N41 - Metal construction materials are not authorized for any part of a packaging which is normally in contact with the hazardous material. T8 - 4 178.274(d)(2) Normal..... Prohibited TP2 - a. The maximum degree of filling must not exceed the degree of filling determined by the following: (image) Where: tr is the maximum mean bulk temperature during transport, tf is the temperature in degrees celsius of the liquid during filling, and a is the mean coefficient of cubical expansion of the liquid between the mean temperature of the liquid during filling (tf) and the maximum mean bulk temperature during transportation (tr) both in degrees celsius. b. For liquids transported under ambient conditions may be calculated using the formula: (image) Where: d15 and d50 are the densities (in units of mass per unit volume) of the liquid at 15 C (59 F) and 50 C (122 F), respectively. TP12 - This material is considered highly corrosive to steel.
DOT Packaging Exceptions (49 CFR 173.xxx)	:	154
DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27)	:	1 L
DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75)	:	30 L
DOT Vessel Stowage Location	:	C - The material must be stowed ‘‘on deck only’’ on a cargo vessel and on a passenger vessel.
Other information	:	No supplementary information available.

SECTION 15: Regulatory information

15.1. US Federal regulations

Hydrochloric Acid, 10% v/v	
SARA Section 311/312 Hazard Classes	Immediate (acute) health hazard

All components of this product are listed, or excluded from listing, on the United States Environmental Protection Agency Toxic Substances Control Act (TSCA) inventory

Chemical(s) subject to the reporting requirements of Section 313 or Title III of the Superfund Amendments and Reauthorization Act (SARA) of 1986 and 40 CFR Part 372.

Hydrochloric Acid, 37% w/w	CAS-No. 7647-01-0	4.34%

Hydrochloric Acid, 37% w/w (7647-01-0)	
EPA TSCA Regulatory Flag	T - T - indicates a substance that is the subject of a Section 4 test rule under TSCA.
RQ (Reportable quantity, section 304 of EPA's List of Lists)	5000 lb
SARA Section 302 Threshold Planning Quantity (TPQ)	500 lb
SARA Section 311/312 Hazard Classes	Immediate (acute) health hazard

15.2. International regulations

CANADA
No additional information available

EU-Regulations
No additional information available

National regulations
No additional information available

15.3. US State regulations

California Proposition 65 - This product does not contain any substances known to the state of California to cause cancer, developmental and/or reproductive harm

SECTION 16: Other information

Revision date : 10/24/2017

Other information : None.

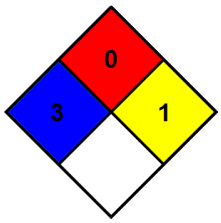
Full text of H-phrases: see section 16:

H302	Harmful if swallowed
H314	Causes severe skin burns and eye damage
H318	Causes serious eye damage
H335	May cause respiratory irritation
H402	Harmful to aquatic life

NFPA health hazard : 3 - Materials that, under emergency conditions, can cause serious or permanent injury.

NFPA fire hazard : 0 - Materials that will not burn under typical dire conditions, including intrinsically noncombustible materials such as concrete, stone, and sand.

NFPA reactivity : 1 - Materials that in themselves are normally stable but can become unstable at elevated temperatures and pressures.



Hazard Rating

Health : 3 Serious Hazard - Major injury likely unless prompt action is taken and medical treatment is given

Flammability : 0 Minimal Hazard - Materials that will not burn

Physical : 1 Slight Hazard - Materials that are normally stable but can become unstable (self-react) at high temperatures and pressures. Materials may react non-violently with water or undergo hazardous polymerization in the absence of inhibitors.

Personal protection : C

C - Safety glasses, Gloves, Synthetic apron

SDS US LabChem

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ORP Standard, 200mV

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Date of issue: 08/30/2006 Revision date: 01/10/2018 Supersedes: 01/10/2018 Version: 1.1

SECTION 1: Identification

1.1. Identification

Product form : Mixtures

Product name : ORP Standard, 200mV

Product code : LC18010

1.2. Recommended use and restrictions on use

Use of the substance/mixture : For laboratory and manufacturing use only.

Recommended use : Laboratory chemicals

Restrictions on use : Not for food, drug or household use

1.3. Supplier

LabChem Inc
Jackson's Pointe Commerce Park Building 1000, 1010 Jackson's Pointe Court
Zelienople, PA 16063 - USA
T 412-826-5230 - F 724-473-0647
info@labchem.com - www.labchem.com

1.4. Emergency telephone number

Emergency number : CHEMTREC: 1-800-424-9300 or 011-703-527-3887

SECTION 2: Hazard(s) identification

2.1. Classification of the substance or mixture

GHS-US classification

Not classified

2.2. GHS Label elements, including precautionary statements

Not classified as a hazardous chemical.

Other hazards not contributing to the classification : None.

2.4. Unknown acute toxicity (GHS US)

Not applicable

SECTION 3: Composition/Information on ingredients

3.1. Substances

Not applicable

3.2. Mixtures

Name	Product identifier	%	GHS-US classification
Water	(CAS-No.) 7732-18-5	98.64	Not classified
Potassium Chloride	(CAS-No.) 7447-40-7	0.75	Not classified
Potassium Ferrocyanide, Trihydrate	(CAS-No.) 14459-95-1	0.53	Not classified
Potassium Ferricyanide	(CAS-No.) 13746-66-2	0.08	Not classified

Full text of hazard classes and H-statements : see section 16

SECTION 4: First-aid measures

4.1. Description of first aid measures

First-aid measures general : Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible).

First-aid measures after inhalation : Allow victim to breathe fresh air. Allow the victim to rest.

First-aid measures after skin contact : Remove affected clothing and wash all exposed skin area with mild soap and water, followed by warm water rinse.

First-aid measures after eye contact : Rinse immediately with plenty of water. Obtain medical attention if pain, blinking or redness persists.

First-aid measures after ingestion : Rinse mouth. Do NOT induce vomiting. Obtain emergency medical attention.

4.2. Most important symptoms and effects (acute and delayed)

Symptoms/effects : Not expected to present a significant hazard under anticipated conditions of normal use.

4.3. Immediate medical attention and special treatment, if necessary

No additional information available

SECTION 5: Fire-fighting measures

5.1. Suitable (and unsuitable) extinguishing media

Suitable extinguishing media : Foam. Dry powder. Carbon dioxide. Water spray. Sand.

Unsuitable extinguishing media : Do not use a heavy water stream.

5.2. Specific hazards arising from the chemical

No additional information available

5.3. Special protective equipment and precautions for fire-fighters

Firefighting instructions : Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire. Prevent fire-fighting water from entering environment.

Protection during firefighting : Do not enter fire area without proper protective equipment, including respiratory protection.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel

Protective equipment : Safety glasses.

Emergency procedures : Evacuate unnecessary personnel.

6.1.2. For emergency responders

Protective equipment : Equip cleanup crew with proper protection.

Emergency procedures : Ventilate area.

6.2. Environmental precautions

Prevent entry to sewers and public waters. Notify authorities if liquid enters sewers or public waters.

6.3. Methods and material for containment and cleaning up

Methods for cleaning up : Soak up spills with inert solids, such as clay or diatomaceous earth as soon as possible. Collect spillage. Store away from other materials.

6.4. Reference to other sections

See Heading 8. Exposure controls and personal protection.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Provide good ventilation in process area to prevent formation of vapor.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Keep container closed when not in use.

Incompatible products : Strong oxidizers. Strong acids.

Incompatible materials : Sources of ignition. Direct sunlight.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Potassium Ferricyanide (13746-66-2)		
ACGIH	ACGIH TWA (mg/m³)	1 mg/m³ Iron salts, soluble, as Fe
NIOSH	NIOSH REL (TWA) (mg/m³)	1 mg/m³ Iron salts, soluble, as Fe

Potassium Ferrocyanide, Trihydrate (14459-95-1)		
ACGIH	ACGIH TWA (mg/m³)	1 mg/m³ Iron salts, soluble, as Fe
NIOSH	NIOSH REL (TWA) (mg/m³)	1 mg/m³ Iron salts, soluble, as Fe

Water (7732-18-5)
Not applicable

Potassium Chloride (7447-40-7)
Not applicable

8.2. Appropriate engineering controls

Appropriate engineering controls : Emergency eye wash fountains should be available in the immediate vicinity of any potential exposure. Provide adequate general and local exhaust ventilation.

8.3. Individual protection measures/Personal protective equipment

Personal protective equipment:

Safety glasses.

Hand protection:

Wear protective gloves

Eye protection:

Chemical goggles or safety glasses

Respiratory protection:

Respiratory protection not required in normal conditions

Other information:

Do not eat, drink or smoke during use.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	:	Liquid
Appearance	:	Liquid.
Color	:	Yellow
Odor	:	Odorless
Odor threshold	:	No data available
pH	:	No data available
Melting point	:	No data available
Freezing point	:	No data available
Boiling point	:	No data available
Flash point	:	No data available
Relative evaporation rate (butyl acetate=1)	:	No data available
Flammability (solid, gas)	:	Non flammable.
Vapor pressure	:	No data available
Relative vapor density at 20 °C	:	No data available
Relative density	:	No data available
Specific gravity / density	:	1 g/ml
Solubility	:	Soluble in water.
Log Pow	:	No data available
Auto-ignition temperature	:	No data available
Decomposition temperature	:	No data available
Viscosity, kinematic	:	No data available

Viscosity, dynamic	: No data available
Explosion limits	: No data available
Explosive properties	: No data available
Oxidizing properties	: No data available

9.2. Other information

No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity

No additional information available

10.2. Chemical stability

Not established.

10.3. Possibility of hazardous reactions

Not established.

10.4. Conditions to avoid

Direct sunlight. Extremely high or low temperatures.

10.5. Incompatible materials

Strong acids. Strong oxidizers.

10.6. Hazardous decomposition products

Potassium oxide. Carbon monoxide. Carbon dioxide.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Likely routes of exposure	: Skin and eye contact
Acute toxicity	: Not classified

Potassium Ferricyanide (13746-66-2)	
LD50 oral rat	2970 mg/kg
ATE US (oral)	2970 mg/kg body weight

Potassium Ferrocyanide, Trihydrate (14459-95-1)	
LD50 oral rat	3613 mg/kg
ATE US (oral)	2970 mg/kg body weight

Water (7732-18-5)	
LD50 oral rat	≥ 90000 mg/kg
ATE US (oral)	90000 mg/kg body weight

Potassium Chloride (7447-40-7)	
LD50 oral rat	2600 mg/kg
ATE US (oral)	2600 mg/kg body weight

Skin corrosion/irritation	: Not classified
Serious eye damage/irritation	: Not classified
Respiratory or skin sensitization	: Not classified
Germ cell mutagenicity	: Not classified
Carcinogenicity	: Not classified
Reproductive toxicity	: Not classified
Specific target organ toxicity – single exposure	: Not classified
Specific target organ toxicity – repeated exposure	: Not classified
Aspiration hazard	: Not classified

Potential Adverse human health effects and symptoms : Based on available data, the classification criteria are not met.

SECTION 12: Ecological information

12.1. Toxicity

Potassium Ferricyanide (13746-66-2)	
LC50 fish 1	869 mg/l
EC50 Daphnia 1	549 mg/l

Potassium Chloride (7447-40-7)	
EC50 Daphnia 1	825 mg/l

12.2. Persistence and degradability

ORP Standard, 200mV	
Persistence and degradability	Not established.

Potassium Ferricyanide (13746-66-2)	
Persistence and degradability	Not established.

Potassium Ferrocyanide, Trihydrate (14459-95-1)	
Persistence and degradability	Not established.

Water (7732-18-5)	
Persistence and degradability	Not established.

Potassium Chloride (7447-40-7)	
Persistence and degradability	Not established.

12.3. Bioaccumulative potential

ORP Standard, 200mV	
Bioaccumulative potential	Not established.

Potassium Ferricyanide (13746-66-2)	
Bioaccumulative potential	Not established.

Potassium Ferrocyanide, Trihydrate (14459-95-1)	
Bioaccumulative potential	Not established.

Water (7732-18-5)	
Bioaccumulative potential	Not established.

Potassium Chloride (7447-40-7)	
Bioaccumulative potential	Not established.

12.4. Mobility in soil

No additional information available

12.5. Other adverse effects

Effect on the global warming : No known effects from this product.

GWPmix comment : No known effects from this product.

Other information : Avoid release to the environment.

SECTION 13: Disposal considerations

13.1. Disposal methods

Waste disposal recommendations : Dispose in a safe manner in accordance with local/national regulations.

Ecology - waste materials : Avoid release to the environment.

SECTION 14: Transport information

Department of Transportation (DOT)

In accordance with DOT

Not regulated

SECTION 15: Regulatory information

15.1. US Federal regulations

All components of this product are listed, or excluded from listing, on the United States Environmental Protection Agency Toxic Substances Control Act (TSCA) inventory

15.2. International regulations

CANADA

Potassium Ferricyanide (13746-66-2)
Listed on the Canadian DSL (Domestic Substances List)

Potassium Ferrocyanide, Trihydrate (14459-95-1)
Not listed on the Canadian DSL (Domestic Substances List)

Potassium Chloride (7447-40-7)
Listed on the Canadian DSL (Domestic Substances List)

EU-Regulations

No additional information available

National regulations

Potassium Ferricyanide (13746-66-2)
Not listed on the Canadian IDL (Ingredient Disclosure List)

Potassium Ferrocyanide, Trihydrate (14459-95-1)
Not listed on the Canadian IDL (Ingredient Disclosure List)

Potassium Chloride (7447-40-7)
Not listed on the Canadian IDL (Ingredient Disclosure List)

15.3. US State regulations

California Proposition 65 - This product does not contain any substances known to the state of California to cause cancer, developmental and/or reproductive harm

SECTION 16: Other information

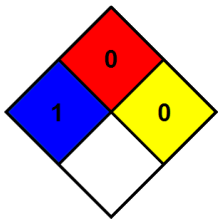
Revision date : 01/10/2018

Other information : None.

NFPA health hazard : 1 - Materials that, under emergency conditions, can cause significant irritation.

NFPA fire hazard : 0 - Materials that will not burn under typical dire conditions, including intrinsically noncombustible materials such as concrete, stone, and sand.

NFPA reactivity : 0 - Material that in themselves are normally stable, even under fire conditions.



Hazard Rating

Health : 1 Slight Hazard - Irritation or minor reversible injury possible

Flammability : 0 Minimal Hazard - Materials that will not burn

Physical : 0 Minimal Hazard - Materials that are normally stable, even under fire conditions, and will NOT react with water, polymerize, decompose, condense, or self-react. Non-Explosives.

Personal protection : B

B - Safety glasses, Gloves

SDS US LabChem

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ATTACHMENT I

Venomous Snake Safety Information

Venomous Snake Safety Information

Texas is home to over 105 different species and subspecies of snakes. Only 15 of those are potentially dangerous to humans. Those are the snakes that we feature here. For more general information on all the snakes of Texas, please visit our Snake pages [http://tpwd.texas.gov/education/resources/texas-junior-naturalists/snakes-alive/venomous-texas-snakes] .

CONTENTS

Pit Vipers

Pit vipers are venomous snakes that have an opening on each side of the head between the eye and the nostril. In Texas, we have 3 groups of these snakes: Copperheads, Cottonmouths, and Rattlesnakes.

Copperheads

Agkistrodon contortrix

Copperheads have chestnut or reddish-brown crossbands on a lighter colored body. These snakes are found in rocky areas and wooded bottomlands and are rare in dry areas. In the spring they can be found along streams and rivers, as well as in weed-covered vacant lots. There are three subspecies of Copperheads in Texas; Southern copperhead (A.c. contortrix), 20-30 inches long and found in the eastern one-third of the state; Broadbanded copperhead (A.c. laticinctus), about two feet long, widely scattered in central and western Texas; and the Trans-Pecos copperhead (A.c. pictigaster), 20-30 inches in length and found near springs in the southern part of the Trans-Pecos.

Cottonmouths

Agkistrodon piscivorous

The Latin name piscivorous means 'fish eating,' indicating its dietary characteristics. Also known as 'water moccasins', only one recognized supspecies is found in Texas; Western cottonmouth (A.p. leucostoma). Cottonmouths can be dark brown, olive-brown, olive green or almost solid black. They are marked with wide, dark bands, which are more distinct in some individuals than in others. Juvenile snakes are more brilliantly marked. The cottonmouth gets its name from the white tissue inside its mouth, which it displays when threatened. This heavy-

bodied snake, which averages about 3-1/2 feet in length, is found over the eastern half of the state in swamps and sluggish waterways, coastal marshes, rivers, ponds and streams.

Rattlesnakes

There are two groups of rattlesnakes: the more primitive forms belong to the genus *Sistrurus*. Texas has two:

Western massasauga (*Sistrurus catenatus tergeminus*), light gray, with brown oval blotches along the middle of the back and smaller blotches along each side. They are two feet in length and found through the middle of the state in grasslands, marshy and swampy areas.
Desert massasauga (*S.c. edwardsii*), lighter in color than the western massasauga, smaller and more slender. Found in the Trans-Pecos, western Panhandle and the lower Rio Grande Valley.

The more advanced forms of rattlesnakes belong to the genus Crotalus and Texas is home to six:

Western diamondback (Crotalus atrox), Brown, diamond-shaped markings along the middle of the back and alternating black and white rings on the tail. Averages 3 1/2 to 4-1/2 feet in length, and can reach seven feet. This is the most common and widespread venomous snake in Texas, found in all but the easternmost part of the state.

Timber rattlesnake (Crotalus horridus) also known as Canebreak rattlesnake is a large, heavy-bodied snake averaging 4-1/2 feet. Brown or tan with wide, dark crossbands. Tail is entirely black. Found in the eastern third of the state in wooded areas in wet bottomlands.

Mottled Rock rattlesnake (Crotalus lepidus) is light bream or pink background with widely spaced, dark crossbands and mottled areas between the crossbands. Small and slender with an average length of about two feet. Found in the mountainous areas of West Texas.

Banded Rock rattlesnake (C.l. klauberi)Similar to the mottled rock rattlesnake, but darker greenish-gray in color. Found only in the extreme western tip of Texas.

Blacktail rattlesnake (Crotalus molossus) is gray to olive green with dark blotches along the back and a black tail. Averaging a length of 3-1/2 feet, it is found from Central Texas throughout most of West Texas in bushes and on rocky ledges.

Mojave rattlesnake (Crotalus scutulatus) is similar to the western diamondback in markings, but smaller and more slender and found only in extreme West Texas.

Prairie rattlesnake (Crotalus viridis viridis) is a slender rattler that is greenish or grayish, with rounded blotches down the middle of its back. Average length is about three feet and its found in the grassy plains of the western third of the state

North American Cobras

Coral Snakes

Micrurus fulvius tener

The brightly colored Texas coral snake is the state's only member of the Elapidae family, which includes the cobras of Asia and Africa. The coral snake is slender with a small indistinctive head and round pupils, and is usually is 2-1/2 feet or shorter. Its distinctive pattern is a broad black ring, a narrow yellow ring and a broad red ring, with the red rings always bordered by the yellow rings. Several harmless snakes are similarly marked, but never with the red and yellow touching. 'Red on yellow, kill a fellow; red on black, venom lack,' is a handy way to distinguish the highly venomous coral snake from nonvenomous ringed species. Coral snakes are found in the southeastern half of Texas in woodlands, canyons and coastal plains.

Precautions and Responses

How to Avoid

Learn to recognize the snake species that are likely to be in the area. Please do not kill a snake - even a venomous one. Snakes serve a valuable function in the environment. The majority of bites result from people taking unnecessary or foolish risks with venomous snakes. Understanding what snakes look for in suitable habitat can help you know when to be wary. Understanding their behavior will help you know what to do if you encounter one. Snakes like tall grass.

- Keep the lawn around your home trimmed low.

- Remove any brush, wood, rock or debris piles from around the residence - they make great hiding places for snakes and their prey - rodents.
- Always wear shoes while outside and never put your hands where you cannot see them.
- Be careful when stepping over fallen logs and rock outcroppings.
- Take care along creek banks and underbrush.

Snakes do not prey on humans and they will not chase you, in fact they usually retreat or escape if given the opportunity. The danger comes when they are either surprised or cornered. Do not play around with a dead snake, they have been known to bite and envenomate. Get a good field guide and keep it handy especially in the field.

What to Do

If bitten,

1. Assume envenomation has occurred, especially if initial symptoms are present. Initial symptoms of pit viper bites include fang puncture marks; in addition, they almost always include immediate burning pain at the bite site, immediate and usually progressive local swelling within five minutes, as well as local discoloration of the skin. Initial symptoms of coral snake bites include tremors, slurred speech, blurred or double vision, drowsiness or euphoria and a marked increase in salivation within four hours; however, life-threatening effects from coral snake envenomation may not be evident for 24 hours or longer.
2. Identify the species of venomous snake that inflicted the bite, if possible, taking care to avoid another person being bitten. Identification is not necessary, but may be helpful.
3. Keep the victim as calm as possible. This helps reduce the spread of venom and the onset of shock.
4. Keep yourself and any other members of the group calm as well. This will help reassure the victim and ensure that the appropriate first-aid measures are followed, as well as preventing anyone else from becoming injured.
5. Know and be alert for the symptoms of shock, and institute the proper treatment should it ensue. Difficulty in breathing and/or kidney failure are frequent symptoms of envenomation.
6. Wash the bite area with a disinfectant if available.
7. Remove jewelry such as rings and watches, as well as tight-fitting clothes, before the onset of swelling.
8. Reduce or prevent movement of a bitten extremity, using a splint if possible; this helps decrease the spread of venom. For the same reason, position the extremity below the level of the heart.
9. Get the victim to a medical facility as soon as possible and begin treatment there with intravenous antivenom, crystalloid solutions and antibiotics. Antivenom treatment is generally most effective within the first four hours of envenomation, and is ineffective after 8-10 hours.

What NOT to Do

1. **Do not** make incisions over the bite marks. This can result in significant damage to already traumatized tissue, and can damage intact structures such as nerves and blood vessels, enhance bleeding caused by anticoagulant components of venom and

increase the rapid spread of venom throughout the body if the circulatory system is compromised. A suction device, such as the Sawyer Extractor™, may be used without making any incisions. This device may remove significant quantities of venom, although its efficacy has yet to be conclusively determined.

2. **Do not** use a tourniquet or other constricting ban except in extreme cases of envenomation, and then only if properly trained in the technique. Such devices are of no value if applied more than thirty minutes after the bite, and if improperly used they can restrict blood vital blood flow to the traumatized tissue and possibly result in the amputation of an extremity. Unbearable pain can also result, and the improper loosening of such devices can allow sudden systemic absorption of venom.
3. **Do not** use cryotherapy (including cold compresses, ice, dry ice, chemical ice packs, spray refrigerants, and freezing) for the same reasons that the tourniquets should be avoided, and also because it can increase the area necrosis.
4. **Do not** use electroshock therapy, a method popularized following publication of a letter from a missionary in South America reporting its effectiveness in treating bites from snakes of uncertain identity. Several controlled clinical trials and at least one on humans have failed to demonstrate any positive result; moreover, the potential negative results from the uncontrolled use of an electric charge are obvious.
5. **Do not** drink alcohol, as it dilates blood vessels and increases absorption from the circulatory system, and thus helps spread venom faster.
6. **Do not** use aspirin or related medications to relieve pain, because they increase bleeding. A pain reliever not containing aspirin, however, may be used.
7. **Do not** use the pressure/immobilization technique, which consists of firmly wrapping the entire limb with an elastic bandage and then splinting, especially for pit viper bites. The theory behind this treatment is to confine the venom to the area of the bite until reaching a medical facility, but studies have shown the technique to be ineffective or worse with venoms which produce local swelling and tissue damage.
8. **Do not** administer antivenom in the field unless properly trained in the procedure, unless evacuation to a medical facility will take many hours or days, or unless envenomation has been extreme. Intramuscular or subcutaneous application of antivenom has proven to be much less effective, and in some cases ineffective, than intravenous administration. Acute allergic reactions to antivenom can occur, and contemplated field administration of antivenom should include provision for a sufficient supply of epinephrine (adrenalin) to counteract any such potential effects.

ATTACHMENT J

Respiratory Protection Program [RESERVED]

ATTACHMENT K

Confined Spaces Program [RESERVED]

ATTACHMENT L

INTERA Standard Operating Procedures [RESERVED]

ATTACHMENT M

ToxiRAE 3 H_2S Monitor User's Manual [RESERVED]