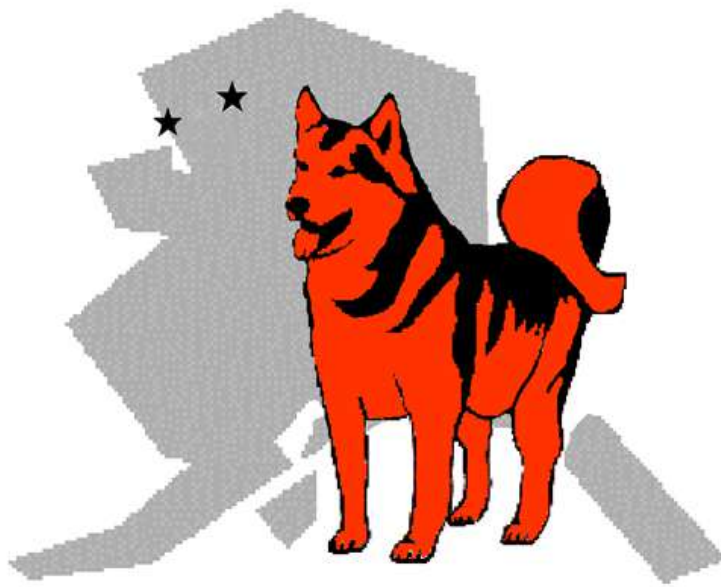


HEALTH & SAFETY HANDBOOK

Last Revision May 2018



*Committed to,
“Everyone Going Home Safe & Healthy Every Day”*

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1.01 Emergency Telephone Numbers

EMERGENCY: Dial 911
Report a Spill: Dial 45367

Mill Operations Control Room – Radio Channel 4, or Dial 45222

Medical Facility	Room NW107	Dial 45265
Physician Assistant	Room NW106	Dial 45265
Response Chief	Room NW102	Dial 45212
Safety & Health Coordinator	Room NW101	Dial 45146/46033
Safety and Training Officers	ESB	Dial 45144/45173/45393
Environmental	Office	Dial 45367/45145
Radiation Safety Officer	E/I Office (Mill)	Dial 45207/45208

Port Emergency Telephone Numbers

Port Operations/Hopper Crew: Radio Channel 3, Dial *48010

Port Medical Facility	Room CL4105	Dial *48011
Port Medic	Room OF4202 / P4203	Dial *48011/*48012
Fire Response	Room OF4202 / P4203	Dial *48011/*48012
Spill Response	Room OF4202 / P4203	Dial *48011/*48012

Employee Notification of Offsite Home Emergencies: Dial 907-754-5222

Offsite persons trying to notify Red Dog Operations employees of home emergencies are to call the Mill Control Room at 907-754-5222. The Mill Control Room Operator will contact Human Resources with the emergency notification information.

All major incidents, such as a fatality or major mine incident, must be reported to MSHA within 15 minutes at 1-800-746-1553. All major spills must be reported to governmental offsite regulators within 15 minutes of the spill.

Red Dog Operations Port must comply with United States Coast Guard Marine Security Directives (MARSEC). There are three levels of MARSEC Level 1, 2, and 3. Signage that indicates the MARSEC Level is posted at the traffic light at MS-2, at the surge bin, outside of the Port Medic office, and on the lighted message board in the Port PAC break-room. All visitors are required to check in with either the Port Medic or the Port Supervisor upon arrival.

The designated radio channels for Red Dog Operations are as follows:

Channel 1 Mine Operations	Channel 4 Mill Operations call in Emergencies
Channel 2 Plant-site, Yards, Roads	Channel 5 Fire Emergency
Channel 3 Port Road	Channel 6 Fire Tactical

1.02 The Red Dog Operations Health & Safety Handbook

Teck has a rich international tradition in the mining industry. Teck and Red Dog Operations are committed to upholding the Company's stated Core Value of Safety, "Everyone Going Home Safe and Healthy Every Day".

Mining exposes people to high risk situations, jobs and tasks. It is every employee's responsibility to aide in identifying and mitigating the safety risks and behaviors in each task or job whenever encountered.

Teck's Management Team at Red Dog Operations enables this by providing every employee with the proper equipment and training to perform their job safely. However, that is not enough to reach our goal. Every time we start a task we make choices that can result in injury. If we take shortcuts, rush, put ourselves in the line of fire, do not keep our mind on task, or if we work outside our level of training, we may be placing ourselves in harm's way. Think about each choice you are making before each action that is taken. Safety is the first measure of quality work.

Red Dog is blessed with the richest zinc deposit in the world. The other vital key to success is our employees, and Red Dog Operations needs both to produce a quality product. Quality work is performed by those employees who can do their job safely.

Some Guiding Principles:

- Safety is at the core of our business.
- All injuries and occupational illnesses are preventable.
- Employee involvement, feedback, and recognition are fundamental to safety.
- Safe behavior is doing the right thing at the right time for the right reasons.
- Management is responsible for visibly and consistently reinforcing that safety is a core value.

Workplace risk will be reduced in the following priority:

1. Engineering Controls
2. Administrative Controls and Operating Practices
3. Personal Protective Equipment

Employees and contractors have the right and responsibility to notify Management of any hazards without reprisal, and they have the right to receive timely and adequate responses to the concerns expressed.

Employees and contractors are responsible for working safe and accountable for their own actions.

Employees and contractors can be held accountable for any violation of the safety policies, procedures and standards, and could result in disciplinary actions.

Training

Training is a key element. Each of us needs to know how to perform the tasks and jobs expected of us. Many hours are devoted to training to promote safety and improve the quality of work performed. The training at Red Dog Operations is designed to assist every employee and contractor on site to work and thrive in a safe environment. It includes mandated training from Federal, State and Local Government Agencies, such as MSHA and EPA; Corporate training derived from Teck's many years in the mining industry at various locations around the globe. By applying the safe work practices you learn during training, you are greatly reducing the risk to you and your coworkers.

Teck Alaska thrives on the principle that, "A well-trained employee, who follows his/her training, is a safe employee."

Safety principles are taught in classes and sessions such as our Courageous Safety Leadership, SafeStart, Hazard Recognition, Workplace Examinations, and others which advocate each of us learn to recognize both hazards and at risk behavior. We must then have the motivation and the courage to mitigate the situation or explain the hazard in the behavior.

These sessions are designed for employee's to assess any situation and act safely, while following the procedures and specific guidelines, rather than to attempt to police every individual and situation.

This journey continues with MSHA, PPE Training, Certified Apprenticeship Programs, Supervisor Training, and specific task training classes. This training is so every employee has the knowledge and skills to do their job, work safely, and watch out for their co-workers.

Job Planning

Another step is job planning. Safety must be considered from conception to completion of any job. Start of day toolbox meetings, Material Work Orders, Pre-Job Walk Downs, Field Level Risk Assessments, Job Safety Analysis, Confined Space Assessments and year round planning for the Zero and Low Tonnage Events are some of tools used to complete every job safely. Complimenting this are Departmental Standard Operating Procedures and Policies.

Teck also provides personal protective equipment to ensure you are fully equipped to conduct any job safely. A variety of respirators, gloves, eye/face protection, specialized tools for safety include harnesses, fire extinguishers, head lamps, flagging and barricading materials, and many different types of tags for different jobs we perform on the Site.

The Safety & Health Department is here to help with knowledge, expertise and technical resources dedicated to helping the workforce achieve safe production. We are always available and willing to assist you with your safety questions and concerns.

Let's all work together to ensure Red Dog Operations is a safe place to live and work so everyone can go home safe and healthy every day.

1.03 Red Dog Operations

Red Dog Operations has basic values that form the cornerstone of our business and of the Red Dog operating philosophy. They are:

- Safety
- Protection of the Environment
- Respect for the Individual
- Product Quality
- Protection of our Assets
- Strong Technology Base

Safety

We take pride in our ability to do our job right and this includes doing it safely. All of us, from the Department Head to the newest employee, have the responsibility to work safely and avoid injury to ourselves and our co-workers. This applies not only on the job, but off the job and at home. We believe maintaining a safe operation at Red Dog is of a benefit far beyond any resulting dollar savings. The human values involved are of far greater importance to the employer, employee and the employee's family.

Protection of the Environment

We work diligently to comply with all existing local, state and federal laws and regulations, to provide additional environmental protection measures, where warranted, that is technically feasible and economically viable. We encourage, support and conduct necessary research to establish high standards of performance and to improve methods for environmental control. We work to keep employees, agency personnel, and the general public fully informed concerning the environmental aspects of company operations.

Respect for the Individual

Red Dog performance standards place certain demands on our Employees. But, they also provide challenges, opportunities and rewards. We recognize our Employees are the key to our success. Without you, Red Dog cannot operate. As a newcomer to Red Dog, we hope to earn your loyalty, enthusiasm and motivation. It is this team spirit that makes Red Dog Operations a great place to live and work. The quality of our product is reflected in your dedication.

Please ask questions, particularly if something is not clear to you. We pride ourselves in being able to deal directly with each Employee and having each Employee able to deal directly with us. We enthusiastically accept our responsibility to provide good working conditions, good wages and benefits, fair treatment, and the personal respect for the individual. Regardless of what position you hold, your contribution to a job well done plays an important part of the overall success of Red Dog and your own personal satisfaction.

Product Quality

The business of mining lead and zinc is competitive. At Red Dog, we are committed to providing customers with a quality product that is delivered on schedule and fulfills their specification requirements. Quality is the result of a planned and exacting effort.

Protection of Our Assets

As Red Dog Operations will be around for many years, it is in our best interest that we keep our plant facilities and equipment in first-class condition. A lesser standard is unacceptable if we are to maintain our competitive edge in the world marketplace.

Strong Technology Base

We must always strive to find better and more efficient ways to operate Red Dog, and it is this goal that will keep us in business when others may fail. Don't hesitate to suggest new ideas. Your input is appreciated!

While the Operating Philosophy applies to all Red Dog Operations employees, as supervisors, it is your duty and obligation to ensure that the Philosophy is adhered to by employees, contractors and visitors.

1.04 Individual Safety Expectations

The success of our operations is based upon each individual having a positive attitude towards safety and injury prevention.

The individual is expected to:

- Participate in establishing a culture of safety with a goal of zero workplace injuries and incidents.
- Be accountable for the safe performance of the job, both for your personal safety and that of fellow workers. This includes adhering to all safe work practices and the proper use of personal protective equipment and safety equipment.
- Report every injury, near hit, spill, and incidence of fire, and equipment or property damage to their Supervisor immediately.
- In the event of an incident, ensure the proper steps are taken to “freeze” the scene so the incident site can be kept in a pristine state for the incident investigation.
- Assist in the investigation of incidents as requested by the Supervisor.
- Take necessary actions to stop or correct unsafe behavior or conditions and report them to your Supervisor immediately.
- Actively participate and contribute in safety meetings.
- Become familiar with the content of this Safety Handbook, Company policies, and pertinent standards or safe operating procedures.

1.05 Safety Guidelines for Supervisors

As a supervisor, you are accountable for the safety of your employees and their compliance with the requirements of the Health and Safety Handbook.

Expectations

- Lead by example through your own safe actions.
- Maintain a working knowledge of all safety rules which apply to your employees jobs.
- Actively support and enforce the requirements of the Health and Safety Handbook and the safety regulations of federal, state and local authorities.
- Ensure the equipment assigned to and used by you and your crew is maintained in a safe working order.
- Organize and plan all work activities, assess jobs using a Safety Environment Task Assignment (SETA) card, Field Level Risk Assessment (FLRA), or similar tool so that risks are recognized and mitigated and that the safety of the crew members are not jeopardized.
- Provide safety orientation to every new employee on your crew. This will include:
 - A warning of the hazards found in the job.
 - Instruction in the safe work procedures necessary to do the assigned job.
 - Making certain that the employee is properly prepared and equipped to do the job.
- Conduct daily toolbox safety meetings and provide a formal safety meeting with presentations that includes content, sign off, and meeting minutes at least once a month.
- Notify your immediate supervisor, or Department Head immediately of any incident which results in personal injury, property damage or spill.
- It is your responsibility to conduct an appropriate investigation of incidents.
 - You must initiate a Supervisor Incident Report (SIR) in SiteLine no later than 24 hours after your first knowledge of the incident.
 - In your investigation you must determine the cause of the incident and provide corrective actions that will prevent a recurrence. After your investigation, you will be expected to implement the measures necessary to prevent recurrence. If it is necessary to obtain cooperation of others to achieve this, it will be your responsibility to bring it to the attention of your immediate supervisor, or the Department Head.

Pre-Job Planning

- Planning will be an integral part in preventing incidents on your crew's shift. Each project and job site will present different problem areas and your planning and pre-job risk assessment must include the anticipation of these problems.
- In planning out your task, it is your responsibility to identify the risks and potential incident exposures which your crew will encounter. Then you must take the measures necessary to eliminate or control the risks and to prevent an incident from occurring.

Your Planning Must Include

- Condition in the area such as weather, terrain and traffic conditions.
- Knowledge of the physical capabilities and skills of your crew members. You must know and respect the limitations of your crew.
- Scheduling of the crew and equipment so that you will have them when and where you need them.
- Obtaining the necessary tools and equipment for the job, including safety equipment, and fire extinguishers.
- Know how to contact emergency fire and medical services.

This Planning must be Backed-up By Action

- Coordinating your work with the work of other crews.
- Training new employees in the safety procedures required for the job.
- Making routine inspections of all tools and equipment.
- Observing the work activity of your crew and promptly correcting any unsafe work habits before they result in an incident.

Safety Orientation

It is your responsibility to ensure each person on your crew understands the importance of incident prevention. This effort must be made in addition to any safety orientation given to newly hired employees. This requirement holds for employees transferring to your crew from other departments, as well as those who are newly hired. You will be expected to:

- Explain the nature and scope of the work assigned to your crew each time a new employee is added and each time your crew begins new work assignments.
- Familiarize the employee with the hazards and risks in the work they are performing and develop a plan for elimination or control of the risks.
- Ensure the employee has been issued the required safety equipment, the Health and Safety Handbook and any other equipment the job requires.
- Explain to all new employees their requirements to support the safety culture as well as the importance of incident prevention. You must make it clear to a new employee that you intend to maintain the safety standard and will enforce the Company's incident prevention practices. **You must also follow-up this statement in your daily actions.**
- Inform the employee of the specific safety instructions which apply to the work, including the need for any special safety equipment. Here again, you must follow-up in your day-to-day actions to enforce the use of the equipment.
- Ensure the employee understands that disregarding safety instructions, breaking rules or violating safety policies or procedures will result in discipline up to and including termination of employment.
- Explain to employees where they can obtain first aid treatment if needed and emphasize the importance of reporting all injuries.
- Explain that any incident, no matter how minor, is to be reported immediately to you or to another supervisor when you are not available. In the event of an incident, ensure the proper steps are taken to "freeze" the scene so the incident site can be kept in a pristine state for the incident investigation.
- Show the employee around the job site and introduce the other members of the crew.

Job Instructions

- Good job instructions and good training go hand-in-hand with safe and efficient production. Both are your responsibility as a supervisor.
- Never assume that an employee is qualified to do a job or run a piece of equipment until you have checked the employee out. All employees require close supervision until they have demonstrated that they know how to perform the duties you have assigned them.
- All task training will be documented using the MSHA Form 5000-23.
- When you give instructions, remember that although you understand exactly what you are telling an employee, the employee may not clearly understand your directions.
- The best way to confirm clear understanding of directions is to ask for the employee to repeat what you said and have them verify their understanding.
- When your instructions are detailed or involved, and have a sequence of events which will occur over a period of time, it is always better to write them down.
- When you give your crew instructions, always provide any specific safety instructions they will be required to follow in performing the work. Never assume an employee will automatically understand this part of the job unless you, as their supervisor, point it out.
- Sometimes you may have to show an employee how to do a job. When that is the case, follow these guidelines:

STEP 1: Prepare the employee to receive the instructions

- Put them at ease. Remember, people don't think straight if they are embarrassed or scared.
- Find out what the employee really knows about this job. Start in where their knowledge ends.
- Get their interest. Relate the job to the crew's assignment; show that this work is important.
- Put the employee into the position of performing the job correctly. Don't have the employee left to determine how to do the job correctly. Eliminate the opportunity for short cuts.

STEP 2: Present the operation

- Tell what you expect of the employee.
- Show how it is done through example.
- Ask the employee to explain to you how the job is done.

Remember:

- Explain the job a step at a time.
- Explain the key points of the job.
- Explain any hazards or risks involved in the job and how to manage them.
- Explain how to protect assigned equipment from abuse or other damage.
- Explain clearly any routine maintenance the equipment may require.
- Ask the employee if they have any ideas on how to do the job more safely and productively.
- Repeat the job and the explanation, if necessary.

STEP 3: Try out the employee's performance

- Have employees do the job and observe them.
- Then have the employees do it again, and have them explain to you what they are doing and why. It's easy to go through motions and not really understand what you are doing.
- Have the employee explain the key points, including safety measures to be followed;
- Correct errors but do not be demeaning, be professional in your critique. Remember our company values; respect for the individual. Treat your employees with dignity. Tell them if they are going in the right direction.
- Continue doing all this until you are confident the person knows how to do the job safely.

STEP 4: Follow-up

- Direct employees to who they should go to and seek help if needed. Ensure they understand that you or your designee will direct them or place them on their own when deemed safe to work on their own.
- Check employees frequently in the beginning and less frequently later on. Identify any mistakes you see, or better ways of doing the job, in an open and friendly manner.
- Have other crew members keep an eye on the new employees.
- Taper off this extra coaching until the employee is able to work under normal supervision.

Safety Observations

- You must make it a habit to complete job safety observations of your crew each day. This means that, during the work day, you stop to watch your crew, correcting any unsafe practices and taking note of exceptionally good safety practices. Bring these observations to the attention of your crew as training opportunities and follow-up on them as you would any other instructions.
- Look for unsafe acts or conditions which could lead to an incident in all your contacts with others on the job, as well as in your own actions. To give this part of your job, as a supervisor, the emphasis it deserves, you must make a special effort to develop your own safety consciousness. You can do this by making deliberate safety observations of your crew.

2.01 General Safety Rules and Guidelines

No job is so important that you cannot take the time to do it safely.

You shall report all injuries, incidents and spills, no matter how minor immediately to your supervisor.

In the event of an incident, ensure the proper steps are taken to “freeze” the scene so the incident site can be kept in a pristine state for the incident investigation.

Supervisors shall have all injured employees immediately report to the onsite medical clinic for an evaluation.

Keep all working areas clean and orderly.

Dispose of trash, construction debris, rags and combustible materials in proper disposal containers.

Running in work areas, except during an emergency, is prohibited.

When ascending or descending stairways, use the handrail, and take one step at a time.

The proper training must be obtained and documented before operating any vehicle, machine, or equipment.

No work shall be started on any equipment without the knowledge and consent of the person responsible for that area. Contact the Mill Operator, Mine Shifter, or Port Operator to discuss hazards that may exist, other crews who may already be working, and to obtain permission to commence new work in those work areas. Follow up with those Area Operators upon the completion of the work, or whenever leaving the area or facility.

Close out all permits upon the completion of work or at the end of the shift.

Hikers going into the areas surrounding the pit must notify the Mine Shifter who will inform them if blasting is expected during the shift. Persons must stay a minimum of 1,800 feet from any blasting site.

Visitors wanting to watch a shot must notify the Mine Shifter who will check with the blaster in charge for guidance as to the safest place to watch.

All personnel shall immediately take necessary action to correct any unsafe actions or conditions and, if appropriate, report them to the responsible Supervisor.

All equipment shall be positioned in such a manner that ensures the equipment's exhaust does not enter buildings.

Serious incidents have occurred because injured personnel were wearing jewelry. These injuries may have been caused by contact with hazards such as moving machinery, energized electrical systems, hot surfaces, or less obvious events like catching rings when climbing equipment. Precautions shall be taken to ensure loose clothing, jewelry, unrestrained long hair, or accessories do not pose a hazard whenever working around rotating/moving equipment.

Fire extinguishers, alarm boxes, fire doors, eyewash stations, and all other emergency equipment shall be maintained in good working order and kept clear of obstructions.

Individuals or work groups involved in working outside of a facility shall have radios or other means of communication in their possession.

A competent person will conduct a workplace examination before miners begin work in that place.

Remember that some employees on the job are inexperienced and may not be aware when danger exists. Warn others when danger exists; they may not be aware of it.

Always know a safe emergency exit path from your work location.

The use or possession of illicit drugs, mood altering substances and alcohol while at Red Dog Operations is cause for immediate suspension, pending review and investigation to determine compliance, and if substantiated, will result in termination. Any employee whom the Company reasonably suspects may be affected by the use of drugs or alcohol may be required to submit to a drug and/or alcohol test. Reasonable suspicion testing is done to identify drug and alcohol affected employees who may pose a danger to themselves or others in their job performance. All prescription medications that may cause drowsiness, dizziness or make you disoriented must be reported to your supervisor and the onsite Physician Assistant. Refer to the HR Employee/Supervisor Handbook, 6.05 Red Dog Drug and Alcohol Policy.

All personnel will adhere to site specific Personal Protective Equipment (PPE) requirements.

If lightning or thunder occurs, suspend all outside activities and immediately seek shelter inside.

Follow all Standard Operating Procedures (SOP's), Guidelines, and Requirement documents.

When lifting, use the strong muscles of the legs instead of the weaker muscles in the back. Do not lift beyond your safe capability. Get help lifting something if needed.

Fighting, horseplay or unsafe acts are prohibited at all Red Dog work locations and may be sufficient cause for immediate suspension or termination.

All defective equipment must be tagged out of service, then repaired or replaced before further use.

D-handled shovels are prohibited at Red Dog Operations.

Never use compressed air to blow off dirt and debris from clothing. Do not horseplay with compressed air or turn it on anyone else. Never use compressed air to clear dirt off or cool down equipment.

Never operate any machinery without the proper safety guards in place. Never remove a mechanical guard except for repairs and only after power is shut off and the main switch is locked-out. Reinstall the guard when repair work is completed, or before attempting to restart.

Never clean, oil, or adjust any machinery while it is in motion.

Keep the safety caps on all compressed gas cylinders when the cylinders are not in use for longer than one hour or, on an approved locking cart and keep bottles standing and secured in a safe manner at all times. Use approved straps or chains only for securing cylinders.

Keep an unattended crane block at the top of its travel and not parked over walkways. Leave no suspended load unattended. *(Exception: Flocculent handling which has been engineered and approved to be done in a safe manner).*

Never walk under a suspended load or an empty crane block.

Do not tamper with any safety device in any manner.

If the temperature is at or below -25 F or if the wind speed including gusts is 25 MPH or greater do not operate or continue to operate any man lift, scissor lift or man basket as this will decrease machine stability. This shall apply to all Red Dog Operations employees and contractors.

Employees are not permitted to have firearms in their possession while onsite. However, with prior arrangements with the Safety & Health Department, employees may be allowed to bring firearms to Red Dog. The Safety & Health Department will take possession of the firearm at the airport upon arrival. On the day before departure, the owner of the firearm must make arrangements with the Safety & Health Department to ensure the firearm is properly secured, an Alaska Airlines Firearm(s) Declaration is filled out, and the firearm is ready for delivery to the airport and placed on the aircraft.

Archery bows are permitted onsite, but will be secured with a locking mechanism issued by the Archery Club Range Master to prevent operation while in possession of the owner or anyone else anytime other than on the indoor or outdoor archery range. You must become a member of the RDO Archery Club, your bow inspected, and the orientation, rules, and safety briefing delivered to you by a qualified member of the RDO Archery Club before you can attend any archery club events.

Every individual has the right and moral obligation to pause or stop the job if you feel it is unsafe. The job will not restart until all personnel involved agree that it is safe to proceed.

No job is so important that you cannot take the time to do it safely.

2.02 Injury and Illness Reporting

Dial 911 to report a medical emergency.

It is mandatory that an employee report any occupational injury or illness, however slight, to their supervisor immediately. Employees are subject to discipline for any failure to report an occupational injury or illness.

Reporting Procedure

In the event of a serious medical emergency, the person witnessing the occurrence will call 911, or call the Mill Operations Control Room on Radio Channel 4.

The emergency dispatcher will notify the appropriate Emergency Response Team via pager to respond to the incident.

Work Related Occupational Injury or Illness

A work related occupational injury that happens while the employee is actively at work performing their assigned work duties or an illness that occurs as a result of an employee's occupation while the employee is onsite.

- Notify your supervisor immediately of the injury or illness
- Ensure the proper steps are taken to "freeze" the scene so the incident site can be kept in a pristine state for the incident investigation.
- See the onsite Physician Assistant (PA) in the clinic for initial evaluation and treatment.

Non-Work Related Illness

A non-work related injury or illness which occur onsite, but is not related to the employee's job.

See the onsite PA in the clinic for initial evaluation and treatment.

Clinic Hours:

6:30AM – 1200PM

1:00PM – 6:00PM

6:30PM – 8:00PM

2.03 Fire Emergency and Response

Report all fires immediately. Report a fire to the Mill Operations Control Room by dialing 911 or call on radio channel 4.

Always report a fire immediately before attempting to fight the fire. This will initiate the Emergency Response Team to respond to the fire emergency.

Access to firefighting equipment must have 3 feet clearance from all directions. Obstacles or debris within this area could delay emergency use. Each employee shall be familiar with the location and use of firefighting equipment. If you have any questions or concerns, please ask your supervisor for assistance.

Do not remove or tamper with fire extinguishers installed on equipment, inside vehicles, or in stationary locations, unless authorized to do so, or in case of fire.

Red Dog Operations uses primarily dry chemical multipurpose ABC Class fire extinguishers throughout the operation. These extinguishers may be 5, 10, or 20-pound sizes for portable units depending on the need for that area and application.

A single fire extinguisher does not work on all types of fire. There are many different types, or classes of fire extinguishers just as there are many different classes of fire. Specialized extinguishers are positioned around the site in preparation for the different classes of fire that may occur. These extinguishers include clean agent fire extinguishers in the electronic equipment areas, combustible metal extinguishers located in the machine shops and airport, wet chemical extinguishers for cooking grease fires located in the kitchen, and flammable liquid fire extinguishers located at the fuel dispensing area. If any of these specialized extinguishers are in your work area, please ask your supervisor for additional instruction for proper operation.

Do not utilize water or foam-type fire extinguishers on electrical fires until the equipment is de-energized.

Do not use water on flammable liquid fires as it may increase the intensity and heat of the flames and spread the fire to other areas.

Any time "Hot Work" is being conducted there must be, at a minimum a 10lb fire extinguisher available for fire watch. Fire extinguishers mounted in the work area are not to be used for this purpose. A fire extinguisher to be used for hot work may be obtained at the Tool Crib or at the Fire Technician's shop in the Service Complex.

All fire extinguishers shall be inspected monthly by the area operator and serviced annually by the Fire Technicians. Discharged or inoperable extinguishers shall be replaced immediately. A Hot Work Permit is required in all areas except approved welding shops. Refer to the RDO Hot Work Requirement for details.

All flammable and combustible liquids shall be stored in an approved and labeled connex or storage cabinet.

Flammable liquids will be stored in manufacturer's container or properly labeled safety cans with spring-closed industry approved cover and flame arrester.

Never use a flammable liquid as cleaning agent. Use only approved cleaning solvents.

On a daily basis, discard or store all oily rags, waste, and similar combustible materials in approved metal covered containers.

Extinguish all matches, cigarettes, cigars, and pipe tobacco before discarding into an approved containers. Do not throw cigarette butts on the ground. Only smoke in designated smoking areas.

Do not smoke while fueling equipment or in refueling areas.

Never leave open flames or heated assemblies unattended. After using open flame tools, thoroughly inspect the area for live sparks.

It is prohibited to store flammable substances on equipment or inside vehicles, unless in an approved and labeled container.

Automatic Systems

The majority of facilities at Red Dog have installed automatic sprinkler systems and fire alarms. Some facilities also have specialized chemical systems. These systems are a key component of the life safety systems installed for the protection of all personnel. The systems are electronically supervised to prevent tampering.

Do NOT tamper, alter, obstruct or inhibit any of these life safety systems.

Tampering or unauthorized disabling of any fire system at Red Dog Operations is grounds for suspension and/or termination.

Do not hang any item from sprinklers, sprinkler piping, or smoke detectors.

Fire equipment including fire hydrants are for emergency use only.

Fire system controls, isolation valves and components are installed by design in various locations around the Mine and Port Facilities. For any questions regarding this equipment, contact the Response Chief or the Fire Technicians.

Evacuation Procedures

Treat all alarms as actual emergencies until declared safe by the appropriate authority.

Supervisors are responsible to ensure all employees know the exit routes from buildings and work areas to the designated muster areas.

When an alarm or other evacuation order is sounded:

1. Quickly safe out your area, tools and equipment. (i.e. shut off torches, secure equipment and close normally closed doors, etc.).
2. Proceed to the designated Primary Muster Area. Be aware of the surrounding conditions along the route. Do not walk through areas that may be involved in the emergency.
3. If the Primary Muster Point cannot be reached, safely proceed to the Secondary Muster Area.
4. Sign in with the person taking role and accounting for personnel at the muster area.
5. Relay any first-hand information about the situation to the Response Chief or Control Room Operator.
6. Do not leave the muster area until given the "All Clear" by the Response Chief.

PAC Evacuation

Exit your room with appropriate clothing for current/seasonal weather conditions, and proceed directly to the Gym. Keep a "to go" bag ready for emergencies with appropriate clothing, closed toed shoes, medication, and your purse or wallet containing your identification. In the case of a fire, you may not be able to return to your room.

Your path to the Gym should be the most direct route possible. If you encounter smoke or fire, proceed to the nearest exit outside. If possible, make your way to the main entrance of the PAC (double doors) and then to the Gym to be accounted for, unless given other instructions by the emergency crews.

Upon arrival at the Gym, quietly stand in line below the designated letter corresponding to the PAC Wing you live in. Check in with the designated Wing Representative for accountability.

If you are a visitor to the PAC that do not have a room assignment in the PAC, report to the center of the gym for accountability.

If the alarm is sounding during shift change or while you are in the utilidor heading towards the PAC, return to the Service Complex for the duration of the incident.

Silencing of the audible alarms is **NOT** notification that the facility is safe. The Response Chief or his representative will verbally notify all personnel in the muster area that either the facility is safe or an evacuation of the building will begin. **In the event of an evacuation follow the instructions of the ERT and stay with the group.**

If you observe smoke or fire in your hallway, stay calm and shelter in place:

1. Report the fire immediately to the Mill Operations Control Room. Dial 911 or call on radio channel 4 to report the fire and your location.
2. Place a towel at the bottom of your door to block smoke from entering your room.
3. Hang a sheet on the outside of the window and leave the window open.
4. Sit or lay down on the floor.

Remember there are systems in place for your safety. The smoke detector will inform the Emergency Response Team of your location, and the sprinkler system will contain fires to small locations.

All personnel will muster with the building occupants if they are working in that facility. Maintenance personnel will monitor radio channel 4 if a radio is available at the muster area. Maintenance personnel may be required to shut power to a facility.

Port Site Evacuation

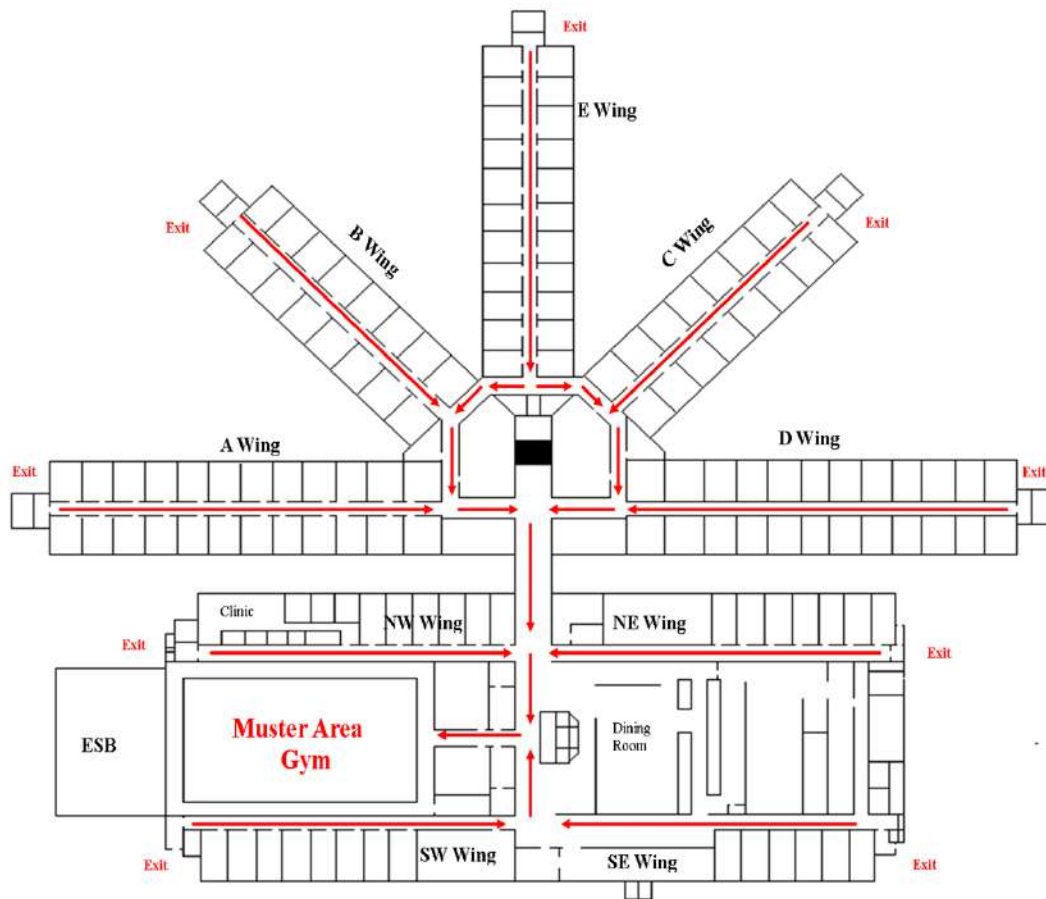
In the event of a fire alarm, proceed to the muster area by quickest direct route. If heavy smoke or dangerous conditions are present, use the nearest emergency exit to leave the building and proceed to the Primary Muster Area (Dining Room). If the dining room is involved in the incident, proceed to the Secondary Muster Area (Basketball Court in front of PAC)

RDO Evacuation Maps

Main PAC

Primary Muster Area: Gym

Secondary Muster Area: Service Complex Warehouse Receiving Area



PAC Expansion, F and G Wings

Primary Muster Area: Gym

Secondary Muster Area: Service Complex Warehouse Receiving Area

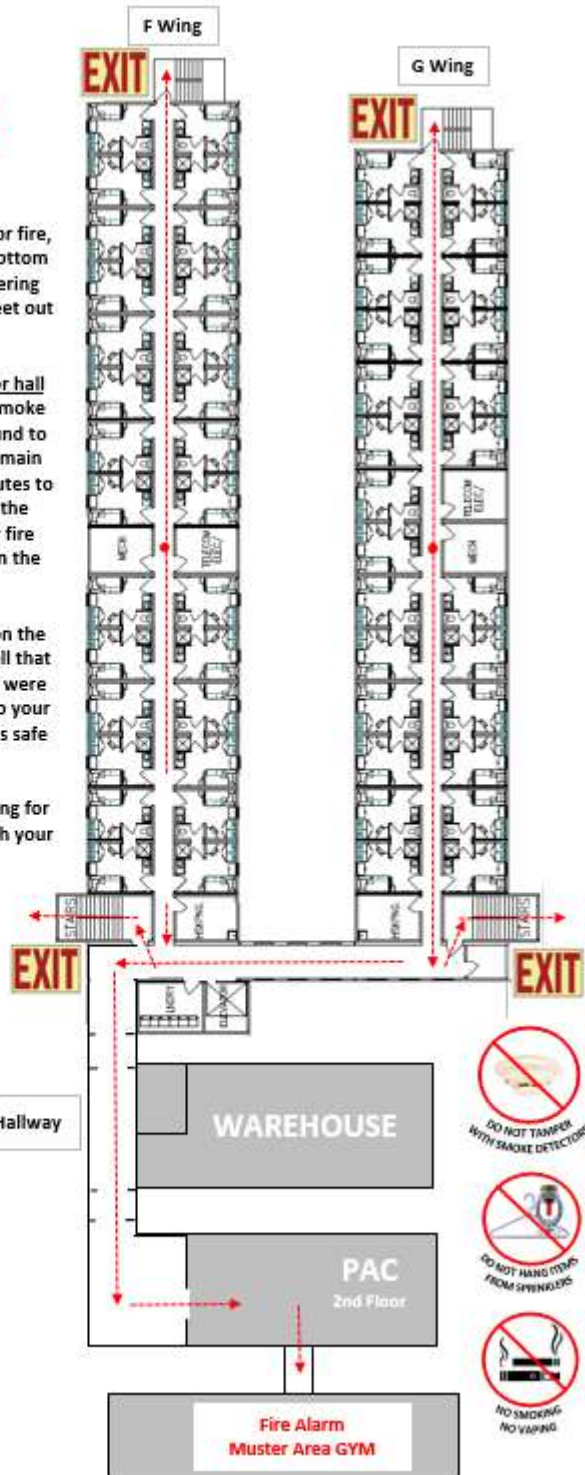
FIRE ALARM RELOCATION PLAN

Room # _____

1. If your hallway is involved with smoke or fire, stay in your room. Place a towel on the bottom of your door to prevent smoke from entering your room. Open the window; drape a sheet out to alert the Response Team.
2. Your primary route will be the 2nd floor hall (see map) to the Gym. If you encounter smoke or fire, proceed out the nearest exit, around to the main entrance (double doors) of the main PAC and then to the gymnasium. If the routes to the gymnasium area, or the areas near the gymnasium, are involved with smoke or fire proceed to the secondary muster point in the Service complex warehouse.
3. Upon arrival at the Muster Area Gym on the first floor, proceed to the letter on the wall that corresponds to the letter of the wing you were staying in. At no time should you return to your room without a general broadcast that it's safe to do so.
4. Exit your room, with appropriate clothing for the current weather conditions. Along with your key card



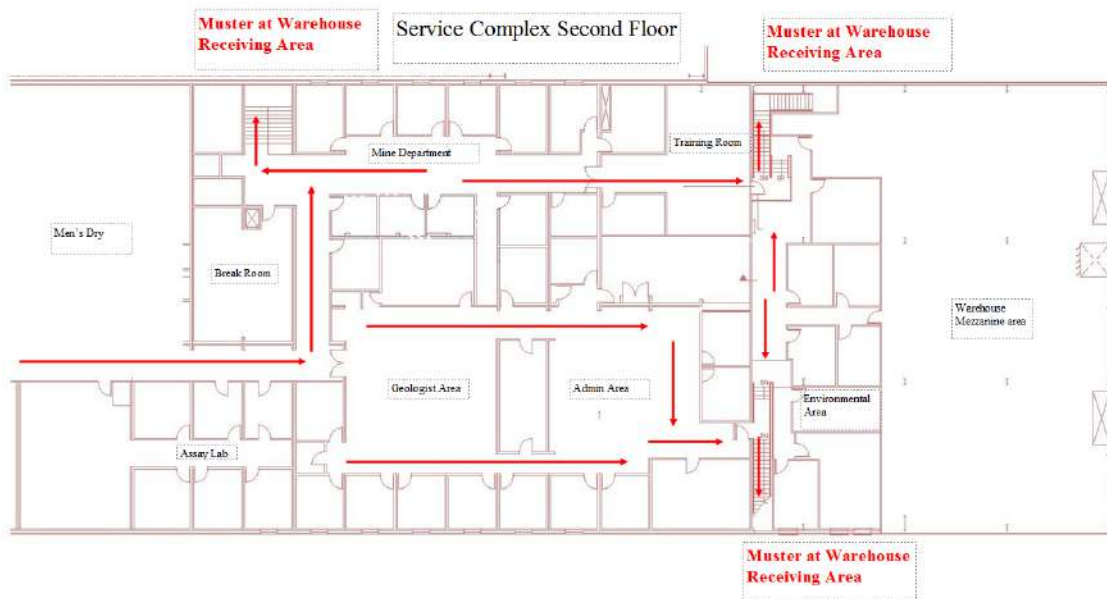
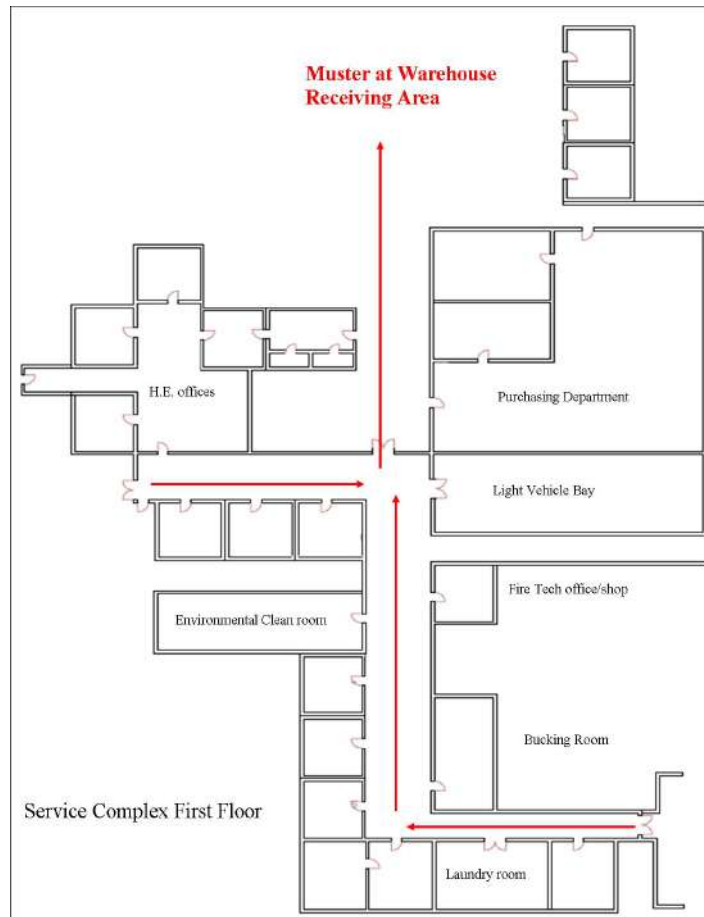
2nd Floor Hallway



Service Complex

Primary Muster Area: Service Complex Warehouse Receiving Area

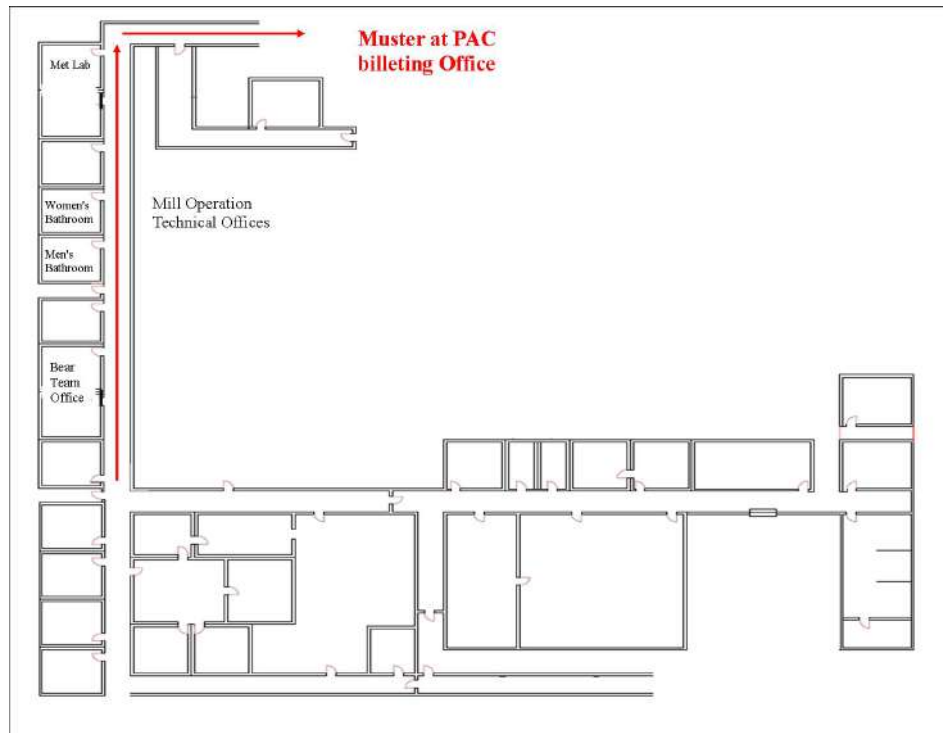
Secondary Muster Area: Gym



Mill Technical Offices

Primary Muster Area: PAC Billeting Office

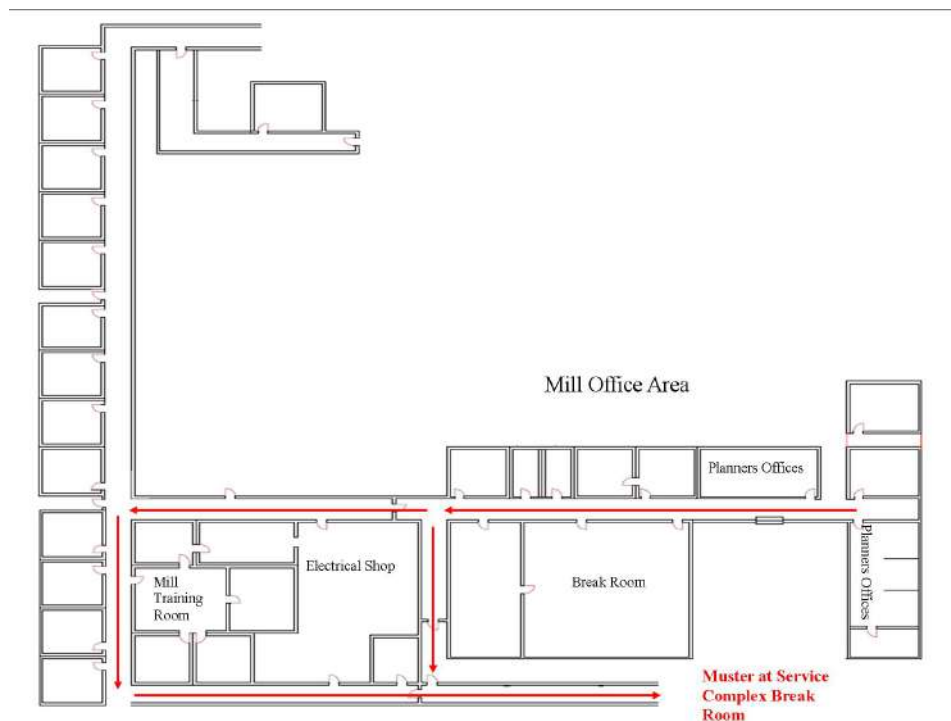
Secondary Muster Area: Service Complex Break Room



Mill Offices

Primary Muster Area: Service Complex Break Room

Secondary Muster Area: Gym



Secondary Muster Area: Service Complex Warehouse Receiving Area

Port PAC

Primary Muster Point: Dining Room

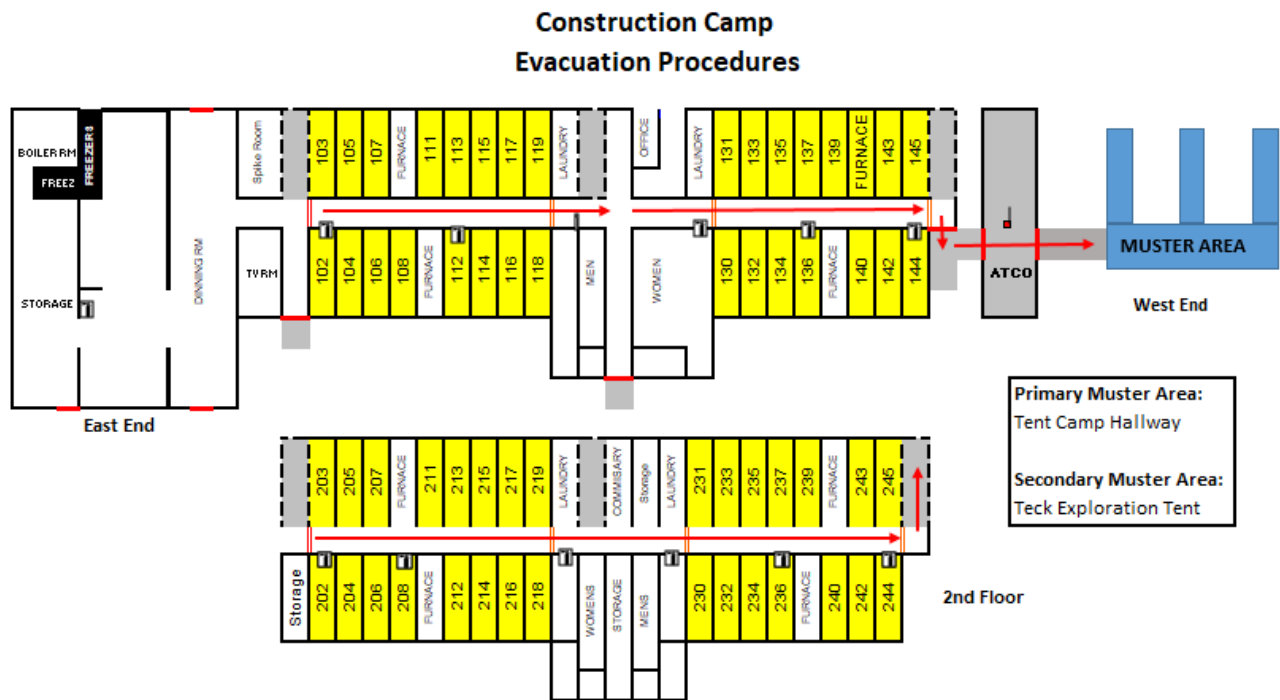
Secondary Muster Area: Basketball Court Outside Main Door



Construction Camp

Primary Muster Area: Tent Camp Hallway

Secondary Muster Area: Teck Exploration Tent



Take all alarms seriously, and evacuate the building to the muster area.

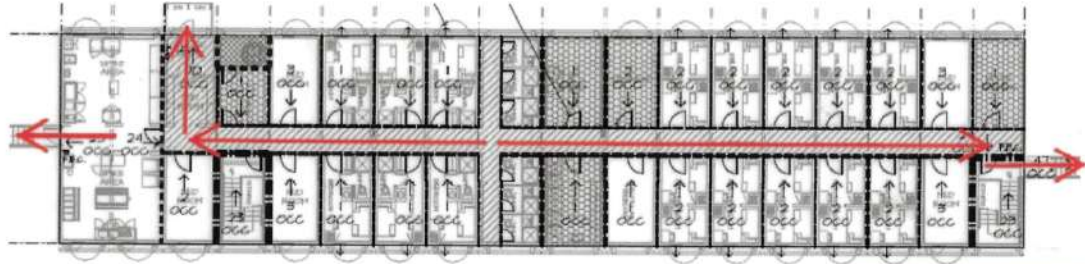
1. Exit your room, with appropriate clothing for the current weather conditions. Ensure to bring a "to go bag" with personal items such as Identification, wallet/purse, medications.
2. Proceed to the exit at the West end of the Con PAC, closest to the ATCO building.
3. Go through the ATCO building and proceed to the Tent Camp Hallway (Primary Muster Area) for accountability roll call.
4. Please follow the instructions given to you.
5. Do not leave the Muster Area until the "All Clear" is given.

Port Construction Camp

Primary Muster Point: Outside, Front of Camp Entrance

Secondary Muster Area: Basketball Court

1st Floor Evacuation Plan

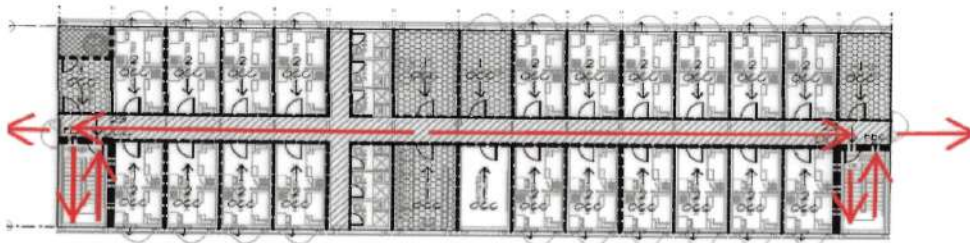


- TAKE ALL ALARMS SERIOUSLY AND EVACUATE THE BUILDING TO THE MUSTER AREA.**
1. EXIT YOUR ROOM WITH APPROPRIATE CLOTHING FOR THE CURRENT WEATHER CONDITIONS BRING A "GO BAG".
 2. PROCEED TO THE EXIT DOOR AT THE END OF THE HALLWAY
 3. PLEASE FOLLOW INSTRUCTIONS GIVEN TO YOU
 4. DO NOT LEAVE THE MUSTER AREA UNTIL THE "ALL CLEAR IS GIVEN."

PRIMARY MUSTER AREA:
OUTSIDE FRONT ENTRANCE

SECONDARY MUSTER AREA:
BASKETBALL COURT

2nd Floor Evacuation Plan



- TAKE ALL ALARMS SERIOUSLY AND EVACUATE THE BUILDING TO THE MUSTER AREA.**
1. EXIT YOUR ROOM WITH APPROPRIATE CLOTHING FOR THE CURRENT WEATHER CONDITIONS BRING A "GO BAG"
 2. PROCEED DOWN THE HALL TO THE NEAREST STAIRWELL, DESCEND STAIRS TO THE 1ST FLOOR.
 3. PROCEED TO THE EXIT DOOR AT THE END OF THE HALLWAY
 4. PLEASE FOLLOW INSTRUCTIONS GIVEN TO YOU
 5. DO NOT LEAVE THE MUSTER AREA UNTIL THE "ALL CLEAR IS GIVEN."

PRIMARY MUSTER AREA:
OUTSIDE FRONT ENTRANCE

SECONDARY MUSTER AREA:
BASKETBALL COURT

Report all fires immediately. Know where your Primary and Secondary Muster Areas are before you start a job, and before you go to bed at night.

If you have any questions, concerns, or need assistance about the fire emergency response procedures and requirements in your work area or living accommodations, please contact your supervisor, the Response Chief, or the Teck Safety & Health Department.

2.04 Safety Meetings

The objective of these meetings is to inform your crew of measures to protect their safety. The Company expects that you will conduct these meetings and that you will support the safe practices you discuss during these meetings on a day-to-day basis.

Holding Safety Meetings

Your meeting must be used solely for the purpose of discussing incident prevention. It is not a time to discuss other aspects of the job, but a meeting on a very specific subject. The talk should center around one or more of the following areas:

- Hazards found in the type of work your crew is doing and how to avoid them;
- Safe work practices which must be followed on the job;
- The discussion of an accident or incident, which has occurred and how it can be prevented from happening again; and
- The safe use of tools or equipment used by the crew.

The key to holding a good safety meeting is taking a little time and effort to prepare in advance. You must plan and prepare for your meeting before you hold it. Decide on what you are going to talk about ahead of time; it should have to do with your crew's work assignment.

Before the meeting, jot down a few notes summarizing the topics you will be talking about.

Organize your thoughts:

- Who will you be talking to?
- What do you want to say?
- When does it apply?
- Where is it important?
- Why is it of concern?
- How are you going to enforce it?

Everyone gets a little nervous talking to a group, but with practice, you will soon learn to conduct a good meeting. If you have difficulty holding these talks, ask your immediate supervisor or Safety and Health Department for help.

- Hold your talk right on the job. The best time is at the beginning of the shift when everyone is alert
- Get the group to discuss the topic with you, but be sure that you maintain control of the discussion so that you get your message across
- Always emphasize the positive side of your message that the concern you have is for their protection.

This is not the time for a general gripe session, but when valid complaints involving safety are voiced, you must take the action necessary to correct the condition or bring it to the attention of area management.

A report of the meeting must be prepared, listing the key points of the meeting and any recommendations for improving the accident prevention program you or your crew can offer. Turn your meeting agenda and report into your supervisor.

2.05 Workplace Examinations

MSHA issued the Final Rule governing the way in which operators must conduct their regular workplace examinations. **Effective June 2nd, 2018.**

The Final Rule was published in the Federal Register on April 9th, 2018

Work place examinations are an incident prevention tool used by operators to identify and correct adverse conditions that may affect the safety and health of miners and violations of safety and health standards before they cause injury or death to miners.

MSHA requires that a competent person examine each working place at least once each shift before work begins, or as miners begin work in that place, for conditions that may adversely affect safety or health.

The working place examination record shall include a description of each condition found that may adversely affect the safety or health of miners and is not corrected promptly.

MSHA requires when a condition that may adversely affect the safety and health of miners is not corrected promptly, the examination record shall include, or be supplemented to include, the date of the corrective action.

Competent Person

The competent person designation is not restricted to supervisors.

A designated non-supervisory miner on the crew having the required experience and ability may conduct the examination.

All personnel conducting workplace examinations shall receive specific task training for the area(s) they will examine.

Successful completion of task training is documented with MSHA Form 5000-23.

Workplace Examination

MSHA allows miners to enter a working place at the same time that the competent person conducts the examination.

MSHA acknowledges that for mines with consecutive shifts or those that operate on a 24-hour, 365-day basis, it may be appropriate to conduct the examination for the next shift at the end of the previous shift. Because conditions at mines can change, operators should examine at a time sufficiently close to the start of the next shift to minimize miners' potential exposure to conditions that may adversely affect their safety or health.

It is not MSHA's intent that the mine operator examine the entire mine, unless work is beginning in the entire mine. An examination is only required in those areas where work will be performed. If

miners are not scheduled for work in a particular area or place at the mine, that place does not need to be examined.

MSHA does not require a specific time frame for the examination to be conducted. Whether conducted before work begins in a working place or as work begins in that place, the examination should be conducted within a time frame sufficient to assure any adverse conditions would be identified before miners are potentially exposed.

MSHA requires mine operators to make a record of the working place examination and to include, among other information, a description of each condition found that may adversely affect the safety or health of miners that is not corrected promptly, and the examination record include the dates of corrective actions for only those adverse conditions that are not corrected promptly.

For adverse conditions that can be corrected promptly, the operator will be responsible for correcting them.

Miners will be promptly notified of adverse conditions found that cannot be corrected promptly.

Conditions noted by the person conducting the examination that may present an imminent danger shall be brought to the immediate attention of the operator who shall withdraw all persons from the area affected until the danger is abated.

Record of Examination

A record of each examination shall be made before the end of the shift for which the examination was conducted. The record shall contain the name of the person conducting the examination; date of the examination; location of all areas examined; and description of each condition found that may adversely affect the safety or health of miners and is not corrected promptly.

The operator shall maintain the examination records for at least one year.

Make the records available for the MSHA Inspector upon request.

Mobile Equipment Walk-Around Inspections

A Mobile Equipment Walk-Around Inspection must be completed for every piece of mobile equipment to be driven during the shift. The inspection will be performed whenever the mobile equipment is first driven at the beginning of the shift, and when each driver first drives that respective vehicle. Every driver shall conduct a pre-operation vehicle inspection before conducting work (driving).

The inspection will be conducted by the operator of that equipment.

If an alternate operator drives that mobile equipment during the shift, after it has already been inspected, they will review the completed inspection sheet and fill out their own walk around inspection form for that shift before driving the equipment.

A written inspection report will be completed and submitted to the department supervisor for review and forwarded on to the Mine Maintenance Department. All deficiencies noted by the operator will be the responsibility of the respective supervisor to take action to correct.

Any mobile equipment found “unsafe to operate” will be immediately brought to the supervisor’s attention and the mobile equipment removed from service until the condition is repaired.

Examples that will remove a piece of equipment from service include; one or both headlights not functioning, blue strobe light not functioning, buggy whip not operational, buggy whip flag missing or damaged, brake lights out, no installed fire extinguisher or any other safety device that is not functioning.

No employee will operate mobile equipment that has been tagged out of service, other than Mine Maintenance personnel performing repairs on that equipment, until repairs have been completed and the Mine Maintenance Department has removed their “Do Not Operate” tag.

Check for leaks and spills from equipment prior to operation and following operation. Report all spills to your supervisor.

2.06 Personal Protective Equipment

All personnel entering an active work area at Red Dog Operations are required to wear the appropriate personal protective equipment. At a minimum, all personnel shall wear the proper head, eye, hand, foot protection, and high visibility and/or reflective clothing. If you have any questions about what is required, please ask your supervisor or the area owner of the respective work area.

Head Protection

A hard hat, at a minimum, must meet or exceed the Type 1 standard set by the ANSI/ISEA Z89.1, American National Standard for Industrial Head Protection. A hard hat shall be worn by employees working in areas where there is a possible danger of head injury from impact, from falling or flying objects, or from electrical shock and burns. The hard hat shall be worn to best fit the work being conducted. The only exception to this is in an office or approved “safe” walkway, during rotational travel, in an approved non-hard hat area, or during off duty recreation.

Type, style, and color of hard hat to be worn will be determined by your supervisor. Hard hats will be worn in accordance with the manufacturer’s recommendations. Ball caps or sweat shirt hoodies shall not be worn under hardhats, as they will interfere with the suspension properties in an impact. Sweatshirt hoodies may impair your vision while walking and driving around the worksite. Welder’s hat, kerchief, or bandana can be worn under the hardhat if worn smoothly on the top of the head not to affect the impact properties of the suspension.

To assist everyone onsite to identify a new miner or a newly employed experienced miner, a green hard hat will be assigned to the employee for at least six months. The supervisor will determine when the new employee is ready, and will assign the employee with a new hard hat at that time.

Service Life of Hard Hats and Suspensions

The suspension of the hard hat will be replaced every 12 months unless excessive wear or damage is noticed prior to that during regular inspection.

The helmet will be replaced every 5 years; after an impact or penetration, or when excessive wear or damage is noticed during regular inspection.

Eye and Face Protection

Eye protection shall be worn by employees working in areas where there is a potential for injury from flying particles, metal sparks, radiation, chemicals, or any other identifiable or suspected eye or face hazard. Eye and face protection must meet or exceed the ANSI/ISEA Z87.1, American National Standard for Occupational and Educational Personal Eye and Face Protection Devices.

The use of close fitting safety eye wear is mandatory when working at Red Dog Operations. Close fitting safety eye wear will have a maximum gap of 5mm between the frame and face at any point.

This standard is for tasks requiring only the use of safety glasses. Close fitting eye wear will be “fit tested” by a supervisor or Safety & Health representative to ensure proper fit.

Tinted safety eye wear shall be replaced with clear safety eye wear when working indoors.

Close fitting safety eye wear shall be worn under the face shield of the PAPR respirator.

Face shields and close fitting eye wear are required for activities that create flying debris, such as grinding, sanding, scraping, chipping, buffing, blasting, handling acids, caustics, or molten metals.

When handling small quantity samples in the Lab area, close fitting eye wear must be worn. For those rare circumstances where potential for splashing and/or explosion exists (i.e. mixing concentrated sulfuric acid and water to produce 1:1 sulfuric acid) a face shield is required.

Workers within 20’ of others performing these tasks are required to wear the same level of eye protection unless barriers (i.e. welding screens or curtains) are in place to control the exposure.

Prior to removal of eye protection, measures for decontamination must be in place whenever activities that create flying particles are conducted.

Specific goggles are required for gas welding and burning. Welding hoods, with appropriate grade glass, are required for electric welding.

Operators opening, emptying, or mixing reagents are required to wear a full face respirator or a half face respirator, goggles, and a face shield, and appropriate rain gear to protect clothing from splashes and reagent dust.

Contact Lenses

Contact lenses are not eye protection. Contact lenses shall not be worn by employees mixing chemicals, working with chemicals, while welding, cutting, grinding, or in any respirator required area.

Occasional visitors to these areas will be allowed to wear contact lenses as long as they also wear safety glasses, goggles or other approved eye protection.

Contact lenses may be worn in all other areas, unless otherwise directed.

Employees who wear contact lenses at work should advise PA at the onsite medical clinic.

Protective Clothing

Protective clothing worn on the job site must be appropriate for the work and environmental conditions. Site Specific training, provided by the Area Supervisor, will identify required clothing.

Do not wear loose fitting clothing, long hair, or jewelry that could catch in machinery.

Prior to personnel exiting their vehicles, employees must first don all required personal protective equipment.

All personnel entering into work areas are required to wear high visibility and/or reflective clothing.

At a minimum, personnel shall wear an Orange, ANSI Class II Safety Vest. These safety vests are available from our warehouse inventory. The two main components recommended are 360 degree visibility and reflective striping. A Class II vest must have at least 775 inches of safety yellow or safety orange background material and 201 square inches of reflective striping.

Foot Protection

Employees shall wear protective footwear when working in areas where there is a danger of foot injuries due to falling or rolling objects, objects piercing the sole, or where exposed to electrical hazards. Protective footwear shall meet the requirements of ANSI Z41, American National Standard for Personal Protection – Protective Footwear.

Protective footwear with heels is recommended for personnel whose jobs require them to climb ladders with round rung steps.

Traction devices shall be worn for outside work where there is the potential of a slip and fall hazard on snow and ice during winter months.

Hand Protection

Employees shall use appropriate hand protection for the job when hands are exposed to hazards such as skin absorption of harmful substances, lacerations, abrasions, punctures, vibration, chemical or thermal burns.

Hearing Protection

Employees shall use hearing protection (earplugs or muffs) when exposed to noise greater than 82 dBA. Double hearing protection (earplugs and muffs) is required when exposed to noise levels exceeding 100 dBA.

Signs will be posted in areas exceeding 82 dBA indicating hearing protection is required, and signs will be posted in areas exceeding 100 dBA indicating double hearing protection (earplugs and muffs) is required.

Employees which, during their normal work shift, may be exposed to workplace noise levels equaling or exceeding an 8-hour time-weighted average sound level (TWA8) of 85 dBA will be enrolled in the Hearing Conservation Program. Employees in the Hearing Conservation Program will receive a baseline audiogram, annual audiograms and hearing conservation training.

Respiratory Protection

When engineering and administrative controls cannot effectively control exposure to airborne contaminants, respirators shall be used.

Respirators shall be worn by employees assigned to work in areas that have been designated as "Respirator Required Areas." Supervisors may require respirator use in Non-Respirator required areas during work that may change environmental conditions.

Proper type respirators must be worn whenever dust, fumes, gases, or other harmful atmospheres are present. Check with your supervisor to obtain the proper type of respirator and cartridges before working in any questionable area.

Employees, who must wear respirators in their work areas, must pass a respirator fit test annually, and maintain facial hair in accordance with RDO requirements.

Respirators must fit without leaks around the face seal. Facial hair can interfere with the operation of the respirator. There shall be no facial hair between the sealing surface of the respirator and the face, or interference with the respirator valve function.

Respirators will be used to the Manufactures recommendations (i.e. the respirator head straps will be on the head and not on the top of the hard hat.

Self-Contained Breathing Apparatus (SCBA) is to be used in oxygen-deficient atmospheres, or where airborne contaminants, gases, or fumes, are at or above the TLV (Threshold Limit Value) of the cartridge type respirator.

Powered Air-Purifying Respirator (PAPR) is commonly used by employees who work in the mill concentrator. The employees who wear a PAPR are not required to pass a respirator fit test, as the PAPR does not have a face seal.

Special Protective Equipment

Shin guards, toe guards, knee pads, acid goggles, rubber boots, rubber gloves, chainsaw chaps, etc., will be used for protection from special hazards associated with various scopes of work.

A USCG approved life jacket, or buoyant work vest, must be worn when working over or near water, around open tanks containing solutions or where there is danger to fall into solutions. There are exceptions when working within a protected travel way.

Welding PPE

Welding can produce harmful fumes and gases from the welding process, from the metal being welded on and the welding wire or rod. Manganese, Hexavalent Chromium and other metal fumes cause respiratory and neurological disease as well as cancer. Local exhaust ventilation (LEV) should be used and positioned to visibly draw fumes into the duct opening and away from the welder. The LEV intake should be moved as the weld location moves. Wear a respirator appropriate for the hazard. Welding helmets with Powered Air Purifying Respirators (PAPRs) provide adequate protection in most cases.

PPE Matrix

Please refer to the RDO PPE Matrix to identify what PPE is available in the Warehouse.

2.07 Cold Weather Safety Guidelines

There is no job that is so important that any employee working at Red Dog Operations shall incur a cold weather injury. Supervisors will ensure a safe work plan is in place and implemented when employees work in inclement weather. Supervisors are responsible for understanding the current weather and wind chill conditions, and control the work activities accordingly to prevent cold weather injuries.

Cold Weather Protection

For extreme cold temperatures, Supervisors refer to the provided Wind Chill Chart. For any outside work scheduled when the wind chill is in the 5-minute frost bite section of the Wind Chill Chart, a hazard assessment shall be conducted to determine if the work is of such a high priority that it needs to be performed in such severe conditions.

Cold Related Injuries

The best defense against cold related injuries is to prioritize and limit outside work during temperature and wind chill extremes. Supervisor shall ensure employees are outfitted with the correct PPE for any outside work. Employees may use the buddy system to ensure all skin is properly covered, with special attention to protect the head, face, hands, wrists, and feet to prevent exposure and the risk of frostbite.

Hypothermia

Hypothermia is the lowering of the body core temperature to the point where it is no longer functioning properly. Symptoms include intense shivering, poor coordination, stumbling, thickness of speech and drowsiness, and loss of memory. Hypothermia is deceptive, and left untreated, may result in collapse and death. Dehydration, or the loss of body fluids, occurs gradually in the cold environment and may increase the susceptibility of workers to cold injury due to a significant change in blood flow to the extremities. Taking certain medication or drugs such as nicotine, or caffeine because of their diuretic circulatory effects can increase susceptibility to cold. Workers with a cold, or flu, or certain diseases, such as diabetes, heart, vascular, and thyroid problems may be more susceptible to the winter elements. The effects of cold weather are more rapid when a person becomes exhausted or immobilized due to injury. It is important to note that most hypothermia cases are reported during cool weather.

Treatment

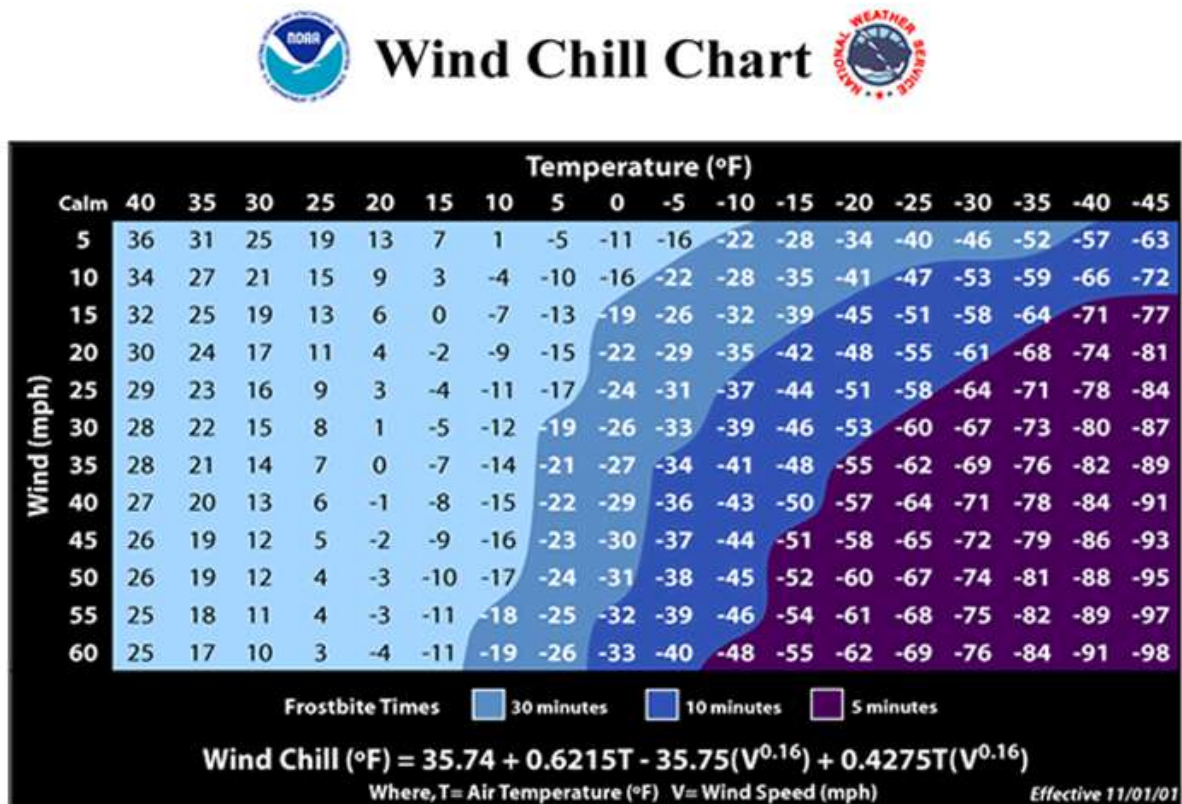
Handle the person gently. Don't massage or rub the person. Excessive, vigorous movements may trigger cardiac arrest. Move the person out of the cold and into a warm area. Remove wet clothing. Cover the person with blankets. Insulate the person's body from the cold ground. Dial 911 to contact emergency services, and transport as soon as possible as directed to the onsite medical clinic.

Frostbite

Frostbite is the freezing of body tissue. It may range from minor injury (“frost nip”) to complete freezing of an extremity. Untreated frostbitten areas will first become reddened, and then become gray or white, particularly on exposed ear lobes, cheeks, or nose. Left untreated, the skin becomes numb and dead white. Watch co-workers for signs of frostbite.

Treatment

Protect the skin for further exposure. Frostbitten hand may be warmed by tucking them into your armpits. Protect your face, nose, and ears by covering them with dry, gloved hands. Don't rub the affected area, and never rub snow on frostbitten skin. Move the person out of the cold and into a warm area. Dial 911 to contact emergency services, and transport as soon as possible as directed to the onsite medical clinic.



The NWS Wind Chill Temperature index uses advances in science, technology, and computer modeling to provide an accurate, understandable, and useful formula for calculating the dangers from winter winds and freezing temperatures. The index does the following:

- Calculates wind speed at an average height of 5 feet, the typical height of an adult human face, based on readings from the national standard height of 33 feet, typical height of an anemometer.
- Is based on a human face model.
- Incorporates heat transfer theory based on heat loss from the body to its surroundings, during cold and breezy/windy days.
- Lowers the calm wind threshold to 3 MPH.
- Uses a consistent standard for skin tissue resistance.
- Assumes no impact from the sun, i.e., clear night sky.

Lock Out/ Tag Out/ Try Out (LOTOTO) SOP

“ONE LOCK-ONE KEY-ONE LIFE”



1 Purpose

To establish a control system and to utilize these procedures to prevent the unexpected release or transmission of machine equipment/process energy.

2 Health and Safety

Failing to isolate an energy source can create an immediate danger to life or health and is recognized as a fatal risk throughout Teck. This document establishes the minimum critical control requirements for protecting individuals from injuries caused by uncontrolled energy from the start-up of machinery or equipment, or release of stored energy during service, repair, maintenance, operation, and associated activities managed by Teck.

3 Scope

This document requirement applies to all Teck controlled activities, and to all Teck Employees and Contractors.

This policy applies to activities such as, but not limited to: erecting, installing, constructing, repairing, adjusting, inspecting, cleaning, operating or maintaining the equipment/process.

For mobile equipment LOTOTO requirements, refer to the Heavy Equipment departments "Standard Practice Document".

HAZARDOUS ENERGY SOURCE	
Hydraulic	Thermal
Pneumatic	Chemical
Compression	Nuclear
Gravity	Kinetic
Mechanical	Electric
Others	

4 Operational Requirements

- 4.1** Should regulatory requirements be more stringent than those described in this document, the regulation shall supersede.
- 4.2** The purchase and design of equipment, including hired and contracted equipment, shall ensure a positive means of energy isolation has been included. Existing equipment with the potential for harmful energy release shall include a positive means of energy isolation.
- 4.3** Isolation shall provide positive protection and be achieved by the use of a personal lock to establish a physical barrier or separation for each person associated with the work.
- 4.4** Personal locks shall:
 - 1) Only have one key and not be a master keyed lock.
 - 2) Have legible identification printed with the employee's name on their departments color coded lock. For color codes refer to section 8 of this document.
 - 3) Not be combination locks.
 - 4) Be kept under the exclusive control of the owning individual. Only used for the purpose of energy isolation.
- 4.5** Designated isolation points shall be clearly labeled to identify the circuit or system for which they have direct control.
- 4.6** Application and exposure survey
 - 4.6.1** Each facility shall conduct an application survey to determine if the equipment/ process can be safely isolated.
 - 1) The survey should determine if energy-isolating devices are available, adequate, and practically located for positive protection.
 - 2) A plan shall be developed to correct the surveyed deficiencies or provide interim alternative protection in order to make the LOTOTO system effective.
 - 4.6.2** Each facility shall conduct an exposure survey to determine what tasks are being done, i.e., cleaning rolls, removing jams, etc., with equipment energized. Each situation shall be evaluated to determine if the task can be accomplished with the power off or alternatively what method must be used to reduce employee risk.
- 4.7** Isolation procedures shall be reviewed annually and audited to assure effective implementation. LOTOTO infringements found in Supervisor Incident Reports (SIR) will be reviewed by LOTOTO committee.
- 4.8** Plant documentation shall certify that employee training has been accomplished and is being kept up-to-date. The certification shall contain each employees name, pin number and dates of training.

5 Procedure

****NOTE**** No work or probing inspection shall be started on any piece of equipment until it has been de-energized and the electrical switchgear locked out/tagged out and tried out.

Lock Out procedures are utilized for personal protection of individuals while working on or in the vicinity (an area that is not accessed by employees under normal operating conditions) of machines, equipment or apparatus which, if operated or energized, could endanger a person's safety, or cause damage to the equipment.

For all electrical switches higher than 480 Volts or tagged "Call an Electrician". Only a qualified individual is permitted to perform switching or work on systems in excess of 480 volts, including all 4160-volt equipment.

The use of electrical control circuitry to accomplish LOTOTO is normally prohibited since it does not offer positive personnel protection. Examples:

- 1) Electrical shorts. (Water in lines and some types of dust can create a path to complete the control circuit.)
- 2) Vibration or switch component failure.
- 3) Remote or interlocked switches not affected by control circuitry.

5.1 Procedures for troubleshooting and testing reenergized equipment will adhere to National Fire Protection Association (NFPA) guidelines.

- 1) Area owner will be notified that specific equipment in their area will need to be shut down for a repair(s) or inspection.
- 2) If the machine or equipment is online, equipment will be brought offline by normal procedures (depress the stop button, open switch, close valve, etc.).
- 3) Area owner of specific equipment will meet the employee(s) requiring work to be performed to review MWO in the MCC of area.
- 4) Area owner will have all personnel around MCC bucket stay clear of area.
- 5) Prior to pulling the disconnect switch perform a visual inspection ensuring that all required safety equipment is on the panel and there are no defects. If any defects are found during your panel inspection contact E&I before disconnecting the switch. When disconnecting the switch stand on the appropriate side to the safest exit point.
- 6) Area owner will de-activate the electrical energy isolating device switch so that the machine or equipment is isolated from all electrical energy sources. (Never pull the disconnect switch for locking out until the equipment has been shut down and the stop button pushed. These switches could explode when pulled under load.)
- 7) Attach a tree and a completely filled out "Do Not Operate" tag to the switch gear, power disconnect, lock box, and/or isolation valve to show that the equipment is available for personnel working on equipment.
- 8) All personnel performing tasks on equipment will lock out all equipment requiring maintenance or inspection by attaching a personal lock to the tree on the switch gear, power disconnect, lock box, and/or isolation valve. Refer to section 5.6 in this document.
- 9) All personnel performing tasks on equipment will do a tryout. The exception would be the lock box; in this case the employee can still perform a tryout if so desired. Refer to Teck Alaska's Lock Box SOP (Qualtrax ID# 2401)
- 10) Stored or residual energy (such as that in capacitors, springs, rotating flywheels, hydraulic systems, air, gas, steam, or water pressure, etc.) must be dissipated or restrained by methods such as grounding, repositioning, blocking, bleeding down, etc. Ensure that the equipment is disconnected from the energy source(s) by first checking that no personnel

are exposed, and then verify the isolation of the equipment by operating the start button or other normal operating control(s). If applicable radio the Control Room Operator (CRO) for confirmation that it will not start by remote activation.

- 11) Return operating control(s) to neutral or "off" position after verifying the isolation of the equipment.
- 12) All Stored Energy sources will be locked and tagged out with "Do Not Operate" tag after energy source is dissipated. See illustration in section 5.9.4 in this document.
- 13) Area owner will release the specific equipment to the employee(s) who will be working on the equipment.

5.2 Completion of Work

- 1) Personnel performing tasks on equipment will notify CRO that the specific piece of equipment is ready to be released.
- 2) CRO will notify Operations or responsible group who will meet personnel at specific equipment. (** if the area owner is unavailable contact the area Supervisor)
- 3) Area owner along with personnel who performed work will perform a visual inspection prior to being released. (Guarding in place, tools, tags/valve locks etc....) are all removed from area and or secured back in place.
- 4) Area owner along with personnel will meet in MCC to remove all personal locks and "Do Not Operate" tag from switch gear.
- 5) Area owner will energize specific equipment and notify CRO.

5.3 Carry Over Equipment/ Long Term Work

- 1) "Do Not Operate" tags will be placed on equipment that is intended to be in long term status (Winter/Summer operational equipment) or is to be carried over into the next shift.
- 2) Tear off the bottom portion of the "Do Not Operate" tag and turn into your supervisor.
- 3) On incomplete equipment work, the supervisor, (or designee) will install one of the Departmental Locks before the last tradesperson removes his/her personal lock. This will indicate the job is incomplete and the equipment cannot be used. Upon completion of the job, the supervisor (or designee) will remove the departmental lock.

5.4 Lock Out Procedure for Radiological Devices

5.4.1 Responsibility:

All employees are responsible for taking protective measures in accordance with this procedure to ensure against inadvertent start up.

Notify the Radiation Safety Officer (RSO) if the shutter must be closed and locked, on a gauge containing a radioactive source. Loss of signal at the detector should be verified with the area operator or control room operator.

The RSO must be notified when devices are to be placed on-line and the shutter opened. The RSO can be reached by telephone at ext. 45208/45285
Locks used in this procedure are to remain protected and attached to the individual gauges. Keys to the referenced locks are to remain with the RSO for the identified equipment.

All LOTOTO procedures will still be followed for these devices. The RSO's lock will be the first lock installed in the lockout, and will be the last one removed, as the device is placed on-line.

5.5 Equipment Specific SOP's

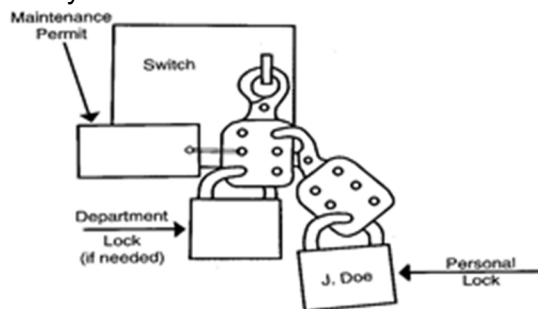
The use of the Lock Box system has many potential applications for use where multiple employees must lock out multiple pieces of equipment in order to carry out their task.

Note:

- 1) Refer to Teck Alaska's Lock Box SOP (Qualtrax ID# 2401)
- 2) Refer to Teck Alaska's Filter Press Lock Out SOP (Qualtrax ID# 1914)
- 3) Although this document covers the majority of our LOTOTO procedures for Red Dog there will be specific SOP's that will cover other departments and or tasks.

5.6 Personal Lock Out

- 1) **Each person involved in maintaining or inspecting equipment must lock out that piece of equipment with their own personal lock. There are no exceptions.**
- 2) Always leave the last hole in the Tree available to add another Tree if necessary.



- 3) In addition to all machinery or equipment, pipelines and valves will also be blocked against hazardous operation. Where process materials, (e.g. compressed gases, reagents, chemicals, or liquids) could present a hazard, by entering a vessel, line, or a work area, each person shall ensure that this does not occur.
- 4) No worker shall remove any lock other than their own, other than a departmental lock when designated.
- 5) All personal locks are to be removed at the end of each shift and the supervisor notified as to status of work.

5.7 Absent Employee Lock Removal

- 1) An employee who fails to remove his/her lock at the end of the shift will be called back to work, at his/her own expense, to remove it.
- 2) If an employee has not removed his/her lock and is off-site, the department Supervisor will be notified and personally supervise the lock removal as follows:
- 3) The Supervisor will supervise a complete inspection of that piece of equipment to ensure that the employee is not present and that all is clear.
 - a. The supervisor will supervise removal of the lock by cutting the Tree.
 - b. Operations will energize the motor as required.
- 4) A supervisor who removes an absent employee safety lock, will:
 - a. Fill out a "Safety Lock Removal Notice" and send it to the Safety and Health Department within 24 hours.

- b. When the employee returns, counsel and instruct him/her on proper lock out procedures.
- c. Supervisor will return the lock to the employee.

5.8 Forms of Energy Control

- LOTOTO
- Blank lines and bleed off pressures
- Disconnecting mechanical linkages
- Secure moving parts

****NOTE**** Software override does not constitute energy isolation. See section 7.6 in this document.

5.9 Various Lock-Out Devices

5.9.1 Lock Out Tree



5.9.2 Panel/ Breaker Lock



5.9.3 Valve Locks



5.9.4 Danger “DO NOT OPERATE” tag

Teck  **RED DOG MINE**

DANGER

DO NOT OPERATE
“SAFETY ABOVE ALL THINGS”

EQUIPMENT #:

Tagged out by (Name):

Supervisor:

Tagged out on (Date):

Reason for LO/TO/TO:

TAG: #: **123456**

Complete back side of this tag.

TEAR OFF THIS STUB, FILL IT IN AND TURN IN TO SUPERVISOR IF JOB WILL CARRY OVER

TAG: #: **123456**

EQUIPMENT #:

Date of LO/TO/TO:

Reason for LO/TO/TO:

LO/TO/TO Installed By:

Teck  **RED DOG MINE**

DANGER

DO NOT OPERATE
“SAFETY ABOVE ALL THINGS”

WORK TO BE COMPLETED BY:

MILL OPS	TECH GROUP
ELECT. MAINT.	COMMISSIONING
MECH. MAINT.	MINE DEPT.
HE SHOP	SAFETY & HEALTH
CONTRACTOR	OTHER

TAG: #: **123456** 01/2015 RD-209-15

TAG: #: **123456** **DANGER**

ADDITIONAL COMMENTS

6 Key Responsibilities

- 6.1 Management is responsible for the development, implementation and administration of an effective LOTOTO system.
- 6.2 All employees are responsible for complying with the provisions of the facility LOTOTO system.
- 6.3 Affected employees shall be aware of LOTOTO procedures use to guard against unexpected startups.
- 6.4 Only authorized individuals shall operate energy isolating devices and place lock/tags on controls to prevent unexpected startups.
- 6.5 Other employees who work in the area where LOTOTO procedures are used shall be instructed about their purpose and prohibited from attempting to restart machines or equipment that are locked or tagged out.

7 Definitions

- 7.1 The term “**LOTOTO**” as referred to this document is defined as Lock Out/ Tag Out/ Try Out.
- 7.2 The term “**CRO**” as referred to this document is defined as Control Room Operator.
- 7.3 The term “**RSO**” as referred to this document is defined as Radiation Safety Officer.
- 7.4 The term “**SIR**” as referred to this document is defined as Supervisor Incident Report.
- 7.5 **Isolation Device-** A device that utilizes a positive means (including a lock with a single key) to prevent the undesired energization.
- 7.6 **Group Lockout Device- A device that enables multiple locks to be placed on a single isolation point.** Refer to Teck Alaska’s Lock Box SOP (Qualtrax ID# 2401)
- 7.7 **Software overrides-** Is the approach to electronically set and hold a device, or electronically defeat an output. The function is electronically initiated and applied to control circuits rather than power circuits.
- 7.8 **Lock-** As referred to in this document will consist of a padlock accompanied by a personal Brass tag on which is permanently printed with the employee’s name and department.
- 7.9 The term “**Departmental Lock**” as referred to in this document will consist of a keyed alike lock that is placed on equipment by a supervisor or his/her designee of that specific department. Departmental Locks will be used to secure equipment during shift changes, when one crew is removing their personal locks as they go off shift and lock out of equipment is required until the next crew attaches their personal locks. Once a Departmental Lock is attached to the tree, it will only be removed at the completion of the task by the Supervisor or designee. Departmental locks are also used on equipment that will remain out of service for extended maintenance. Departmental Locks will be identified by a departmental lock color and an attached tag.

7.10 “Do Not Operate” tag- Refers to a standard tag that is installed, by the responsible department, for anyone working on that piece of equipment. The “Do Not Operate” tag will contain the following information:

Tagged out by (Name)
Department
Date Tagged
Time Tagged
Equipment #
Explanation or purpose for lock out

7.11 The term “**Tag Out**” refers to using a tag to secure a piece of equipment. This is to be used only when a piece of equipment is not physically capable of being locked out.

7.12 The term “**Energized**” refers to electrical, hydraulic, pneumatic and mechanical energy. This is also to include, as examples, equipment with accumulators, capacitors and flywheels, which may have stored energy.

7.13 The term “**Tree**” refers to a device used to attach departmental or personal locks to a piece of equipment. This may be referred to as a “Lock Out Tree.” See illustration in section 5.9.1 in this document.

7.14 The term “**Qualified**” refers to an individual (i.e. Electrician) trained in and familiar with the operation of, and the hazards of the energy source associated with the equipment upon which the individual is working with.

8 Key Documents/Tools/References/General Requirements

CFR 30- MSHA regulations

CFR 29- OSHA Regulations

NFPA 70E- National Fire Protection Association

ANSI Z244.1- Standard for Energy Control, Lock-out-Tag-Out and alternative methods.

Teck Alaska High Potential Risk Control Requirements for Energy Isolation & Lockout

All locks will be color coded by department:

<u>Mill Operations</u>	<u>Red</u>
<u>Mine Operations</u>	<u>Black</u>
<u>Mechanical Maintenance</u>	<u>Green</u>
<u>Electrical Maintenance</u>	<u>Yellow</u>
<u>Technical Group</u>	<u>Orange</u>
<u>Contractors</u>	<u>Blue</u>
<u>Safety & Health & Fire Department</u>	<u>Gray</u>
<u>Commissioning</u>	<u>White</u>
<u>Heavy Equipment Shop</u>	<u>Green</u>

Red Dog Operations Confined Space Entry Requirements

Last Update: 24 October 2018
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1 INTRODUCTION/ SCOPE

This document contains procedures and policies that apply to confined space entry. It outlines;

- the identification and assessment of confined spaces,
- qualifications and training related to confined space entry, and
- Isolation, atmospheric testing, attendant requirements, and ventilation as they pertain to confined space entry.

This requirement applies to all work involving confined spaces at Teck Alaska Red Dog Operations (RDO). This Program assists employees, contractors and subcontractors with the recognition of a confined space and outlines the format and standard for writing confined space procedures.

This requirement documents the minimum precautions that are required prior to entry into a confined space. However, if unusual circumstances or risks are involved please refer to 29 CFR 1910.146 and the ANSI Standards referenced in this document for additional guidance.

Appendix 1: Defines the terms used in this document.

Appendix 2: Defines Roles and Responsibilities for Teck Employees and Contractors.

2 DEFINITION OF A CONFINED SPACE

To be considered a confined space it must have all three characteristics listed below. However, if you are not sure whether the space you need to work in should be considered a confined space, consult a Confined Space Assessor.

2.1 THREE CHARACTERISTICS OF CONFINED SPACES

a. Is large enough and configured in such a way that a worker could enter to perform assigned work.

A space that is too small for a worker to enter is not a confined space. For example, a narrow space between two walls may be an enclosed space, but unless the worker can fit inside the space, it is not considered a confined space, even if the worker can get a hand or foot into the space. Keep in mind that an enclosed space may still have hazards, atmospheric or otherwise, that need to be addressed.

b. Has limited or restricted means for entry or exit that may complicate the provision of first aid, evacuation, rescue, or other emergency response service.

Entry points may not be designed for easy walk-in. Other limitations include access by permanent or temporary ladders or by stairways that provide poor access because of restrictive slope, narrow width, or extreme length. Physical obstructions inside the space—such as bulkheads, collapsed material, or machinery—may impede exit. Limited means of entry and exit not only make escape or rescue difficult but can also restrict natural ventilation.

c. Is not designed or intended for continuous human occupancy.

As confined spaces are not designed or intended for continuous human occupancy, they are not sites of regular or ongoing work activity. Workers usually enter confined spaces only for purposes such as inspection, maintenance, repair, or construction. This often means the space is not normally ventilated and may have an atmosphere that is not safe to breathe.

Even if a space does not fit this definition, be aware that it may have other hazards that need to be assessed and controlled before workers can enter. For example, a space may have a toxic atmosphere even if it does not fit the definition of a confined space because entry and exit are not limited or restricted.

2.2 CONFINED SPACE IDENTIFICATION AND ACCESS CONTROL

An inventory of identified confined spaces and confined space assessments that have been completed are available in Qualtrax. All confined spaces must have a documented assessment form prepared by a confined space assessment team before entry can be made. Once a confined space assessment form has been completed work may commence.

- a.** Each confined space shall be posted with a sign reading: **"DANGER FOLLOW CONFINED SPACE ENTRY PROCEDURE BEFORE ENTERING. QUALTRAX ID# XXXX"**.
- b.** Confined space assessments shall be kept current.
 - i. If changes are made to the process equipment or the confined space that may affect the hazards and controls within the confined space the confined space must be re-assessed by an assessment team.
- c.** Activities which have the potential to create new confined spaces (including modifications or new construction) must be examined by an assessment team to ensure updates to the inventory are appropriate.
- d.** Access to confined spaces must follow a hierarchy of control as follows:
 - i. Closed confined spaces must be secured to prevent access by physical means that require a tool to remove (e.g. bolt-on or zip-tied covers, barricades, or other means to restrict the potential for entry).
 - ii. When confined spaces are opened for ongoing work, any unsupervised entry points must be labeled and barricaded to indicate the presence of a confined space and to prohibit unauthorized entry.

2.3 UNDERSTANDING PERMIT and NON-PERMIT CONFINED SPACES

Confined space definitions in the regulations sometimes lead to confusion to those that have not completed the required training; as a "permit required confined space" and a "non-permit required space" **both require** a confined space entry permit form. It may be easier to think of the two as higher risk and lower risk confined spaces.

a. Permit Required Confined Space (Higher Risk)

In a permit confined space, hazards have been identified that cannot be completely eliminated and a completely filled out permit is **required** before entry is made. They also require a confined space attendant, that rescue plans be followed, and ongoing monitoring that must be enforced as long as the confined space is occupied.

b. Non-Permit Confined Space ("Lower Risk")

In a non-permit confined space, serious safety hazards are not present and/or they have been eliminated by other means such as LOTOTO. Although non-permit required spaces have fewer requirements, they still **require** a completely filled out entry permit before entry is made.

2.4 CONFINED SPACE HAZARD ASSESSMENT

A documented Confined Space Identification & Hazard Assessment Form shall be completed by a specially trained, cross-functional assessment team. These documents will be maintained and can be retrieved from Qualtrax and form the basis for the field investigation. If an assessment is not available for a confined space you intend to enter, your supervisor must arrange for an assessment of the space.

A Confined Space Identification & Hazard Assessment Form lists hazards that were identified by the team at the time of the assessment. This identifies the minimum standard as conditions may change or the tasks may entail risk(s) not identified in the original assessment.

- a.** When conducting a hazard assessment, the assessment team considers the potential for:
 - i. Oxygen enrichment or deficiency
 - ii. Flammable/ Combustible gas, vapor, mist, dust
 - iii. Other hazardous atmospheres
- b.** The hazard assessment will consider other potential hazards:
 - i. Lines containing harmful substances requiring isolation and LOTOTO
 - ii. Potential for workers becoming engulfed or entrapped by material
 - iii. Slip, trip and fall hazards
 - iv. Drowning
 - v. Exposure to noise
- c.** Other hazardous conditions such as thermal extremes and radiation prior to workers entering a confined space, the confined space supervisor must identify potential hazards and evaluate risks associated with the confined space work to be performed by reviewing the Confined Space Identification & Hazard Assessment Form with all involved persons. The Confined Space Supervisor may find other hazards not listed on the completed assessment form at the time of entry. The assessment form acts as an overview of the basic hazards of the space and may not identify all hazards in the space.
- d.** However, if the assessment team has defined the space as a "permit required space", it cannot be re-classified and must be treated as a permit required space.

3 PERMIT REQUIRED CONFINED SPACES (PRCS)

A PRCS has the following characteristics. If the space contains **any** of the following characteristics, then the full entry procedure must be followed:

NOTE: This is after the space has been identified as a confined space.

- a.** Contains or has a potential to contain a hazardous atmosphere;
- b.** Contains a material that has the potential for engulfing an entrant;
- c.** Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or
- d.** Contains other recognized safety or health hazard(s).

3.1 Permit Required Confined Space Entry Procedure

- a.** Review the Confined Space Identification & Hazard Assessment Form to familiarize yourself with the hazards. The assessment form is to be used as a guide for filling out the confined space entry permit.
- b.** Conditions making it unsafe to remove or open the entrance cover shall be eliminated before the cover is opened (this refers to confined spaces that are fully enclosed). After opening the entrance cover, the opening or the nearby area shall be promptly guarded by railings, barrier tape, or other temporary barriers to prevent unauthorized entry and to protect entrants during entry. *(Refer to Teck Alaska Flagging and Barricading Policy)*
- c.** If the atmosphere is or has a potential to be hazardous;
 - i. Atmospheric sampling shall be performed and recorded prior to entry at all levels of the space, continuously while the space is occupied, and prior to re-entry. The results of all samples shall be logged on the permit.
 - ii. If the required atmospheric conditions cannot be met, the space may not be entered unless:
 - iii. Continuous forced air ventilation will maintain the atmosphere at safe level; or
 - iv. The proper personal protective equipment (SCBA, respirators etc.) will provide adequate isolation from the hazard.
- d.** When acceptable entry conditions are met, the Confined Space Supervisor shall complete the authorization section on the entry permit. The entry permit shall be kept by the attendant at the entry site.
- e.** Each person entering the confined space shall print their name on the entry permit. The attendant will record all entry and exit times on the entry permit.
- f.** Each person entering the space shall use the appropriate personal protective equipment. The minimum equipment shall consist of:
 - i. Hardhat
 - ii. Close fitting safety glasses
 - iii. Safety Boots
 - iv. Safety harness with lifeline attached outside the space. The harness and/or lifeline may be omitted if they will create more of hazard than they prevent.
 - v. Respiratory protection appropriate for environment.
- g.** If conditions within the space change, it may be necessary to evacuate the space and assess. The use of cleaning agents, flammable, and other atmospheric contaminants may constitute a change which requires evacuation and entry permit cancellation.
- h.** When the entry is complete (completion of authorized work) the attendant shall close out the space and bring the entry permit to the confined space supervisor for a close out signature. The confined space supervisor will bring the closed out/completed permit to the drop box near the mill breakroom.
- i.** The General Supervisor of the Confined Space Supervisor will be notified by document control that the permit has been turned in. The General Supervisor of the Confined Space Supervisor is responsible for auditing permit compliance.
- j.** Entry permits cannot be carried over to the next shift. A new entry permit must be completed at the beginning of each shift where confined space work is required.

4 NON-PERMIT CONFINED SPACES

A non-permit confined space does not contain or, with respect to atmospheric hazards, have the potential to contain serious safety hazards capable of causing death or serious physical harm.

If the Permit Required Confined Space box is checked on Part #6 of the Confined Space Identification & Hazard Assessment Form, the Confined Space Supervisor cannot reclassify the space.

All confined space entries still require the use of the Confined Space Entry Permit.

The confined space can only be reclassified if all of the serious safety hazards have been eliminated and the Non-Permit Required Confined Space box is checked on Part #6 on the Confined Space Identification & Hazard Assessment Form.

The Entry Supervisor must approve of the reclassification after following the confined space entry permit form step 7.

By signing the document, he/she may allow the Entrant to work in the confined space without an Attendant.

NOTE: If the conditions change or another hazard is introduced, a new Entry Permit must be completed.

An attendant is not required for entry so long as:

- a. If the permit space poses no actual or potential atmospheric hazards and if all hazards within the space are eliminated without entry into the space, the permit space may be reclassified as a non-permit/reclassified confined space as long as the hazards remain eliminated.
- b. If it is necessary to enter the confined space to eliminate hazards, entry shall be performed under the requirements of this document.
- c. The employee shall document the basis for determining that all hazards in a permit space have been eliminated on the confined space entry permit.
- d. If hazards arise within a space that has been reclassified, the space shall be evacuated. The space shall then be re-evaluated to determine whether it must be reclassified as a PRCS.

5 TRAINING

All Teck personnel performing identification, assessment, and classification of confined spaces must be qualified under the Teck Red Dog Operations training and qualification process. Additional contractor requirements are outlined in Appendix 2.

Confined space training materials and records must be kept, and include names of the persons conducting the training, dates of delivery, training content, and attendee participation – this also applies to contractors.

- a. All persons performing air samples shall be trained in the use of the air monitor being used when attending the "Confined Space Entry Program" training class as this is an integral part of the training.
- b. Confined space supervisors, authorized entrants, attendants, and assessors shall participate in training and establish their proficiency in their required duties by way of attending training. Records of the training shall be maintained on a MSHA 5000-23 training form. Teck Alaska Incorporated Red Dog Operations employees and its contractors training records will be maintained by the responsible company.
- c. Refresher training on the confined space entry program is required every three years (controlled by SiteLine).

5.1 Confined Space Assessor

The Confined Space Identification & Hazard Assessment Form must be prepared by a trained assessor. All employees assigned to assess a confined space must successfully complete and have current certification for Confined Space Assessor.

5.2 Confined Space Supervisor

Any person signing off on an entry permit must be certified through successful completion of the confined space supervisor course and have an MSHA 5000-23 form.

a. Teck Employees

Shall be certified through successful completion of the Confined Space Supervisor training course and have an MSHA 5000-23 form.

b. Contractors

Shall be certified through successful completion of the Confined Space Supervisor training course and have an MSHA 5000-23 form.

5.3 Entrant/Attendant

Entrants must be trained to immediately leave the confined space when the attendant indicates evacuation is necessary, when the continuous monitor alarm goes off, or when any unsafe work environment develops.

a. Teck Employees

All entrants and attendants must successfully complete and be current with the Red Dog Confined Space Training Program and hold an MSHA 5000-23 form.

b. Contractors

Contract workers who will be performing entrant & attendant duties must be qualified as per federal regulations. If trained offsite you must still hold an MSHA 5000-23 form or have completed the Red Dog Confined Space Training Program and hold an MSHA 5000-23 form.

6 ENTRY INTO A CONFINED SPACE

The following section describes the accepted methodology for preparing for a confined space entry.

Note: **A person is considered to have entered a confined space when any part of their body crosses the plane of the entrance to the space.**

6.1 Entry Permit and the Confined Space Identification & Hazard Assessment Form

The entry permit must be completed based on the completed Confined Space Identification & Hazard Assessment Form. If a confined space does not have a completed Confined Space Identification & Hazard Assessment in Qualtrax, contact a supervisor to assemble an assessment team. A confined space may **NOT** be entered unless a Confined Space Identification & Hazard Assessment form has been completed by an assessment team.

6.2 Lockout/Tagout/Tryout Procedures

To prevent accidental start-up, all power driven equipment in the confined space such as agitators and pumps must be LO/TO/TO and de-energized following Red Dog's LO/TO/TO program and the Confined Space Identification & Hazard Assessment form. Energy sources other than electrical (steam, compressed air, hydraulics, gravity, etc.), must be considered and secured by locks, blinds, chains, sprags, or blocking.

6.3 Blanking/Blinding Procedures

All lines and *systems* that permit the entry of hazardous material, such as liquids, gases or solids (concentrates, fines, sanitary waste, etc.) into the confined space must be blanked or blinded off. Merely shutting off or locking a valve is not adequate protection. All blanks and blinds must be tagged to identify them as part of a confined space entry procedure (refer to Figures 1 and 2).

- a. Unless certified by a professional engineer to provide adequate safety for the particular conditions of anticipated pressure, temperature, and service, a blank or blind must be manufactured in accordance with the specifications of one of the following standards:
 - (a) ANSI Standard API 590-1985, Steel Line Blanks;
 - (b) ANSI Standard ASME/ANSI B16.5-1988, Pipe Flanges and Flanged Fittings;
 - (c) ANSI Standard ASME B31.1-1992, Power Piping;
 - (d) ANSI Standard ASME B31.3-1993, Chemical Plant and Petroleum Refinery Piping.
 - If a blank or blind is certified by a professional engineer, the employer must keep a record of its certification, location and conditions of service.
 - If required, an allowance for corrosion must be made in the design of a blank or a blind.
 - A blank or blind must be stamped with or otherwise indicate its pressure rating.

- If a line is to be opened for disconnection or to insert a blank or a blind, written safe work procedures must be prepared and followed to prevent hazardous exposure of workers to its contents.
- Visual indication that a blank or blind has been installed must be provided at the point of installation.
- If required to prevent leakage, gaskets must be installed on the pressure side of blanks or blinds and flanges must be tightened to make the blanks or blinds effective.



Figure 1: Open end of pipe with a blind. Nearest valve closed locked and tagged.

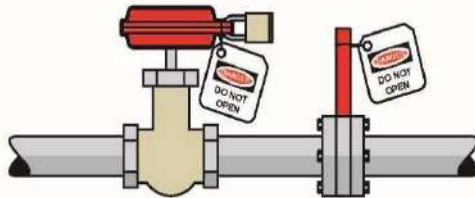
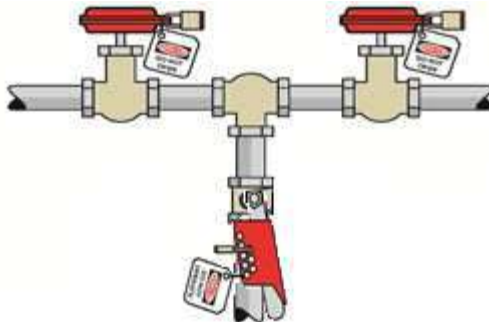


Figure 2: Insertion of full pressure Blank. Nearest valve closed, locked and tagged. Blank is also tagged to indicate its purpose.

b. Double Block and Bleed

Double block and bleed systems may be used where blanking or blinding is impracticable. The diameter of the **bleed** line must be no less than the diameter of the line being isolated, unless certified by a professional engineer (see Figure 3).



Bleed Line must secured in the open position

Figure 3: Closing, locking and tagging at least two valves

NOTE: Attention must be given to adjacent piping that could introduce an added hazard to the workers in the confined space.

If the above noted isolation techniques are not feasible, contact a Safety and Training Officer for guidance before proceeding.

6.4 Testing and Evaluating the Atmosphere

Before a worker enters a confined space, the atmosphere must be tested in accordance with the confined space training program.

6.5 Cleaning, Purging, Inerting, Venting

- a. Cleaning** should always be done prior to entry and whenever practicable from outside the confined space. Here are some examples of how to clean a confined space from the outside:
- Use a vacuum and hose to remove contaminants such as process sludge or residue.
 - Pressure wash the space from outside.
 - Use a tank with a drain hole in the bottom and an agitator, and continually flush the space.
 - List, when possible, the methods used to ensure:
 - The confined space contains clean, breathable air.
 - Flammable or explosive gas or vapor levels if present are maintained below 10% of the Lower Explosive Limit (LEL).
 - After draining or emptying a space of its previous contents, cleaning, neutralization, de-scaling, etc. may be necessary to avoid residual toxic or corrosive chemicals and slippery surfaces.
- b. Purging** is removing the unsafe air from the confined space and replacing it with clean breathable air prior to entry. This is commonly accomplished by blowing air into the confined space using portable mechanical ventilators. Purging is most effective if there are no contaminants being generated within the space. If there are contaminants, the space must first be cleaned and then purged.
- i. Purging may be necessary to minimize the possibility of a fire or explosion inside or outside the confined space.
 - ii. **Pre-entry Purge Ventilation: Requires a minimum of 20 air changes per hour. Minimum purge time is 30 minutes.** Purge time may **not** be increased to accommodate a lower ventilation rate, i.e., the calculated ventilation rate is the minimum required for adequate air mixing.
- c. Ventilation** of a confined space with fresh air, by natural, forced or mechanical means, is necessary to establish and maintain a safe atmosphere. Ventilation needs to be continued for as long as anyone is in the confined space.
- i. Minimum Ventilation Rate is required to achieve effective air mixing inside the confined space. If the Minimum Ventilation Rate of 20 air changes per hour cannot be practicably achieved, consult an occupational hygienist or engineer to design and document the most effective alternative ventilation configuration. If the minimum Ventilation Rate calculation results in less than 50cfm the minimum will be elevated to 50cfm.
 - ii. Effectiveness of air mixing
 - **Good** = no obstructions in space, at least two ventilation openings (air inlet and outlet) – [no change required];
 - **Moderate** = some airflow restriction (e.g., only one ventilation opening) and possible “dead spots” – [may need to adjust equipment and ventilation requirements];
 - **Poor** = airflow restriction (e.g., only one ventilation opening) and possible ‘dead spots’. Space has a complex shape or has many

- obstructions – [consult engineer or occupational hygienist].
- iii. Consideration should also be given to where the fresh air is drawn from and where the confined space exhaust air is finally vented to, so that the fresh air is not contaminated either by exhaust air or by other pollutants, and the exhaust air does not cause other risks.
 - iv. Mechanical ventilation may be either local exhaust ventilation (LEV) or dilution ventilation. LEV is effective where the source of contaminant generation is localised, the extraction point can be located close to the source and adequate make-up air is available (e.g. capture or extraction of welding fume).
 - v. Where dilution ventilation is used, air needs to be introduced in a way that will ensure effective circulation throughout the confined space, taking account of the configuration of the space, the position of the openings and the properties of the contaminants.
 - vi. During operations likely to generate contaminants, mechanical ventilation equipment may not be adequate or sufficiently reliable to maintain contaminants at acceptable levels or to ensure a safe oxygen level. Where mechanical ventilation equipment is likely to be necessary to maintain acceptable contaminant levels in a confined space, the equipment must:
 - be monitored to ensure continuous operation while the confined space is occupied, and
 - Have the controls (including any remote power supply) clearly identified, tagged and protected to guard against unauthorized interference.
 - vii. Denote if a ventilation system is used to control airborne contaminants in the confined space as dictated by the entry permit.
 - If clean breathable air in a confined space cannot be assured before workers enter, or if it cannot be maintained while workers are inside, then the appropriate respirators (SCBA) must be provided for workers to safely enter and remain in the space. Respirators are to be used only if it is impracticable to provide clean breathable air or if the confined space has an inert atmosphere. In these situations, workers rely on respirators either to remove contaminants from the air they inhale or to provide a safe source of air.
 - If a respirator is required, the qualified person will denote this on the entry permit. All workers entering the space must wear the appropriate respirator.

6.6 Personal Protective Equipment

Personal protective equipment (PPE) requirements associated with the confined space must be identified, whether it is normal plant PPE or special PPE (chemical goggles, complete body covering, etc.).

6.7 Lifelines, Harnesses, and Lifting Equipment

Lifelines, harnesses, and lifting equipment are mandatory in PRCS when workers are required to enter a confined space with the following characteristics:

- a. Potential for a seriously hazardous atmosphere.
- b. High risk of engulfment or entrapment.
- c. Any other recognized serious health or safety hazard.
- d. **Retrieval lines must be attached to a mechanical device if confined space is over 5 ft. deep.**

NOTE: Refer to Section 3.1.f for further information on lifelines and harnesses in permit required confined spaces.

6.8 Access & Egress:

If it is not reasonably practical to eliminate the need to enter the confined space, then any risk associated with entry to and exit from the space must be minimized. Entry to and exit from a confined space is safer when openings (access points) are large enough for persons and equipment to pass easily through them. Where relevant, the following features should be incorporated at the design, manufacture, and installation stages:

- a. Access points (including those within the confined space, through divisions, partitions or obstructions) should be large enough to allow people wearing the necessary protective clothing and equipment to pass through, and to permit the rescue of all people who may enter the confined space.
- b. A safe means of access to and within the confined space, such as fixed ladders, platforms and walkways should be provided.
- c. Access points should be unobstructed by fittings or equipment that could impede rescue and should also be kept free of any obstructions during work in the confined space. If equipment such as electrical cables, leads, hoses and ventilation ducts are required to pass through an access hole, a second access point may be needed.
- d. There should be enough access points to provide safe entry to and exit from the confined space. For example, the spacing of access holes on sewers (or in the case of large vessels, the absence of such access holes over considerable lengths) may affect both the degree of natural ventilation and the ease with which persons can be rescued.

6.9 Permits Required

a. Confined Space Entry Permit:

Workers may only enter a confined space after written approval in the form of a confined space entry permit form that has been issued by the confined space supervisor.

- b. The confined space supervisor responsible for the entry permit into the confined space must inspect the job site to identify the need for additional forms and permits. These may include:
 - i. **Dig Permit** - required if entry into the confined space is part of a demolition procedure or an excavation below ground/floor level.
 - ii. **Hot Work Permit** - may be required if work involves the use of open flame or other sources of ignition such as grinding.
- c. A new confined space entry permit must be completed and signed by the confined space supervisor:
 - i. If there is a change in scope of work or conditions within the confined space.
 - ii. If there is a change in work crew or worker supervisor.
 - iii. After each shift change, or
 - iv. After a change in the confined space supervisor.

6.10 Material Handling in a Confined Space

Material existing in the space needs to be removed to the best of the entrant's

ability before entrance into the space. Any material still in the space during an entry poses a risk of engulfment. Refer to section 6.5 on proper cleaning methods.

Engulfment means to be swallowed up in or be immersed by material, which may result in asphyxiation. Examples of stored materials that may pose a risk of engulfment include: plastics, sand, liquids, fertilizer, slag and coal. Stored materials such as slag and fertilizer can form a crust or bridge when a container is emptied from below, leaving the top layer in place. Workers walking on the bridge or working below the bridge on the floor of the container may be engulfed if a bridge collapses (see Figure 5).

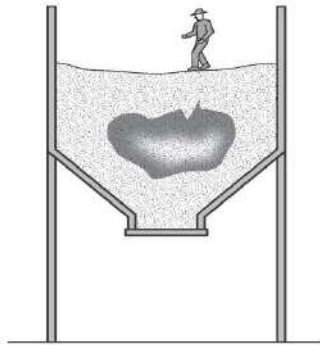


Figure 5: *Example of 'bridging' which may result in engulfment*

- a. Scaling** - Confined spaces must be inspected prior to entry and appropriate measures taken to isolate or otherwise remove loose material that, should it fall, threatens the safety of workers in the confined space. If practical, the removal of scale material should be performed from outside the space. Where removal is impractical, other measures must be taken to protect workers from overhead hazards (i.e. canopies or other forms of protective overhead structures).
- b. Spragging** - Accomplished with the use of devices such as wedges, chains, bars or other equipment that prevents the equipment from moving (equipment turning on its axis, ring gears on the outside of a large rotating drum, etc.).
- c. Blocking** - Ensure a method of supporting equipment inside a confined space that could have the potential for falling and injuring workers. Such equipment includes shafts, agitator blades, etc.

Note: Blocking/Spragging and restraining devices must be capable of performing the functions for which they are to be used, which may be shown by documentation from the equipment manufacture and maintained as specified by the manufacture.

6.11 Fire Safety

Flammable atmospheres in confined spaces may result from the evaporation of a flammable residue, flammable materials used in the space, a chemical reaction (such as the formation of methane in sewers), or from the presence of combustible dust (such as that in coal silos).

If an ignition source such as a sparking or electrical tool (including static on a person) is introduced into a space containing a flammable atmosphere, an explosion can result.

- a. Controlling flammable substances:** When a space contains or may contain flammable substances, the confined space supervisor will consider the following when completing the entry permit:
- i. **Minimizing** quantities of flammable materials inside the space at all times
 - Isolating the confined space from flammable substances
 - Cleaning all flammable residues prior to entry
 - Using non-flammable cleaning solvents where possible
 - Controlling any flammable materials that must be used
 - Keeping cylinders of acetylene, propane, and other flammable gases outside the confined space
 - Wetting down spontaneously combustible residues before removal
 - Maintaining the atmosphere as far below 10% of the LEL as possible
 - Checking welding and cutting hoses
 - Removing oxyacetylene welding torches and hose assemblies from confined spaces when not in use, whenever practicable
 - Checking the other side of the surface for other workers or for combustible materials before using a torch or similar welding equipment on walls, bulkheads, etc.
 - ii. **Except** for compressed air supplied to a respirator, medical resuscitation equipment, and handheld aerosol spray containers. A cylinder of compressed gas is not permissible inside a confined space.
 - iii. **Welding** and cutting torches must be removed when not in use. Refer to Red Dog Operations Health and Safety Handbook.

6.12 Electrical Safety

Consideration must be given to the work activities that may alter the conditions within or around the confined space. These work activities may require additional controls than those identified in the confined space hazard assessment.

- a. Tools** - Electrical tools and equipment, used in a confined space must be grounded or double insulated and be so marked, and if wet or damp conditions exist inside the space, must be protected by an approved ground fault circuit interrupter (GFCI). Careful consideration of insulation of the welder is needed when doing electrical welding inside metal enclosures, and the condition of the equipment (cables, electrode holder) should be checked regularly.
- b. Lighting** - Review the need for additional lighting prior to entry, and install if necessary. Proper lighting, guarded to prevent bulb breakage, must be used. Low voltage units minimize the potential for electrical shock.
- i. When additional lighting is required on a job in a confined space, flashlights must be supplied to each worker for the purpose of emergency exit, or in the event of a power failure.

6.13 Rescue

- a.** Refer to the Confined Space Rescue Plan for specific instructions.
- b.** Before a worker enters a permit required confined space, the supervisor must contact the Control Room Operator (CRO) or if working at the Port contact the Port Medic. In the case of an emergency, the CRO/Medic will contact rescue services.
- c.** Where multiple confined spaces are active (occupied) concurrently, rescue personnel must have an effective means to simultaneously evacuate all confined

- spaces in the event of an emergency that limits their ability to affect a rescue at another confined space.
- d. Upon completion of confined space entry or at the end of the work shift the confined space supervisor must ensure that the Control Room Operator (CRO)/Port Medic is notified that work has ceased and the space is unoccupied.
- e. Refer to the Permit Required Confined Space Rescue Plan documents in Qualtrax for further information

6.14 Confined Space Rescue Equipment:

- a. Refer to the Confined Space Rescue Plan for specific equipment.
- b. Emergency Services will determine what specialized rescue equipment will be required for each confined space.
- c. All rescue personnel must be trained in the use of all required equipment.

6.15 Attendant

For every **permit required confined space entry**, a worker must be assigned as an attendant who checks on the well-being of workers inside the space by visually observing them. The attendant also summons help in the event of an emergency. Workers inside the space must be able to contact the attendant at any time, either through voice or visual contact. The attendant must be situated at the entry point to the confined space or at another suitable location such that either eye to eye contact can be made, radio communication is maintained or another available form of communication is maintained while workers are inside the space.

- a. Must be adequately instructed and trained.
- b. Participate in pre-job planning sessions with crew entering space.
- c. Know who is in the space. Keep a written record of those people in the confined space.
- d. Keep unauthorized people out of the space. Only those who are authorized, trained and properly equipped are permitted to enter the space. See the record mentioned above.
- e. Must establish prescribed communication system with those in the confined area.
- f. Be able to recognize early signs of trouble: i.e. headache, unusual behavior, etc. and order workers to get out of the space immediately if anything of this nature occurs.
- g. Watch for, and be able to recognize, hazards that may be introduced from outside the space. Flammable or toxic vapors can flow from one area to another. Plants adjacent to the space may have upsets that can affect the conditions in the space. Fuel burning equipment parked beside the space can discharge fumes to the area.
- h. Maintain clear access to and from the confined space. Maintain control of the area and do not let anyone tamper with or remove any of the equipment, i.e. ladders, breathing air bottles, lights, etc.
- i. If someone in the space falls, or has difficulty breathing, call for help. Do not enter the space.
- j. Maintain a close watch on all ventilation or breathing air equipment to ensure that it is functioning properly. If problems arise, alert workers inside the space and order them to exit the space.
- k. Maintain a close watch on any monitoring equipment located outside the space to

- detect any harmful environmental changes in the space.
- l.** If rescue is required, call 911 or contact the CRO immediately (channel 4).
- m.** The attendant shall not leave the post unless a qualified replacement is available. If a qualified replacement is not available, all workers must exit the space before the attendant leaves the post.

Appendix 1 – Definitions

Acceptable Entry Conditions refers to the conditions that must exist in a confined space to allow entry and to ensure persons involved with an entry can safely enter and complete work within the space.

Atmosphere refers to the gases, vapors, mists, fumes, and dusts within a confined space.

Adjacent Piping/workings, means a device such as a pipe, line, duct or conduit which is connected to a confined space or is so located as to allow a substance from within the device to enter the confined space.

Assessment Form refers to the hazard assessment form used by a confined space assessment team to identify and assess all hazards in and around a specific confined space area.

Attendant refers to an individual stationed outside one confined space who monitors the entrant(s) and who performs all the assigned attendant's duties (see Appendix 2).

Blanking or Blinding, means the absolute closure of a pipe, line, or duct by the fastening of a solid plate (such as a spectacle blind or a skillet blind) that completely covers the bore and that is capable of withstanding the maximum pressure of the pipe, line, or duct with no leakage beyond the plate.

- a.** A **blank** means a solid plate installed through the cross-section of a pipe, usually at a flanged connection;
- b.** A **blind** means a solid plate installed at the end of a pipe which has been physically disconnected from a piping system.

Blocking means a method of supporting equipment inside a confined space that could have the potential for falling and injuring workers. Such equipment includes shafts, agitator blades, etc.

Clean Respirable Air, when used to describe the atmosphere inside a confined space, means an atmosphere which is equivalent to clean, outdoor air and which contains;

- a.** about 20.9% oxygen by volume;
- b.** no measurable flammable gas or vapor as determined using a combustible gas measuring instrument, and
- c.** no air contaminant in concentrations exceeding either 10% of its applicable exposure limit in acceptable ambient air quality standard established by an authority having jurisdiction over environmental air standards, whichever is greater.

Confined Space, means a space that:

- a. Is large enough and so configured that an employee can bodily enter and perform assigned work
- b. Has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry), and
- c. Is not designed for continuous employee occupancy, and

Confined Space Assessor, refers to an individual that has successfully completed the Confined Space Assessor training course and holds a current MSHA 5000-23 for Confined Space Assessor. This person serves on the Confined Space Assessment Team when a confined space on site needs to be assessed for potential hazards.

Confined Space Assessment Team, means a team of individuals who have all fulfilled the requirements of confined space assessment team training as determined by the Red Dog trainer. The team's purpose is to identify and document all confined space hazards.

Confined Space Supervisor, means the person who has been trained and certified with Red Dog's supervisory confined space training and must hold a MSHA 5000-23 form. This is the only person who can sign the confined space entry permit as a SUPERVISOR for authorization purposes. They are responsible for determining if acceptable entry conditions are present at a permit space where entry is planned, for authorizing entry and overseeing entry operations, and for closing entry as required by this section.

- a. Determining if acceptable entry conditions are present in the permit space
- b. Authorizing entry or allowing current operations to continue
- c. Overseeing entry operations
- d. Closing entry permit as required
- e. Designating the permit space attendant
- f. Ensuring everyone is properly trained
- g. Ensuring that the permit is filled out properly
- h. Auditing as work proceeds
- i. Notifying CRO to ensure that the entry is logged into the system for rescue purposes if needed

Confined Space Area Owner, means the specific area operator or supervisor that will isolate and prepare the confined space for entry (for example, LOTOTO).

Control Room Operator (CRO), means the person who is in charge of the mill operation controls. This person also serves as the 911 dispatcher in case of an emergency.

Disconnecting means physically disconnecting adjacent piping from a confined space to prevent its contents from entering the space in the event of discharge.

Document Control, means the person in charge of documenting and maintaining records of confined space hazard assessments and entry permits for the site.

Double block and bleed, means the closure of a line, duct, or pipe by closing and locking or tagging two in-line valves and by opening and locking or tagging a drain or

vent valve in the line between the two closed valves.

Note: Double block and bleed systems are not used as a means of isolation when the ambient air temperature at the point of isolation or the temperature of the product in the line at the point of isolation is at or below 32 degrees Fahrenheit (0 degrees Celsius) (Alaska Occupational Safety and Health, Alaska Administration Code). Refer to section 8.5 Blanking/Blinding Procedures.

Emergency, any occurrence (including failure of hazard controls or monitoring equipment) or event internal or external to the permit space that could endanger Entrants.

Employer means Teck Alaska at the Red Dog Mine Site.

Engulfment means the surrounding and effective capture of a person by a liquid or finely divided (flowable) solid substance that can be aspirated to cause death by filling or plugging the respiratory system or that can exert enough force on the body to cause death by strangulation, constriction, or crushing.

Entrant, any person who has fulfilled the training requirements to enter a confined space outlined herein.

Entrapment, in reference to a hazard in a confined space that has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross section. Example – A silo that comes to a point at the bottom would be considered to have a hazard of entrapment because a person would not be able to escape the space. They would be *trapped*.

Entry, A person is considered to have entered a confined space when any part of their body crosses the plane of the entrance to the space.

Entry Permit, a document provided by the employer to allow and control entry into a confined space.

Flammable/Explosive Atmosphere means an atmosphere containing a flammable gas or vapor at a concentration between the lower explosive limit (LEL) and the upper explosive limit (UEL). This includes dust hazards such as coal, sulfur, & fertilizer.

Harmful Substance means a WIS (Waste Information System) controlled product, or a substance which may have a harmful effect on a worker.

Hazard, means any practice, behavior, substance, condition, or combination of these that can cause injury or illness to people, or damage to property.

Hazard Assessment, means the process of identifying hazards so they can be eliminated or controlled. Hazard assessments for confined spaces must be done by a confined space assessment team.

Hazardous Atmosphere means an atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue (that is, escape unaided from a permit space), injury, or acute illness from one or more of the following causes:

- a. Flammable gas, vapor, or mist in excess of 10% of its lower flammable limit (LFL);
- b. Airborne combustible dust at a concentration that meets or exceeds its LFL;
NOTE: This concentration may be approximated as a condition in which the dust obscures vision at a distance of 5 feet (1.52 m) or less.
- c. Atmospheric oxygen concentration below 19.5% or above 23.5%;
NOTE: An atmospheric concentration of any substance that is not capable of causing death, incapacitation, and impairment of ability to self-rescue, injury, or acute illness due to its health effects is not covered by this provision.
- d. Any other atmospheric condition that is immediately dangerous to life or health.

Hot Work, means the employer's written authorization to perform operations (for example, riveting, welding, cutting, burning, and heating) capable of providing a source of ignition.

IDLH is an acronym for Immediately Dangerous to Life or Health, an atmosphere that poses an immediate threat to life, would cause irreversible adverse health effects, or would impair an individual's ability to escape from a dangerous atmosphere.

NOTE: Some materials -- hydrogen fluoride gas and cadmium vapor, for example -- may produce immediate transient effects that, even if severe, may pass without medical attention, but are followed by sudden, possibly fatal collapse 12-72 hours after exposure. The victim "feels normal" from recovery from transient effects until collapse. Such materials in hazardous quantities are considered to be "immediately" dangerous to life or health.

Inserting, means intentionally flooding the atmosphere inside a confined space with an inert gas such as nitrogen to eliminate the hazard of ignition of flammable vapors inside the confined space but thereby creating an oxygen deficient atmosphere.

Isolation is the process by which a permit space is removed from service and completely protected against the release of energy and material into the space by such means as:

- a. Blanking or blinding
- b. Misaligning or removing sections of lines, pipes or ducts.
- c. A double block and blind system
- d. Lockout, Tag Out, and Try Out (LOTOTO) of all sources of energy.
- e. Blocking or disconnecting all mechanical linkages.

Line breaking, means the intentional opening of a pipe, line, or duct that is or has been carrying flammable, corrosive, or toxic material, an inert gas, or any fluid at a volume, pressure, or temperature capable of causing injury.

LEL (Lower Explosive Limit,) means the minimum concentration of a flammable gas or vapor that will support a self-propagating flame when mixed with air (or oxygen) and ignited.

Natural Ventilation means the natural movement of air through the confined space resulting from the design and shape of the space, and the number of openings.

Mechanical Ventilation means the introduction of air into the space by the use of

fans, blowers, or other power driven equipment. Must be designed, installed, and maintained in accordance with established engineering principles and must be specified in the written procedures.

Non-Permit/Reclassified Confined Space, means a confined space that does not contain any hazards capable of causing death or serious physical harm and does not have the potential to contain atmospheric hazards capable of causing death or serious physical harm. The confined space entry form must be filled out completely even if the confined space has been reclassified as a non-permit confined space.

Oxygen Deficient Atmosphere refers to an atmosphere where the oxygen content is less than 19.5% by volume.

Oxygen Enriched Atmosphere means an atmosphere inside a confined space that contains more than 23.5% oxygen by volume.

Permit Required Confined Space, is a confined space that has one or more of the following characteristics:

- a. Contains or has the potential to contain a hazardous atmosphere;
- b. Contains material that has the potential for engulfing the entrant (i.e. coarse ore, concentrate ore, dirt, sludge, etc.);
- c. Has an internal configuration such that an entrant could be asphyxiated by inwardly converging wall(s) or by a floor which slopes downward and tapers to a smaller cross-section; or
- d. Contains any other recognized **serious safety or health hazard**.

Purging means the method by which gases, vapors, or other airborne impurities are displaced from a confined space.

Rescue Plans, are the implementation of a written proper pre-plan developed by the Red Dog Safety and Health Department.

Rescue Service (Red Dog Fire Department), means the personnel designated to rescue employees from permit spaces.

Retrieval System, means the equipment (including a retrieval line, chest or full-body harness, wristlets, if appropriate, and a lifting device or anchor) used for non-entry rescue of persons from permit spaces.

Sprag/Spragging means a mechanical device engineered to hold a piece of equipment in a secure position. This device must be capable of being locked out if there is the potential for inadvertent displacement.

UEL (Upper Explosive Limit), the maximum concentration of a flammable gas or vapor that will support a self-propagating flame when mixed with air (or oxygen) and ignited.

Worker Supervisor, means any individual who is directing work activity for one or more workers. Needs not be confined space trained.

Appendix 2 - RESPONSIBILITY

Confined Space work will be performed by confined space trained employees under the supervision and instruction of a confined space supervisor.

1 General Manager

It is the General Manager's responsibility to ensure:

- a. All confined spaces are identified and cataloged.
- b. A Confined Space Identification & Hazard Assessment is conducted by a trained confined space assessment team for each identified confined space on site.
- c. Each person who is assigned duties or responsibilities related to entering a confined space will be successfully trained in Red Dog's confined space entry program.

1.1 Superintendent of Safety and Health

Will be responsible for:

- a. Administration of the confined space entry program;
- b. The Safety and Health Department will aid assessment teams in the identification and classification of confined spaces using the Confined Space Identification & Hazard Assessment Form.
- c. Ensure the confined space entry requirements are reviewed for compliance and other required changes at least every three years or when an update is issued to the Teck Corporate Confined Space Policy.

1.2 Confined Space Assessor

Will be responsible for:

- a. Adequately assessing hazards during completion of the Confined Space Identification & Hazard Assessment Form.

1.3 Confined Space Supervisor

Is responsible to ensure that the following are done for each entry:

- a. Entry does not occur unless absolutely necessary.
- b. Pre-entry testing and inspections are conducted according to the entry permit.
- c. Assign an attendant.
- d. Ensure those individuals with an assigned duty associated with the entry, prior to entering into a confined space, are trained and have:
 - i. The hazards and controls related to work in the confined space.
 - ii. The contents of the entry permit.
 - iii. Their own duties and responsibilities.
 - iv. A completed MSHA 5000-23 form.
- e. Ensure the Confined Space Hazard Assessment Form has been reviewed.
- f. Ensure a pre-job meeting(s) is held with all workers involved with the confined space entry.
- g. If any changes occur within the confined space, work activities, or isolation procedures during entry that are not identified in the confined space entry permit:
 - i. Stop work and all workers exit the confined space
 - ii. Review safe work procedures and

- iii. Ensure new procedures are documented and communicated to all workers involved prior to re-entry into the confined space.
- h. Ensure that prior to entry the Red Dog Rescue Plan is followed.
- i. Close the entry and ensure removal of personnel and equipment upon completion of work in the confined space.
- j. Ensure access points are barricaded, secured, and/or labeled when the space is occupied and unoccupied.

1.4 Worker Supervisor

May be responsible for:

- a. Identifying workers to enter a confined space to perform work.
 - i. If work is required, the worker supervisor must ensure that a trained confined space supervisor is assigned to monitor the confined space entry.

1.5 Document Control

Responsible for:

- a. Maintaining an inventory list of all confined spaces on site, including all relevant forms for each confined space including Confined Space Hazard Assessment Forms and entry permits.
- b. Maintaining confined space entry permits for a minimum of one year.

1.6 Emergency Services (Red Dog Fire Dept.)

- a. Follow the rescue plan as determined by the Response Chief.
- b. Where multiple confined spaces are active (occupied) concurrently, rescue personnel must have an effective means to simultaneously evacuate all confined spaces in the event of an emergency that limits their ability to affect a rescue at another confined space.

1.7 Safety and Health Department

- a. Aid assessment team in the identification and assessment of confined spaces using the hazard assessment form.
- b. Maintain the confined space entry requirements for Red Dog Operations.
- c. Audit compliance with regulations and standards related to confined spaces.

1.8 Attendant

All Permit-Required confined spaces at Red Dog must have an Attendant present at the entrance.

The attendant is responsible for;

- a. Identifying the hazards that may be faced during entry.
- b. Posting the entry permit at the entrance to the space.
- c. Being aware of potential behavioral effects of hazards on entrants.
- d. Ensuring atmospheric samples are taken as required.
- e. Ensuring all entrants are aware of the hazards in the space.
- f. Communicating with entrants as necessary to monitor entrant status and to alert entrants of the need to evacuate.
- g. Organizing and recording the monitoring activities inside and outside of the space. This is to determine whether or not it is safe to remain in the space.
- h. Being situated at or near the entry point to the confined space so as to be able to

- view and control access to the confined space entry point.
- i.** Not having any other assigned duties that would interfere with their confined space duties while workers are within the confined space.
- j.** Being able to continuously summon the workers inside the space.
- k.** Being able to immediately summon rescue personnel.
- l.** UNDER NO CIRCUMSTANCES MAY THE ATTENDANT ENTER THE SPACE or ABANDON POST WHILE THE SPACE IS OCCUPIED.

1.9 Contractors

- a.** The Teck Alaska (TAK) representative responsible for contractor(s) who will be involved with confined space is required to inform all involved contractors about the Red Dog confined space requirements and to schedule any training or assessments, if needed.
- b.** Contractors are responsible to comply with the Red Dog Operations confined space entry requirements and policies.
- c.** Contractors are required to use the Red Dog confined space entry permit.
- d.** For training requirements, refer to Section 5 for more information.
- e.** Contractors must use air monitors supplied by Red Dog and be properly trained to use.

1.10 Red Dog Port Operations

- a.** All Red Dog Port employees shall follow the Red Dog confined space entry requirements.
- b.** Confined space supervisors must follow Port rescue plans (located on Qualtrax) in the event of a confined space emergency.

Confined Space Entry Permit Form – Post at Entrance

STEP 1 – ENTRY BASICS					
COMPANY:		DEPARTMENT:		DATE:	
QUALTRAX ID #:		START TIME:		EXPIRE TIME:	
EQUIPMENT #:		MWO #:			
WORK TO BE PERFORMED IN CONFINED SPACE:					
CONFINED SPACE SUPERVISOR: (<i>print name</i>)				CS SUPERVISOR'S PIN #:	
ENTRANT(S) NAME:					
1.					
2.					
3.					
4.					
5.					

STEP 2– PRE-ENTRY ATMOSPHERIC MONITORING:							
GAS/TOXIN	O ₂	LEL	CO	H ₂ S	NO ₂	SO ₂	HCN
PERMISSIBLE ENTRY LEVELS	19.5-23.5 %	Under 10%	Under 35 ppm	Under 1 ppm	Under 3 ppm	Under 2 ppm	Under 4 ppm
READING %							
TIME OF INITIAL READINGS:							
MX6 #:							

STEP 3 –ISOLATION PROCEDURES AND HAZARD CONTROLS (<i>Check “Yes” or “N/A” for ALL items</i>)					
PROCEDURE	YES	N/A	PROCEDURE	YES	N/A
Required PPE is provided			Cleaned and/or drained confined space		
Lock Out / Tag Out / Try Out all sources of energy			Hydraulic Isolation		
Purged Space			Radiation Isolation		
Proper lighting installed			Chemical Isolation		
Blank / Blind / Bleed all lines			Pneumatic Isolation		
Flagging / Barricading of all entry points			Other: (List)		
Safe access provided (scaffold, ladder, etc...)			Other: (List)		
Comments regarding this entry:					

STEP 4 – COMMUNICATION (EMERGENCY RADIO CHANNELS: 3- Port 4- Mine) & (EMERGENCY PHONE #: 911)	
List type of communication between Entrant(s) and Attendant.(i.e. Radio, line of sight, Air horn)	

STEP 5 –EQUIPMENT (<i>Check “Yes” or “No” for ALL items</i>)					
EQUIPMENT	YES	NO	EQUIPMENT	YES	NO
Advanced Respirator (<i>PAPR, SAR, Full Face, SCBA</i>)			Body Protection (<i>Rain gear, chemical suit, etc...</i>)		
Ventilator/Blower			Ground Fault Circuit Interrupter (<i>GFCI</i>)		
Double Hearing Protection			Intrinsically Safe Portable Lighting/ Tools		
Double Eye Protection			Chemical gloves		
Other equipment you are using:					

Confined Space Entry Permit Form – Post at Entrance

STEP 6 – CONFINED SPACE SUPERVISOR REQUIRED ACTIONS (Check “YES” when each item is verified & completed)

ACTION	YES	ACTION	YES
The CS Hazard Assessment Form is attached to this entry form		All Safety Equipment & PPE Available for use	
CS Entry Form Posted at or near the entrance to the space		SDS(s) Reviewed (<i>if not applicable write N/A</i>)	
All Preparation / Isolation Procedures Complete		MSHA 5000-23s verified for all employees	
Surrounding Areas Free From Vapors/ Hazards		The confined space is safe for entry	

STEP 7 – CONFINED SPACE WORK SCOPE

1.	On The Confined Space Identification & Hazard Assessment Form Part 6 is this space a Permit Required Confined Space? (If “Yes” go to question #2, if “No” go to question # 3)	YES	NO
2.	If YES, the confined space is classified as a PERMIT REQUIRED CONFINED SPACE . <ul style="list-style-type: none"> Review & complete the “CONFINED SPACE RESCUE PLAN” located in Qualtrax and attach to this form. (mark “X” when completed) Complete Step 8 to authorize entry Step #9 & #10 is REQUIRED. Complete Step 11 to close the CS Entry Form once job is completed. 		
3.	IF NO, will any of the work in this space create a serious safety hazard to the entrant(s)? (If “Yes” go to question #2, if “No” go to question # 4)	YES	NO
4.	IF NO, the confined space may be classified as a NON-PERMIT REQUIRED CONFINED SPACE . <ul style="list-style-type: none"> Print out and complete the “CONFINED SPACE RECLASSIFICATION FORM” located in Qualtrax Complete Step 8 to authorize entry. Step #9 & #10 are optional and NOT required. Complete Step 11 to close the CS Entry Form when the job is completed 		

STEP 8 – CONFINED SPACE SUPERVISOR AUTHORIZATION

I certify that all required precautions have been taken, the Confined Space Hazard Assessment Form has been reviewed, and the necessary equipment has been provided for safe work in the identified confined space. I authorize entry into this confined space.

Confined Space Supervisor Signature: _____

Date: _____

Time: _____

STEP 9 – AUTHORIZED ENTRANT(S) ACCESS/EGRESS TIMES:

Attendant’s Name:	Entrant’s Name:	Time In	Time Out	Time In	Time Out	Time In	Time Out	Time In	Time Out	Time In	Time Out

STEP 10 – ATMOSPHERIC MONITORING:

GAS/TOXIN	ACCEPTABLE	READING	READING	READING	READING	READING	READING	READING
O ₂	19.5-23.5 %							
LEL	Under 10%							
CO	Under 35 ppm							
H ₂ S	Under 1 ppm							
NO ₂	Under 3 ppm							
SO ₂	Under 2 ppm							
HCN	Under 4 ppm							
Time of Reading(s):								

STEP 11 – CONFINED SPACE ENTRY FORM CLOSURE

I certify that all work has been completed within the specifications of this Confined Space Entry Form and the space is secure.

Confined Space Supervisor Signature: _____

Date: _____

Time: _____

Confined Space Reclassification Form

Teck

Note: This confined space may only be reclassified if all serious safety hazards have been eliminated before entry and if the Identification & Hazard Assessment Form Part #6 Non-Permit Required Confined Space box is checked.

Confined Space Location:		Qualtrax ID#:	
Main Entry Point(s):		Main Exit Point(s):	
# of Entrant(s):		Type (flotation cell, sump, etc.):	
Does the space contain actual or potential atmospheric hazards?			
Will any of the work in this space create a serious safety hazard to the entrant(s)?			
**If "Yes" to any above question you may NOT reclassify this space. If "NO" continue on with this form. **			
Description of work scope: (Be as detailed as possible)			
Have all identified hazards been eliminated?			
Communication:			
EMERGENCY RADIO CHANNEL: 3- Port 4- Mine		EMERGENCY PHONE #: 911	

**** If any hazard is encountered during entry or at any time during the work activities, a new Confined Space Entry Permit will need to be initiated to identify the newly found hazard(s).**

Reclassification Authorization:

I certify that all known or potential hazards have been appropriately eliminated prior to entry into the above confined space, thereby allowing for the reclassification of the space as a Non-Permit Confined Space. I authorize entry into this confined space.

Entry Supervisor Name (Print): _____ Date: _____

Entry Supervisor Signature: _____

Note: Complete Step 11 on the Confined Space Entry Permit once job is completed and the space is secure.

Emergency Response Team- Confined Space Rescue Plan

1. Emergency Response Team Procedure:
 - a. Follow all confined space entry procedures.
 - b. Assess all emergencies at the time of call out to determine the following:
 - i. Rescue equipment required for the space;
 - ii. Personal protective equipment for rescuers, including appropriate respirators for any contaminants or IDLH conditions;
 - iii. Communication between workers, rescuers, the supervisor of the entry, and standby persons;
 - iv. Possible hazards that may arise during rescue, the appropriate evaluation of these hazards, and control methods recommended by a competent person; and
 - v. Rescue methods for a worker who is unconscious, unresponsive, distressed or otherwise incapacitated.
 - vi. Communicate to the Control Room Operator to cease all other confined space entries.
2. Rescue Information:
 - a. All rescue equipment is kept in a ready state on the rescue truck located in the Fire Station in the ESB that consists of: tri-pod, rescue rope, full body harnesses, ventilation equipment, air monitoring equipment, SCBAs, supplied air systems with emergency escape bottles, and victim recovery equipment such as Stokes basket and SKED.
 - b. All rescue personnel involved in a confined space rescue will have annual refresher training.
 - c. All rescue personnel involved in a confined space rescue will have hand held radios and work off the emergency channel, along with communication to the CRO/Dispatch if necessary.
 - d. Any possible hazards that arise during a rescue will be evaluated by the on-scene Person in Charge for the rescue; The MX6 gas monitor will also be utilized to evaluate the atmosphere. At no time will any rescue personnel be placed in danger.
 - e. Rescue methods must be determined prior to the entry or during the evaluation of the confined space. There are three type of rescues methods:
 - i. Self-Rescue – an alarm goes off and the worker exits on their own accord.
 - ii. Non Entry Rescue – the worker is pulled straight out of the area from the outside.
 - iii. Entry Rescue – because of injuries, the design, or other possible complications a rescuer must enter the area to get the worker out.
 - f. If it is determined that entry rescue is the only choice to make, then a confined space rescue team may need to be on standby during the confined space work, a complete evaluation / scope of the job being performed. The Response Chief or designee will need to evaluate the job and the confined space to determine the best rescue method.
 - g. Never enter into an unknown atmosphere without an air supplied respirator with escape bottle and a similarly qualified and equipped backup person present outside the space.
 - h. Know the hazards and associated relevant controls for work in the confined space, including information of possible contaminants in the atmosphere of the confined space (i.e. signs or symptoms, consequences and physiological effects of exposure to these contaminants).

Permit Required Confined Space Rescue Plan

Teck

For use at Red Dog Mine Site –

1. Entry Supervisor Procedure:

- Contact the Control Room Operator on Channel 4 prior to any Permit Required Confined Space entry.
- Verify that rescue services are available using the Red Dog Onsite application in Rover.
- Let the Control Room Operator know the time of entry, where the entry will be made, and the number of employees entering the space.
- Complete bottom portion of this form
- Complete Step 7.2 on the Confined Space Entry Permit.
- After completion of the confined space entry, notify the Control Room Operator of the time of closure and that all entrant(s) are clear.
- Turn in all confined space entry/rescue related documents into mill hallway basket.

Confined Space Location:		Qualtrax ID#:	
Main Entry Point(s):		Main Exit Point(s):	
# of Entrant(s):		Type (flotation cell, sump, etc.):	
Description of work scope inside the space and adjacent work:			
Specify the serious safety hazard(s):			
Communication:			
EMERGENCY RADIO CHANNEL: 4		EMERGENCY PHONE #: 911	
Confirm radio check to Control Room Operator/ Dispatch. (mark "X" when complete prior to entry)			
Emergency Response Team Verification:			
Minimum of (5) trained Confined Space Rescue personnel onsite? (Yes or No) (If "No", DO NOT enter the confined space)			
Does a specific rescue assessment need to be completed? (Yes or No) (If "Yes", contact the Red Dog Fire Department prior to confined space entry for authorization)			
Rescue Equipment: (mark "X" if using)			
Harness			
Tripod or Miller DuraHoist			
Lifeline (for vertical entry of 5' or deeper)			
Supervisor Name:		Signature:	Date:

2. Confined Space Attendant Procedure:

In the case of an emergency, the attendant shall:

- Determine the nature of the Emergency; order all entrants to evacuate the space.
- Immediately notify the Control Room Operator on **Channel 4** who will notify the ERT.
- The attendant may attempt to pull an injured worker from the space using a life line only if it is possible to do so without entering the space.
- Secure the area until the Red Dog Emergency Response Team arrives.

Permit Required Confined Space Rescue Plan

Teck

For use at Red Dog Port Site -

1. Entry Supervisor Procedure:

- a. Contact the Port Medic on Channel 3 prior to any Permit Required Confined Space entry.
- b. Verify that rescue services are available using the Red Dog Onsite application in Rover.
- c. Let the Port Medic know the time of entry, where the entry will be made, and the number of employees entering the space.
- d. Complete bottom portion of this form
- e. Complete Step 7.2 on the Confined Space Entry Permit.
- f. After completion of the confined space entry notify the Port Medic of the time of closure and that all entrant(s) are clear.
- g. Turn in all confined space entry/rescue related documents into the Port Medic.

Confined Space Location:		Qualtrax ID#:	
Main Entry Point(s):		Main Exit Point(s):	
# of Entrant(s):		Type (flotation cell, sump, etc.):	
Description of work scope inside the space and adjacent work:			
Specify the serious safety hazard(s):			
Communication:			
EMERGENCY RADIO CHANNEL: 3		EMERGENCY PHONE #: 911	
Confirm radio check to Port Medic. (mark "X" when complete prior to entry)			
Emergency Response Team Verification:			
Minimum of (5) trained Confined Space Rescue personnel onsite? (Yes or No) (If "No", DO NOT enter the confined space)			
Does a specific rescue assessment need to be completed? (Yes or No) (If "Yes", contact the Red Dog Fire Department prior to confined space entry for authorization)			
Rescue Equipment: (mark "X" if using)			
Harness			
Tripod or Miller DuraHoist			
Lifeline (for vertical entry of 5' or deeper)			
Supervisor Name:		Signature:	Date:

2. Confined Space Attendant Procedure:

In the case of an emergency, the attendant shall:

- a. Determine the nature of the emergency; order all entrants to evacuate the space.
- b. Immediately notify the Port Medic.
- c. The attendant may attempt to pull an injured worker from the space using a life line only if it is possible to do so without entering the space.
- d. Secure the area until the Red Dog Emergency Response Team arrives.

3.03 Flagging and Barricading Requirement

1 Purpose and Scope

The purpose of this requirement is to provide effective means of communication for the elimination of serious injuries and fatalities through flagging, barricading, and access control to prevent the unintended or unauthorized interaction between personnel, equipment and workplace hazards. This requirement applies to all employees and contractors performing work at Red Dog Operations.

2 Definitions

Flagging	Flagging offers no physical protection but serves to alert personnel in the area that a hazard or unsafe condition is present.
Barricade	Provides a physical barrier.
Yellow & Black Caution Flagging	Method of temporarily demarcating areas to warn personnel of lower risk to potential hazards. This includes the use of yellow with black letter flagging signage and/or tags. The area shall only be entered if persons are aware of the nature of the hazard and have taken the appropriate steps required to protect against the hazard.
Red & Black Danger Flagging	Method of temporarily demarcating areas to warn personnel of higher risk potential hazards. This includes the use of red with black letter flagging, signage and/or tags. No person shall enter or work within an area that has been demarcated with Danger Flagging unless permission has been obtained from the barricade owner or person whose contact details appears on the information tag/sign.
Soft Barricade	Normally used for temporary demarcation only. Does not physically prevent personnel access or can be crossed relatively easily. Soft barricades include, but are not limited to flagging, cones, rope, red and yellow chain. All methods of soft barricade shall incorporate a sign/information tag to identify the owner and hazards.
Hard Barricade	A temporary or permanent structure designed to restrict personnel entry. Hard barricades include, but are not limited to: jersey barriers, fencing, and earthen mounds.
Tags/ Signs	A descriptive tag or sign attached to a soft or hard barricade to identify and provide a warning with instructions/information to personnel regarding the hazard. NOTE: this is not applicable to roadway berms.

3 Procedure

Proper barricading shall be installed as soon as reasonable practical once a hazard or unsafe condition has been identified. A hazard or unsafe condition should not be left unattended until proper mitigation controls have been implemented.

4 Barricading & Signage

- Barricades shall be properly installed to prevent personnel from unintended or unauthorized interaction with workplace hazards.
- The application of a soft or hard barricade shall fully delineate a safe area.
- Proper Caution and Danger identification must be applied to soft and hard barricades, with the exception of berms.
- “Caution” is identified through the use of yellow flagging with black letters.
- “Danger” is identified through the use of red flagging black letters.

5 Barricade Selection

- The need for barricading shall be considered in a workplace risk assessment, at which time the type of barricade and person responsible for the barricade shall be established.
- Only Caution and Danger flagging shall be used to delineate workplace safety hazards. Survey tape shall not be used for demarcating a hazard.
- The need and type of barricading to be installed depends on:
 - hazards identified
 - type of task(s) being undertaken
 - duration of the activity
 - exposure to the hazard
- Hard barricades should be selected where practicable when the hazard and associated risk requires physical separation to prevent access to the hazard. Hard barricades can include, but are not limited to, fences, berms and portable barricades.
- Soft barricades should be erected to physically delineate an area where lower risk hazards are identified.
- For the purpose of this requirement, roadway berms, handrails, and guardrails that run parallel to a roadway or walkway are not considered to be barricades.
- When an earthen mound, handrail or guardrail is installed perpendicular to an authorized roadway or walkway, it shall be considered a barricade.

6 Barricade Installation

- The installation of barricades shall be completed prior to work commencing, or as soon as practicable when the hazard has been identified.
- Soft and hard barricades shall have information signs or attached tags at distances to allow for a person(s) to be able to read and understand the associated hazard along the length of the barricade and at each designated entry point, with the exception of berms.
- Floor openings shall be covered with material that will withstand 5 times the expected load otherwise barricaded in such a way that impedes travel into the area.
- Should questions arise as to how an area is required to be barricaded, contact your Supervisor, the Operating Area Supervisor or the Safety and Health Department.

7 Barricade Maintenance and Removal

A process shall be implemented to periodically validate all barricades:

- are installed as per the requirements of this document
- are maintained
- include legible information tags/signage

- and boundaries are adequate for the hazard

Immediately upon completion of the activity or when the hazard has been eliminated, barricades and flagging shall only be removed by the person responsible for the barricading.

A process must be established to transfer the responsibility for a barricade should the person responsible for the installation of the barricade leave the job, or if the person responsible for the barricade has a work shift that ends before the hazard has been eliminated.

8 Flagging

- Flagging offers no physical protection but serves to alert personnel in the area that a hazard or unsafe condition is present. Survey tape shall not be used for safety barricading.
- Yellow caution flagging serves only as a warning and will be utilized to warn employees of unusual conditions that may be a potential hazard or unsafe condition. Employee may enter the caution area only after reading the tag and understanding the hazard(s).
- Red danger flagging will only be utilized to mark the areas that are immediately dangerous to safety and health; it does not serve as a physical guard from the danger or unsafe condition. Only employees assigned to correct the problem shall enter. Employees assigned to correct the problem in this area shall be told about the hazard and what protective measures to follow. Soft barricading i.e., red danger "Do Not Enter" or yellow "Caution" flagging shall not be used to guard any open sided floors, holes and or excavations, platforms or catwalks. A hard barricade must be provided for these situations along with signage posted or tags attached.
- Flagging cannot be tied off to any life and safety equipment i.e. sprinkler valves, pull stations, fire extinguishers, AED or eye wash stations.

9 Tagging and Signage

- Tags/ signs must be checked periodically for legibility to retain control. Information required on the tags:
 - Reason why the barricade is required (hazard) (danger)
 - Name and contact details of the person(s) who erected the barricade
 - Date the barricade was placed
- Tags and signs are to be placed at each access point of the hazard.

10 Key Responsibilities

Employee:

- Employees identifying an area requiring flagging and or barricading must advise the area supervisor or designee of the hazard. This should be done as reasonably possible without leaving a hazard or unsafe condition unattended.
- Use barricade and flagging, tags and or signs at the area when a potential hazard exist that may cause harm or injury if left unattended.
- Completely remove the barricade and flagging after the hazard is resolved.

Supervisor:

- Ensure flagging and barricading is used according to this requirement.
- Ensure flagging and barricading materials are readily available.

- Ensure employees are trained on proper use and knowledge of flagging and barricading in their area.
- Ensure flagging and barricading tags and signs maintain legibility.
- Ensure all flagging and barricading is removed once the hazard no longer exists.

11 Key Documents/Tools/References

Teck High Potential Risk Control Requirements for Barricading, Dated November 2014
 30 CFR Part 56.20011 MSHA Safety and Health Standards-Surface Metal and Nonmetal Mines
 Red Dog Operations Employee and Contractor Handbook

“Caution” Flagging
 S/C 44617

“Danger Do Not Enter”
 Flagging
 S/C 5515



“Danger”
 Barricade Tag
 S/C 228347



“Caution”
 Barricade Tag
 S/C 228346



3.04 Hot Work Requirement

1 Purpose and Scope

The purpose of this document is to provide guidance in managing the Red Dog Operations Hot Work Requirement. Hot work is defined as any temporary operation involving open flames or producing heat and or sparks, including welding, brazing, cutting, grinding, soldering and torch applied roofing.

The Hot Work Requirement involves hazard recognition and awareness regarding the management of combustibles and fuel sources near the hot work being performed, providing vigilance during the operation, and communicating effectively to stakeholders the hot work to be performed. The following guidelines at a minimum are consistent with FM Global requirements. This requirement applies to all employees and contractors performing hot work at Red Dog Operations.

Anyone performing, supervising or overseeing hot work shall complete the Factory Mutual Hot Work training course provided by the RDO Training and Development Department documented with a MSHA Form 5000-23.

2 Definitions

Fire Extinguisher: For hot work, fire extinguishers must be at least a minimum 10 lb ABC dry chemical extinguishing agent. Fire extinguishers may be checked out at the Mill Tool Crib or Fire Systems Technicians Shop. Permanently mounted extinguishers in buildings shall not be used for hot work.

Fire Watch: All fire watch personnel shall receive training in fire prevention, detection, and suppression techniques, as well as emergency response activation. The fire watch must remain at the immediate location during the hot work operation and for 1 hour after the hot work has been completed. If the hot work fire watch must be relieved, it must be done by an equally trained individual. On large hot work operations it may be appropriate to implement several fire watch persons. An example would be when sparks cannot be contained to one floor or level. The fire watch duties are required when hot work is conducted in any building not designated as a hot work area.

Heightened Hazard Area: A heightened hazard area is one which has substantial combustibles, but limited or no physical fire protection. These areas may include; lube storage bays in the HE Shop (N3, N4, and S4), rubber lined mills, rubber lined pipes, non-sprinkler protected conveyors, insulated tanks, and roofs. When the combustible cannot be removed, active measures will be taken to minimize the potential ignition hazard. An active measure may include; flooding the area with water, maintaining a constant water stream (dousing) or temporary removal of hazard, (i.e. cutting away additional insulation). If active measures cannot be taken, the Heightened Hazard Area will be reclassified as a High Hazard Area for the purpose of the Hot Work Permit.

High Hazard Area: High Hazard Areas have been defined as locations having a high loss potential in the event of a fire. This is due to the value of the area and / or the potential hazards associated with the areas. The areas identified as High Hazard are: Powerhouse #1 (6022), Powerhouse #2 (6030), Port Powerhouse (4002-4901) Reagent Building (2016), Emulsion Plant (6005), and all Fuel Dispensing Stations. Before hot work may commence at these locations, the Red Dog Fire Department must be notified 24 hours in advance. The Response Chief or his/her designee will meet with the tradesman, the area supervisor, and the area operator to determine the extent of the hot work. The fire department will be on standby at the hot work location during the actual hot work with a minimum engine company of three (3) personnel. Once hot work has been completed the fire department will return to their station. The fire department will not be substituted as fire watch. A designated fire watch must perform the required duties.

Hot Work Permit: The Hot Work Permit form F2630 is a document which has been approved by FM Global. When the Hot Work Permit is correctly completed, it certifies that the area where hot work is to be conducted has been inspected for potential ignition hazards and those hazards have been identified and mitigated to perform the hot work safely.

3 Key Responsibilities

Permit Authorizer: The permit authorizer is the supervisor of the tradesman performing the hot work and will be responsible to confirm that the Required Precautions checklist has been completed on the permit prior to starting any hot work. The permit authorizer will ensure that the fire watch has completed the one (1) hour post-work fire watch upon completion of the job.

Tradesman: The person conducting the hot work must be familiar with emergency procedures. The tradesman will ensure that the work area is clear of all combustibles, ventilation is established to eliminate hazardous atmospheres, all hot work equipment is in good working condition, and all oxygen/acetylene equipment are equipped with flashback arrestors.

Fire Systems Technician: The Fire Systems Technician will ensure that the ventilation setup is adequate for venting the Motor Control Center (MCC) to prevent any accidental alarm and system activating from hot work smoke. The detection system must not be taken out of service unless ventilation systems are not adequate to ventilate the area.

Fire Watch: The fire watch will have no other duties assigned while hot work is being performed. The dedicated fire watch's sole responsibility is to observe the area at least 35 feet around the hot work site, including the other side of any wall or barrier, lower floor levels, and maintain the area free of combustibles and tripping hazards. The fire watch must understand and follow the conditions listed on the Hot Work Permit. The fire watch must understand the alarms and where and how to activate them. The fire watch will notify the person conducting the hot work if any sparks are not contained at the work area, sound the alarm for assistance if required, and extinguish any small fires started by sparks or slag.

Area Operator: The area operator is the owner of the area and will be responsible for ensuring that the three (3) hour area monitoring is complete once the one (1) hour continuous post-work fire watch has been completed. The area operator is responsible for signing the final check on part 2 of the Hot Work permit.

4 Procedure

Hot work shall be authorized as a last resort. Consider all alternatives in the planning stage, schedule hot work during shutdown periods, and if possible, avoid last minute changes. Some alternative methods include:

- Mechanical removal and relocation of frozen piping to a heated area vs. thawing of piping in place with any form of hot work.
- Mechanical bolting vs. welding.
- Screwed or flanged pipe vs. sweat soldering.
- Reciprocating saw or band saw vs. radial saw.
- Mechanical pipe cutter vs. a torch or radial saw cutting.
- Electric heat gun vs. open flame torch.
- Mechanical removal and relocation of piece requiring hot work.

If Hot Work is the only alternative:

- The Mill Machine Shop, Mill Welding Shop, and the Heavy Equipment Welding Shop are designated areas where hot work may be performed without a Hot Work Permit.
- For hot work required in all other areas the implementation of the FM Global Hot Work Permit is required.
- Hot work will be suspended in any indoor area where engineered automatic sprinkler systems have been removed from service for maintenance, repairs or testing.
- Hot work equipment shall be maintained in proper working condition. Damaged or leaking hoses or hose attachments are of particular concern on torch cutting and welding equipment.
- Protect equipment or flammables from heat sources when they cannot be removed. Use FM Global approved welding pads, blankets and screens when hot work activities are to be performed.
- Hot work is prohibited where accumulations of volatiles or combustibles are severe and cannot be corrected.
- Performing hot work on partitions, walls, ceilings or roofs with a combustible covering is prohibited.
- Suspend fire resistant tarpaulins under hot work conducted near the ceiling if possible.
- Separate hot work operations from combustible material by a minimum of 35 ft. (11m). If this is not practicable or cannot be achieved, an alternative is to use FM Global approved welding blankets and screens to properly isolate the hot work from adjacent combustible occupancies.
- Consult a Teck Fire Systems Technician if hot work is to be performed in a Motor Control Center (MCC) or any other out-building with a detection system prior to the start of the work.
- For hot work in Heightened Hazard Areas (areas with substantial combustibles in close proximity to the hot work being performed) active measures will be implemented to reduce the fire danger. If active measures cannot be taken the hot work will be classified as a High Hazard Area for the purpose of the Hot Work Permit.
- Hot work in High Hazard Areas shall utilize the Fire Department High Hazard Standby Operating Procedure in addition to this guideline.

5 Methods

Mill Concentrator Hot Work Procedure

- Teck Maintenance Crew Supervisor or Contractor Maintenance Crew Supervisor is issued an MWO for hot work in the Mill Concentrator.
- The crew reports to the Mill Operations Control Room to notify the Operator of the hot work task.
- The crew fills out the Hot Work Permit; this includes the “In Case of Emergency” contacts listed on the back of the permit.
- The Mill Area Operator and the Maintenance Crew Supervisor conduct a pre-job walk down of the proposed work area with the crew to ensure the area is in a safe condition to perform the hot work.
- The Mill Area Operator approves the hot work. The Mill Area Operator and the Maintenance Crew Supervisor sign the Hot Work Permit as the Permit Authorizers. This verifies the location has been examined, the precautions on the Required Checklist have been taken to prevent fire, and permission is authorized for the hot work to commence.
- The Mill Area Operator takes Part 1 of the Hot Work Permit and posts it on the hot work board located in the Mill Operations crew meeting room.
- The Maintenance crew takes Part 2 of the Hot Work Permit and posts it at the job site.
- The Maintenance crew executes the hot work task.
- When the Maintenance crew completes the hot work task, the Finish Time is documented on Part 2 of the Hot Work Permit.
- The Maintenance Crew post-work fire watch monitors the hot work area for one (1) hour after the work has been completed.
- The Maintenance Crew post-work fire watch signs off on Part 2 of the Hot Work Permit verifying the hot work area and all adjacent areas to which sparks and heat might have spread were inspected during the one (1) hour period.
- The Maintenance Crew notifies the Mill Area Operator that the hot work task and first one (1) hour post-work fire watch is complete. Part 2 of the Hot Work Permit will remain posted in the hot work area.
- The Mill Area Operator will monitor the hot work area for an additional three (3) hours after the one (1) hour continuous post-work fire watch.
- When the Mill Area Operator has completed the three (3) hour monitoring, the Mill Area Operator will sign off the Final Check on Part 2 of the Hot Work Permit verifying that the work area was monitored for three (3) hours following completion of the one (1) hour post-work fire watch.
- The Mill Area Operator will collect Part 2 of the Hot Work Permit and match it up with Part 1 of the Hot Work Permit posted in the Mill Operations crew meeting room. The Hot Work Permit is considered complete and closed at this time.
- The Mill Area Operator will return the completed Hot Work Permit to the Mill Operations Shift Supervisor for verification that all hot work has been completed.
- The Operations Shift supervisor will return the completed permit to the Maintenance Supervisor for review. The Supervisor then places the completed permits in the drop basket located next to the Mill Mailboxes in the planning hallway.
- The Mill Clerk collects and files the completed Hot Work Permit and must retain them in their files for one (1) year.

Work areas outside the Mill Concentrator

- For Teck employees performing hot work in areas outside of the Mill Concentrator, the Teck supervisor responsible for the work to be performed will contact the Area Owner Supervisor or their designee.
 - The Teck Supervisor responsible for the work to be performed will perform the same duties as the Mill Operations Operator, as described in the Mill Concentrator Hot Work Procedure section.
 - The only exception is posting Part 1 of the Hot Work Permit in the Mill Operations crew meeting room. Part 1 of the Hot Work Permit will be posted in the General Supervisor's office, or equivalent, of the employee performing the hot work.
 - The area General Supervisor will retain the completed Hot Work Permit for one (1) year.
 - At the Port facilities, the Port Coordinator will retain completed Hot Work Permits for one (1) year.
-
- For Contractor employees performing hot work in areas outside of the Mill Concentrator, the Contract Supervisor responsible for the work to be performed will contact a Teck Projects Representative.
 - Teck Projects Representative will perform the same duties as the Mill Operations Operator, as described in the Mill Concentrator Hot Work Procedure section.
 - Part 1 of the Hot Work Permit shall be posted in the Teck Project office.
 - Teck Projects will retain the completed Hot Work Permit for one (1) year.

6 General Requirements

Fire Watch / Fire Monitoring: Based on the type of building construction used at Red Dog Operations, FM Global has set the requirement standards for continuous fire watch at one (1) hour and follow up monitoring at three (3) hours. The FM Global Hot Work Permit form F2630 will be used for all hot work at RDO. (Refer to FM Global Property Loss Prevention Data Sheet 10-3 for details)

Permit Expiration: A Hot Work Permit may only be issued for one (1) work shift. If hot work is carried over to the next shift, a new permit shall be issued. In the event of a detection or suppression system alarm, all Hot Work Permits in the affected area will be suspended. Once the systems have been returned to service, a new Hot Work Permit shall be issued.

7 Departure from Procedure

This requirement was written to comply with applicable laws, regulations and FM Global guidelines pertaining to hot work at Red Dog Operations. Failure to follow this requirement could result in unsafe conditions, including increased risk of fire and/or explosion. Departure from procedures resulting in injury and/or pollution may also lead to criminal or civil penalties for you and the company as well as adverse effects on company performance and reputation.

8 Key Documents/Tools/References

FM Global Pocket Guide to Hot Work Loss Prevention

Red Dog Operations Emergency Response Organizational Philosophy section: High Hazard Stand-By.

HOT WORK PERMIT

STOP!
Avoid hot work when possible! Consider using an alternative cold work method.

This Hot Work Permit is required for any temporary operation involving open flames or producing heat and/or sparks conducted outside a Hot Work Designated Area. This includes, but is not limited to: brazing, cutting, grinding, soldering, torch applied roofing and welding.

Instructions for Permit Authorizer

- Specify the precautions to take.
- Fill out and keep Part 1 during the hot work process.
- Leave Part 2 to the person doing the job.
- Keep Part 2 on file for future reference including signed confirmation that the post-work fire watch and monitoring have been completed.
- Sign off the hot work on Part 2.

Part 1
Required Precautions

- ☐ The fire pump (with operator) and switched to automatic.
- ☐ Control valves to water supply for sprinkler system are open.
- ☐ Extinguishers are in service/operable.
- ☐ Hot work equipment is in good working condition.

Requirements within 35 ft (10 m) of hot work:

- ☐ Shield combustible construction using (e.g., FM Approved) welding pads, blankets and curtains.
- ☐ Remove or shield nonremovable combustibles using (e.g., FM Approved) welding pads, blankets and curtains.
- ☐ Isolate potential sources of flammable gas, ignitable liquid or combustible dust (e.g., shut down equipment).
- ☐ Remove ignitable liquid, combustible dust and combustible residues.
- ☐ Shut down ventilation and conveying systems.
- ☐ Remove combustibles and consider a second fire watch on opposite side of fire wall, ceiling and when openings exist or thermally conductive materials pass through.
- ☐ Is work on a combustible building assembly (e.g., Torch-Applied Roofing)? If yes, provide **ADDITIONAL REQUIRED PRECAUTIONS** below.

Hot work on/in closed equipment, ductwork or piping

- ☐ Isolate equipment from service.
- ☐ Remove ignitable liquid and purge flammable gas/vapor.
- ☐ Prior to work, and/or during work, monitor for flammable gas/vapor LEL readings!
- ☐ Remove combustible dust and/or other combustible materials.
- ☐ If work with equipment with nonremovable combustible lining or parts? If yes, provide **ADDITIONAL REQUIRED PRECAUTIONS** below.

Fire watch/monitoring the hot work area

Times listed are sufficient for majority. Use Table at back of permit for guidance for combustible concealed cavities, roof work or favorable factors.

- ☐ Perform a continuous fire watch during hot work.
- ☐ Perform a continuous fire watch post-work for:
 - ☐ 1 hour or other _____ hours.
 - ☐ Perform fire monitoring for:
 - ☐ 2 hours or other _____ hours.

ADDITIONAL REQUIRED PRECAUTIONS:

HOT WORK BY
☐ Employee
☐ Contractor

DATE _____ **JOS NUMBER** _____

LOCATION OF WORK (BUILDING/FLOOR/OBJECT) _____

WORK TO BE PERFORMED _____

NAME OF PERSON PERFORMING HOT WORK _____

NAME OF PERSON PERFORMING FIRE WATCH _____


I verify the above location has been examined, the Required Precautions have been taken, and permission is authorized for this work.

PERMIT AUTHORIZER (PRINT AND SIGN) _____

THIS PERMIT EXPIRES ON (LIMIT AUTHORIZATION TO ONE SHIFT)
DATE _____ **TIME** _____ **AM/PM** _____

Note: Emergency notification on back of form.

Additional FM Global Resources:
Property Loss Prevention Data Sheet 10-3, Hot Work Management
Hot Work Permit App via leglobal.com/apps
Hot Work Permit form #2030 via leglobal.com
Online training at training.leglobal.com
FM Approved equipment via fmapproved.com



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WARNING

HOT WORK IN PROGRESS!
Watch for fire!

In case of emergency, call the contacts listed below before attempting to extinguish the fire.


Contact	Number

Construction and Occupancy Factors for Post-Work Fire Watch and Monitoring Periods

	Combustion Factors						
	Noncombustible construction, or FM Approved Class 1 or Class A building materials		Combustible construction without concealed cavities		Combustible construction with unprotected concealed cavities		
	Watch	Monitor	Watch	Monitor	Watch	Monitor	
Occupancy Factors	Residential with any combustibles contained within closed equipment (e.g., ignitable liquid within piping)	30 minutes	0 hours	1 hour	3 hours	1 hour	5 hours
	Office, retail or manufacturing with limited combustible loading	1 hour	1 hour	1 hour	3 hours	1 hour	5 hours
	Manufacturing with moderate to significant combustible loading except on steel frame	1 hour	2 hours	1 hour	3 hours	1 hour	5 hours
	Warehousing	1 hour	2 hours	1 hour	3 hours	1 hour	5 hours
Exception: Occupancies with processing or having bulk storage of combustible materials capable of supporting flame (growing fires (e.g., paper, pulp, textile fibers, wood bark, grain, coal or charcoal))	1 hour	3 hours	1 hour	3 hours	1 hour	5 hours	

When performing torch-applied roofing, apply additional precautions and conduct a minimum 2 hours fire watch and 1 hour fire monitoring. If an infrared camera is utilized, reduce to a 1 hour fire watch and 1 hour fire monitoring.

When performing hot work on equipment containing nonremovable combustible linings or parts, apply additional precautions and conduct a minimum 1 hour fire watch and 3 hours fire monitoring within the equipment, and in the surrounding areas per table above.



3.05 Red Dog Operations Working at Heights Requirement

February 2016; Updated March 2021

1 Purpose and Scope

This requirement applies to all employees and contractors performing work at heights at Teck Alaska Red Dog Operations. Fall protection must be in use whenever there is a requirement to perform work at heights. Falls from heights is recognized as a fatal risk. This requirement outlines safe work practices and procedures when working on elevated work surfaces, and addresses the fundamental principles and critical control requirements that are to be followed regarding measures to eliminate and mitigate fall hazards.

2 Definitions

Fall Protection	All systems that protect employee from sustaining injury from a fall. Includes handrails, guarding, fall protection systems, safety harnesses and lanyards, or other devices designed to prevent injury from a person falling from any height.
Fall Prevention	The design and use of a fall prevention system such that no exposures to an elevated fall hazard occurs. This may require more than one fall prevention system or a combination of prevention or protection measures.
Fall Restraint	An approved anchorage device and any necessary components that function together to restrain a person in such a manner that will not allow a fall of any distance.
Fall Arrest System	The use of multiple, approved safety equipment components such as body harnesses, relief step safety devices, lanyards, decelerations devices, horizontal and/or vertical lifelines and anchors to arrest a free fall and prevent personnel from falling to a lower level or onto dangerous equipment.
Lanyard	An engineered assembly to connect a harness to an anchor point or a static line in situations where there is risk of a fall.
Self-Retracting Lanyard (SRL)	A specific kind of lanyard used with a safety harness that utilizes inertia to activate a breaking mechanism that is part of a block unit housed inside the body of the lanyard.
Barricade	A physical barrier capable of withstanding 200 lbs. of force from any direction that prevents inadvertent access to an area.
Anchor Point	Anchor points and lifelines shall be designed and installed to minimum engineering specifications and appropriate for the load. Anchor points used for attachment of personal fall arrest equipment shall be independent of any anchor being used to support or suspend platforms and capable of supporting at least 5000 lbs. per employee attached.
Relief Step Safety Device	A device attached to the harness that is deployed in the event of a fall. It provides support and enhances blood circulation until rescue. It will alleviate suspension trauma by permitting the leg muscles to move and flex.

Dropped Objects Protection	A primary prevention system using a combination of tool, materials tethering and secondary prevention systems when a drop hazard cannot be eliminated. Secondary prevention systems include, but not limited to, hard canopies, safety nets and controlled access zones may also be required.
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3 Working at Heights Planning

Elimination: This is the first and best line of defense against falls from heights. Elimination requires careful assessment of the workplace and the work itself. Pre-planning of the work and site often not only leads to eliminating the hazard altogether, but also identifies alternative approaches to the work that can measurably enhance productivity. The idea is to design safety into the work process and not simply to try to add safety as an afterthought. Examples include things like changing the work procedure to activate mechanical equipment and read instruments from a secure place, remote from the fall hazard, rather than by having to access the equipment in places which entail exposures to falling.

Prevention: Prevention of falls is the second line of defense when fall hazards cannot be eliminated. Each work location shall be examined for the potential of injury from falling and suitable preventive measures shall be taken. This also requires assessment of the workplace and work process. It involves making changes to the workplace so as to preclude the need to rely on the worker's behavior and personal protective equipment to prevent falls. Where routine work is performed, permanently installed platforms with handrails, mid-rails and toe boards shall be installed. Examples include use of stairs, guardrails, barriers, and travel restriction systems to prevent the worker from direct and unprotected exposure to the fall hazard. Prevention techniques deal with preventing the fall before onset.

Control: The use of fall arrest is the last line of defense. It should be considered only after determining "within reason" that the fall hazard cannot be eliminated or the possibility of falling mitigated. This is the domain of fall arrest and calls for equipment such as safety net or harnesses, relief step safety devices, lanyards, shock absorbers, lifelines, and anchor points. It deals with reducing the risk of injury after the onset of a fall. Fall protection also necessitates assessment and planning of the workplace and work process in order to select the proper equipment, install it, and use it correctly.

4 Key Responsibilities

Supervisor: The supervisor or other person in charge of work is responsible for the implementation of this safe practice. The Supervisor also has the responsibility to ensure fall hazard situations are identified and addressed consistent with the Fall Protection Program philosophy and to follow any or all guidelines deemed appropriate to ensure personnel safety while working at heights.

The Supervisor shall take practical measures to eliminate, prevent or control fall hazards. If a fall hazard cannot be eliminated, then a means fall prevention shall be planned and implemented.

Employee: The person working on elevated structures is responsible for drawing upon their training, experience, and awareness of the hazards associated with their work to ensure safe work practices are followed while working at heights.

5 General Requirements

- 1) Prior to initiating any work at height, a risk assessment shall be completed to ensure the necessary controls are in place for the hazards.
- 2) Utilize the Hierarchy of Controls to eliminate the risk of fall where reasonably practicable; Elimination, Substitution, Engineering, Separation, Administration, or PPE.

- 3) All fall prevention devices or features in the work area shall be evaluated daily during the area inspection to ensure it is still in proper working condition.
- 4) When working at heights, the working walking surface will be evaluated as part of a risk assessment with necessary controls put in place for the hazards identified during the fall prevention inspection.
- 5) All fall arrest and fall restraint equipment shall be used and inspected before each use in accordance with the manufacturer's recommendations and specifications.
- 6) An equipment register and tagging system shall be in place to indicate compliance with this inspection. **Ensure relief step safety devices are installed on all harnesses.**
- 7) Items not meeting the inspection criteria shall be removed from service and destroyed.
- 8) Prior to climbing and working at heights, the personnel involved in the climbing activities shall hold a pre-job meeting to discuss the hazards.
- 9) Any concerns shall be brought to the attention of the supervisor.
- 10) **When working at heights and using fall arrest, a person shall not work alone.** The person climbing shall be monitored by another person in the immediate vicinity.
- 11) Any fall arrest or fall restraint must employ 100% tie off to an approved anchor point.
- 12) Handrails are not an approved anchor point; unless properly engineered to do so.
- 13) If approved engineered anchorages are not available, the supervisor must approve a safe work plan.
- 14) A personal fall arrest system shall be utilized and attached to an approved anchor point for any of the following conditions
 - a. When there is a requirement to perform work at heights and the hazard of a fall has not been eliminated or preventive measures have not been implemented.
 - b. When working within six (6) feet of an exposed edge, floor opening, and there are no means to prevent a fall over the edge, such as a restraining device or a handrail.
- 15) Only ANSI approved full body harnesses shall be used in the personal fall arrest system.
- 16) Body belts shall not be used.
- 17) All floor openings shall be secured by installing guardrails, barricades, or a temporary cover capable of supporting the load that may pass over the top.
- 18) Elevated work surfaces, such as roofs, shall be determined capable of supporting the loads to which they will be exposed.
- 19) Where scaffolding is erected to mitigate work at heights, the structure must be engineered in accordance with the manufacturer's specifications and regulatory requirements.
- 20) Fall restraint equipment must be worn and utilized when working on scaffolding or elevated platforms or equipment without fall prevention barriers.
- 21) It is not intended that people be tied-off while working within the confines of the handrails of a properly erected and completed scaffold.
- 22) The site emergency response plan(s) shall include the rapid retrieval of personnel in the event of a fall from height.
- 23) Personal fall arrest equipment, such as harnesses, lanyards, and retractable lifelines shall be taken out of service any time they are subjected to a fall.
- 24) A control system shall be in place to prevent tools, materials, and other objects from being dropped and falling from height.
- 25) Positioning device systems as a component of a fall restraint system will be attached to an approved anchorage point and not allow a person to fall any distance.
- 26) **Report all falls to your supervisor.**

6 Mobile Aerial Work Platforms

Personnel operating mobile aerial work platforms shall be trained and competent for the specific make and model of the equipment. Employees must have a current MSHA Form 5000-23 filed onsite before they are authorized to operate.

A harness shall be worn and a fall restraint lanyard attached to a designated anchor point provided inside the basket when working from an aerial lift. Follow the aerial platform manufacturer's guidelines when using fall restraint devices in aerial work platforms. A restraint system shall be used for fall protection from an aerial lift or a boom-type elevating work platform. The employer must ensure that the lanyard in use prevents the user from being ejected from the man-basket.

Employees shall always stand firmly on the floor of the basket and shall not sit or climb on the edge of the basket or use planks, ladders, or other devices for a work position.

When it is necessary to exit the basket, while working at height, 100% tie off shall be maintained with a lanyard attached to a designated anchor point on the basket and an appropriate anchor point external to the basket. Once the basket has been appropriately exited, only the external anchor point shall be used.

7 Ladders

- Ladders and their use shall meet the requirements of the applicable regulatory standard.
- All ladders shall be inspected for missing or inoperable hardware, bent rungs, damaged rails, or any other deficiencies or defect prior to each use.
- All defective ladders shall be reported to the supervisor and the tool crib attendant.
- Extension ladders shall be securely tied-off, and maintain a 4:1 vertical ratio.
- The centerline of the person must stay in between the side-rails of the ladder.
- If work is performed on a ladder and the possible fall distance is more than six (6) feet and three (3) points of contact cannot be maintained, a fall arrest system shall be used.

8 Personal Fall Arrest Systems Training

Training shall ensure workers can identify "work at heights" and to instruct persons in the correct wearing and use of personal fall arrest and fall restraint equipment.

Before working at heights, all employees and contractors will be trained in the following topics:

- The nature of fall hazards in the work area, including falling object hazards and electrical hazards.
- The correct procedures for wearing, maintaining, and inspecting fall arrest systems.
- The use and operation of guardrail systems, personal fall arrest, and any other protection to be used.
- Calculation of fall clearances and arresting forces.
- Distinguishing between fall restraint, work positioning, and fall arrest.
- Symptoms and means of preventing suspension trauma
- Installation and use of the suspension trauma safety device, Relief Step.
- Respond properly to a fall emergency.

9 References

Teck Fatal Risk Requirements for Working at Heights

29 CFR 1910 OSHA General Industry Standards

29 CFR 1926 OSHA Construction Industry Standards & Regulations

30 CFR Part 56 MSHA Safety and Health Standards-Surface Metal and Nonmetal Mines

3.05b RDO Working at Heights Employee Assessment Form

Date:

Location:

Person(s) Performing Work at Heights:

Department:

Supervisor:

Assessor:

General Working at Heights Requirements	Y/N/NA	Comments
Are you familiar with the RDO Working at Heights Requirement?		
Did you conduct and document a risk assessment of the scope of work to explore all options (scaffolding, aerial platform, handrails, etc.) to eliminate or reduce the exposure to working at heights?		
Did you assess and evaluate all fall prevention devices (i.e. handrails) or features in the work area during the workplace inspection to ensure all fall protection is in proper working condition?		
Did you inspect all of your fall arrest and/or fall restraint equipment before each use IAW the manufacturer's recommendations?		
Is the equipment register and tagging system in place to indicate compliance with the equipment inspection? Do you have current annual inspection tags on your fall arrest equipment?		
Do you have Relief Step safety devices installed on your fall arrest harness?		
Do you know what you do with expired or damaged fall prevention equipment?		
Did you participate in a pre-job meeting prior to commencing your work at heights to discuss and document the hazards associated with this scope of work?		
Were all of your safety concerns brought to the attention of your Supervisor?		
Are you aware of the Working at Heights requirement associated with working alone?		
While using your fall arrest equipment, are you 100% tied off to an engineered anchor point capable of supporting at least 5000 lbs?		
Is a Supervisor approved Safe Work Plan in place if engineered anchor point(s) are not available?		
Are all floor openings in your work area secured by guardrails, barricades, or temporary covers capable of withstanding 5 times the load that may pass over it? How was this verified?		
Were elevated work surfaces, such as roofs, determined capable of supporting the loads to which they will be exposed? How was this verified?		
Was scaffolding in your work area engineered and constructed IAW the manufacturer's specifications and inspected and signed off by a competent person? Who is the competent person?		
Is fall restraint equipment worn and utilized when working on scaffolding or elevated platforms or equipment without fall prevention barriers?		
Do you have an emergency response plan in the case of a fall while working at heights?		
Do you know what to do with your fall arrest equipment if it was subjected to protecting you from a fall?		
What controls do you have in place to eliminate or prevent you from dropping tools or other objects while working at heights?		
What are you required to do if you drop a tool or other object while working at heights?		
When selecting the proper fall arrest equipment for this working at heights task, what distances were considered? (Hint: Length of the lanyard or SRL (6'), Deceleration of fall (3.5'), Height of worker (6"), and (3.5') safety factor?		

Mobile Aerial Work Platforms	Y/N/NA	Comments
Are you trained and competent for this specific make and model of mobile aerial work platform?		
Do you have a current MSHA Form 5000-23 filed onsite?		
Are you wearing a full body harness and utilizing the proper fall restraining lanyard attached to a designated anchor point inside the basket when working from the aerial work platform?		
Are you committed to always standing firmly on the floor of the basket, and never sit or climb on the handrails or edges of the basket?		
Ladders	Y/N/NA	Comments
Does the ladder you are using meet the requirements of the applicable regulatory standards and the RDO Working at Heights and Ladder requirements?		
Did you inspect the ladder prior to use to ensure there are no deficiencies such as missing or inoperable hardware, bent rungs, damaged rails, or any other deficiencies or defects?		
What do you do if you inspect and observe a defective ladder?		
Does your Supervisor have a ladder tracking register or tagging system in place?		
Is the extension ladder you are using securely tied off, maintaining a 4:1 vertical ratio?		
Are you aware you should routinely and diligently work between the side-rails of the ladder?		
Are you aware you are to use your fall arrest equipment while working on a ladder when the fall distance is greater than 6 feet and three points of contact cannot be maintained?		
Do you have any questions or concerns in regards to Working at Heights?		

Additional comments from the assessment:

3.06 Ladder Safety

Select the right ladder for the job. Ladders and their use shall meet the requirements of the applicable regulatory standard.

Use ladders mainly for climbing to or from other levels. If you can, eliminate the hazard of working from a ladder by using a man-lift or scaffolding.

If work is performed on a ladder and the possible fall distance is more than six (6) feet and three points of contact cannot be maintained, a fall arrest system shall be used.

Ladder Inspection

Inspect the ladder before you use it. All ladders shall be inspected for missing or inoperable hardware, bent, loose, or damaged rungs, damaged rails and braces, missing screws, hinges, bolts, nuts, or other hardware. Report all deficiencies or defects to your supervisor, and remove the ladder from service.

The use of wooden ladders is prohibited.

Make certain the ladder is strong enough for its intended use by reviewing the load rating on the ladder.

Ensure ladders have safety feet.

Read the safety information labels on the ladder.

Setting up a Ladder

Keep all types of ladders at least 10 feet away from live overhead power lines and other overhead obstructions.

Use a barricade or guard to prevent unexpected collision. Lock or block any adjacent doors. When blocking an emergency exit, ensure the ladder is continually attended. Whenever the worker leaves the area, clear the emergency exit path.

All four legs of a stepladder must be on solid, level ground.

Never lean a ladder against an unstable surface.

Never lean a self-supporting stepladder, (A-frame) ladder against a wall to use it as a straight ladder.

Ensure to extend and lock the spreaders of a self-supporting ladder.

Choose a ladder that is long enough to ensure work can be done safely. The side rails of a straight or extension ladder shall extend at least 36 inches above the top of the landing platform or other support point.

Position a straight or extension ladder at a 4 to 1 ratio. The ladder base shall be 1 foot from the wall or other vertical surface for every 4 feet of ladder length up to the resting position.

To avoid shifting, straight or extension ladders shall be securely tied-off.

Keep the area around the ladder base uncluttered.

Using a Ladder

Always check the ladder before you use it. Recheck it if it has been left unattended.

Check ladder rungs and bottoms of your shoes and gloves for slippery substances.

Climb and descend ladders slowly and with caution. Always face the ladder, and use both hands.

The centerline of the person must stay in between the side-rails of the ladder.

Prevent a dropped object hazard. Secure tools with a tool lanyard, and carry tools in a tool belt. Raise and lower your tools with a hand line if necessary.

Do not climb higher than the second tread from the top on a stepladder or the third rung from the top of a straight ladder.

Stay off of the braces, top step, and service tray.

Never move or “walk” a ladder when you or someone else is on it. .

Climbing devices, cages or platforms are required for fixed ladders over 20 feet in height.

If a ladder is defective it will not be used and will be destroyed and disposed of.

3.07 Scaffolding Requirements

1 Purpose and Scope

This requirement applies to all employees and contractors who build, disassemble, or perform work on a scaffold at Teck Alaska Red Dog Operations. Falls from heights is recognized as a fatal risk. This requirement outlines safe work practices and procedures when working on or around scaffolding, and addresses the fundamental principles and critical control requirements that are to be followed. The purpose of this document is to communicate the expectation to have all scaffolding erected, inspected, maintained, and safe for use to eliminate and mitigate scaffolding failure and fall hazards.

2 Training Requirements

Scaffold Builders

Employees and contractors who are involved in erecting, disassembling, moving, operating, repairing, maintaining, or inspecting a scaffold shall be trained by a competent person to recognize any hazards associated with the work in question.

Employees and contractors who perform this type of scaffolding work shall attend the Competent Person Scaffolding Builder Course and the Fall Protection Training Course.

Training will be documented on the MSHA Form 5000-23 after successful completion of these courses before commencing work on scaffolding.

The training shall include the following topics, as applicable:

- The nature of scaffold hazards.
- The correct procedures for erecting, disassembling, moving, operating, repairing, inspecting, and maintaining the type of scaffold in question.
- The design criteria, maximum intended load-carrying capacity and intended use of the scaffold.
- Fall Protection Training to include fall distance calculations, fall arrest and fall restraint equipment requirements, engineered anchor points, and the proper wear and fit of the harness and relief steps.
- Any other pertinent requirements in accordance with 30 CFR, Part 56.11027 and 29 CFR, Part 1926.451, and Part 1926.454.

When there is reason to believe that an employee lacks the skill or understanding needed for safe work involving the erection, use or dismantling of scaffolds, the employer shall retrain each such employee so that the requisite proficiency is regained. Retraining is required in at least the following situations:

- Where changes at the worksite present a hazard about which an employee has not been previously trained.

- Where changes in the types of scaffolds, fall protection, falling object protection, or other equipment present a hazard about which an employee has not been previously trained.

Where inadequacies in an affected employee's work involving scaffolds indicate that the employee has not retained the requisite proficiency.

Scaffold Users

Every employee or contractor who performs work while on a scaffold shall be trained by a person qualified in the subject matter to recognize the hazards associated with the type of scaffold being used and to understand the procedures to control or minimize those hazards.

Employees and contractors who perform work while on a scaffold, "scaffold users" shall attend the Scaffold User Training Course. Training will be documented on the MSHA Form 5000-23 after successful completion of the course before performing work on scaffolding. The training shall include the following areas, as applicable:

- The nature of any electrical hazards, fall hazards and falling object hazards in the work area.
- The correct procedures for dealing with electrical hazards and for erecting, maintaining, and disassembling the fall protection systems and falling object protection systems being used.
- The proper use of the scaffold, and the proper handling of materials on the scaffold.
- The maximum intended load and the load-carrying capacities of the scaffolds used.
- Any other pertinent requirements in accordance with 30 CFR, Part 56.11027, 29 CFR, Part 1910.28, 29 CFR, Part 1926.451, and Part 1926.454.

In some cases, employees and contractors who are "scaffold users" may be required to work on partially completed scaffolding with fall arrest equipment due to restricted areas or similar situations. These employees shall attend the Fall Protection Training Course before performing this work. **Note, this is a rare occurrence, and all scaffolding shall be built to a completed status in most cases.**

3 Scaffold Capacity

Each scaffold and scaffold component shall be capable of supporting, without failure, its own weight and at least 4 times the maximum intended load applied or transmitted to it.

4 Scaffold Design and Construction

- Scaffolds shall be designed by a qualified person and shall be constructed and loaded in accordance with that design.
- Scaffolding shall be constructed under the supervision of a competent person.
- Scaffolds shall be verified complete, inspected, and a tagging system in place before use.

Each platform on all working levels of scaffolds shall be fully planked or decked between the front uprights and the guardrail supports as follows:

- Each platform unit (e.g., scaffold plank, fabricated plank, fabricated deck, or fabricated platform) shall be installed so that the space between adjacent units and the space between the platform and the uprights is no more than 1 inch wide, except where the employer can demonstrate that a wider space is necessary (for example, to fit around

uprights when side brackets are used to extend the width of the platform). The platform shall be planked or decked as fully as possible and the remaining open space between the platform and the uprights shall not exceed 9 1/2 inches.

- As an exception, the requirement in the paragraph above to provide full planking or decking does not apply to platforms used solely as walkways or solely by employees performing scaffold erection or dismantling.

In these situations, only the planking that the employer establishes is necessary to provide safe working conditions is required.

- Each scaffold platform and walkway shall be at least 18 inches wide.
- Where scaffolds must be used in areas that the employer can demonstrate are so narrow that platforms and walkways cannot be at least 18 inches wide, such platforms and walkways shall be as wide as feasible, and employees on those platforms and walkways shall be protected from fall hazards by the use of guardrails and/or personal fall arrest systems.
- Each end of a platform 10 feet or less in length shall not extend over its support more than 12 inches unless the platform is designed and installed so that the cantilevered portion of the platform is able to support employees and/or materials without tipping, or has guardrails which block employee access to the cantilevered end.
- Each platform greater than 10 feet in length shall not extend over its support more than 18 inches, unless it is designed and installed so that the cantilevered portion of the platform is able to support employees without tipping, or has guardrails which block employee access to the cantilevered end.
- On scaffolds where scaffold planks are abutted to create a long platform, each abutted end shall rest on a separate support surface. This provision does not preclude the use of common support members, such as "T" sections, to support abutting planks, or hook on platforms designed to rest on common supports.
- On scaffolds where platforms are overlapped to create a long platform, the overlap shall occur only over supports, and shall not be less than 12 inches (30 cm) unless the platforms are nailed together or otherwise restrained to prevent movement.
- At all points of a scaffold where the platform changes direction, such as turning a corner, any platform that rests on a bearer at an angle other than a right angle shall be laid first, and platforms which rest at right angles over the same bearer shall be laid second, on top of the first platform.
- Wood platforms shall not be covered with opaque finishes, except that platform edges may be covered or marked for identification. Platforms may be coated periodically with wood preservatives, fire-retardant finishes, and slip-resistant finishes; however, the coating may not obscure the top or bottom wood surfaces.
- Scaffold components manufactured by different manufacturers shall not be intermixed unless the components fit together without force and the scaffold's structural integrity is maintained by the user. Scaffold components manufactured by different manufacturers shall not be modified in order to intermix them unless a competent person determines the resulting scaffold is structurally sound.
- Scaffold components made of dissimilar metals shall not be used together unless a competent person has determined that galvanic action will not reduce the strength of any component to a level below.

5 Scaffold Supports

Supported scaffolds with a height to base width (including outrigger supports, if used) ratio of more than four to one (4:1) shall be restrained from tipping by guying, tying, bracing, or equivalent means, as follows:

- Guys, ties, and braces shall be installed at locations where horizontal members support both inner and outer legs.
- Guys, ties, and braces shall be installed according to the scaffold manufacturer's recommendations or at the closest horizontal member to the 4:1 height and be repeated vertically at locations of horizontal members every 20 feet or less thereafter for scaffolds 3 feet wide or less, and every 26 feet or less thereafter for scaffolds greater than 3 feet wide. The top guy, tie or brace of completed scaffolds shall be placed no further than the 4:1 height from the top. Such guys, ties and braces shall be installed at each end of the scaffold and at horizontal intervals not to exceed 30 feet (measured from one end [not both] towards the other).
- Ties, guys, braces, or outriggers shall be used to prevent the tipping of supported scaffolds in all circumstances where an eccentric load, such as a cantilevered work platform, is applied or is transmitted to the scaffold.
- Supported scaffold poles, legs, posts, frames, and uprights shall bear on base plates and mud sills or other adequate firm foundation.
- Footings shall be level, sound, rigid, and capable of supporting the loaded scaffold without settling or displacement.
- Unstable objects shall not be used to support scaffolds or platform units.
- Unstable objects shall not be used as working platforms.
- Front-end loaders, forklifts, and similar pieces of equipment shall not be used to support scaffold platforms unless they have been specifically designed by the manufacturer for such use.
- Supported scaffold poles, legs, posts, frames, and uprights shall be plumb and braced to prevent swaying and displacement.

6 Suspension Scaffolds

For information about the criteria for Suspension Scaffolds, please refer to 29 CFR 1926.451(d).

7 Scaffold Tagging and Inspection

Scaffolds and scaffold components shall be inspected for visible defects by a competent person experienced in the erection of scaffold before each work shift, after the erection of scaffold, and after any occurrence which could affect a scaffold's structural integrity.

- All scaffold identification tags will be of a solid green, yellow, or red color with black lettering.
- All scaffold identification tags will have the front information displayed and must be completed for each tag.
 - Date Erected / Tagged
 - Inspected By: Name and Position
 - Inspection Date

- Department or Group Responsible for Erection/Maintaining/Dismantling on the reverse.

Scaffold Tagging Color Schemes

Green - tags will be hung on scaffolds that have been inspected and are safe for use. A green "SAFE FOR USE" tag(s), and should be attached to the scaffold at each access point after the initial inspection is complete.

Yellow - "CAUTION" tag(s), will replace all green "Safe Scaffold" tag(s) whenever the scaffold has been modified to meet work requirements, and as a result could present a hazard to the user. This tag indicates special requirements for safe use. The tag as a minimum requirement shall have:

- The unusual or potential hazard marked on the reverse.
- The preventative measures that must be taken prior to use to mitigate the hazard marked on the reverse.
- The name of the Teck supervisor or company representative authorizing the use of the Yellow tagged scaffold.
- The yellow tag should not to be removed until the scaffold has been returned to a safe, Green Tag condition, and an inspection by a "competent person" has been completed. Based on the results of that inspection the appropriate tag (red or green) will be hung on the scaffold and the yellow tag removed.
- **NOTE: Use of the "yellow tag" status is not intended to override the green tag system. All efforts should be made to return the scaffold to a "Green Tag" status.**

Red " DANGER – UNSAFE FOR USE" tag(s), will be used during erection or dismantling when the scaffold is left unattended and replace all green "Safe for Use " tag(s) or yellow "Caution / Hazard " tag(s) in the event a scaffold has been deemed unfit for use. The tag(s) as a minimum requirement will include:

- The inspection date and the name of the person who performed the inspection filled in on the front of the card.
- The designation, under erection, being dismantled, required repairs, or overhead protection only, marked on the reverse.
- Scaffold re-inspections must be completed any time when conditions may have changed causing the integrity of the scaffold to be suspect

8 Scaffold Access

This section applies to scaffold access for all employees.

- When scaffold platforms are more than 2 feet above or below a point of access, portable ladders, hook-on ladders, attachable ladders, stair towers (scaffold stairways/towers), stairway-type ladders (such as ladder stands), ramps, walkways, integral prefabricated scaffold access, or direct access from another scaffold, structure, personnel hoist, or similar surface shall be used. Cross braces shall not be used as a means of access.
- Portable, hook-on, and attachable ladders shall be positioned so as not to tip the scaffold.
- Hook-on and attachable ladders shall be positioned so that their bottom rung is not more than 24 inches (61 cm) above the scaffold supporting level;

- When hook-on and attachable ladders are used on a supported scaffold more than 35 feet high, they shall have rest platforms at 35-foot maximum vertical intervals.
- Hook-on and attachable ladders shall be specifically designed for use with the type of scaffold used;
- Hook-on and attachable ladders shall have a minimum rung length of 11 1/2 inches (29 cm); and
- Hook-on and attachable ladders shall have uniformly spaced rungs with a maximum spacing between rungs of 16 3/4 inches.
- Stairway-type ladders shall be positioned such that their bottom step is not more than 24 inches above the scaffold supporting level, be provided with rest platforms at 12 foot maximum vertical intervals, have a minimum step width of 16 inches, except that mobile scaffold stairway-type ladders shall have a minimum step width of 11 1/2 inches, and have slip-resistant treads on all steps and landings.
- Stair towers (scaffold stairway/towers) shall:
 - Be positioned such that their bottom step is not more than 24 inches above the scaffold supporting level.
 - A stair rail consisting of a top rail and a mid-rail shall be provided on each side of each scaffold stairway.
 - The top rail of each stair rail system shall also be capable of serving as a handrail, unless a separate handrail is provided.
 - Handrails, and top rails that serve as handrails, shall provide an adequate handhold for employees grasping them to avoid falling.
 - Stair rail systems and handrails shall be surfaced to prevent injury to employees from punctures or lacerations, and to prevent snagging of clothing.
 - The ends of stair rail systems and handrails shall be constructed so that they do not constitute a projection hazard.
 - Handrails, and top rails that are used as handrails, shall be at least 3 inches from other objects.
 - Stair rails shall be not less than 28 inches nor more than 37 inches from the upper surface of the stair rail to the surface of the tread, in line with the face of the riser at the forward edge of the tread.
 - A landing platform at least 18 inches wide by at least 18 inches long shall be provided at each level.
 - Each scaffold stairway shall be at least 18 inches wide between stair rails.
 - Treads and landings shall have slip-resistant surfaces.
 - Stairways shall be installed between 40 degrees and 60 degrees from the horizontal.
 - Guardrails shall be provided on the open sides and ends of each landing.
 - Riser height shall be uniform, within 1/4 inch for each flight of stairs. Greater variations in riser height are allowed for the top and bottom steps of the entire system, not for each flight of stairs.
 - Tread depth shall be uniform, within 1/4 inch, for each flight of stairs.

- Ramps and walkways.
- Ramps and walkways above lower levels shall have guardrail systems.
- No ramp or walkway shall be inclined more than a slope of one (1) vertical to three (3) horizontal (20 degrees above the horizontal).
- If the slope of a ramp or a walkway is steeper than one (1) vertical in eight (8) horizontal, the ramp or walkway shall have cleats not more than fourteen (14) inches apart which are securely fastened to the planks to provide footing.
- Integral prefabricated scaffold access frames shall:
 - Be specifically designed and constructed for use as ladder rungs;
 - Have a rung length of at least 8 inches
 - Not be used as work platforms when rungs are less than 11 1/2 inches in length, unless each affected employee uses fall protection.
 - Be uniformly spaced within each frame section
 - Be provided with rest platforms at 35-foot maximum vertical intervals on all supported scaffolds more than 35 feet high; and
 - Have a maximum spacing between rungs of 16 3/4 inches. Non-uniform rung spacing caused by joining end frames together is allowed, provided the resulting spacing does not exceed 16 3/4 inches.
 - Steps and rungs of ladder and stairway type access shall line up vertically with each other between rest platforms.
 - Direct access to or from another surface shall be used only when the scaffold is not more than 14 inches horizontally and not more than 24 inches vertically from the other surface.
- Access for employees erecting or dismantling supported scaffolds shall be in accordance with the following:
 - The employer shall provide safe means of access for each employee erecting or dismantling a scaffold where the provision of safe access is feasible and does not create a greater hazard. The employer shall have a competent person determine whether it is feasible or would pose a greater hazard to provide, and have employees use a safe means of access. This determination shall be based on site conditions and the type of scaffold being erected or dismantled.
 - Hook-on or attachable ladders shall be installed as soon as scaffold erection has progressed to a point that permits safe installation and use.
 - When erecting or dismantling tubular welded frame scaffolds, (end) frames, with horizontal members that are parallel, level and are not more than 22 inches apart vertically may be used as climbing devices for access, provided they are erected in a manner that creates a usable ladder and provides good hand hold and foot space.
 - Cross braces on tubular welded frame scaffolds shall not be used as a means of access or egress.

9 Scaffold Use

- Scaffolds shall be erected, moved, dismantled, or altered only under the supervision and direction of a competent person qualified in scaffold erection, moving, dismantling or

alteration. Such activities shall be performed only by experienced and trained employees selected for such work by the competent person.

- Scaffolds and scaffold components shall be inspected for visible defects by a competent person before each work shift, and after any occurrence which could affect a scaffold's structural integrity.
- Scaffolds and scaffold components shall not be loaded in excess of their maximum intended loads or rated capacities, whichever is less.
- The use of shore or lean-to scaffolds is prohibited.
- Any part of a scaffold damaged or weakened shall be immediately repaired or replaced, or removed from service until repaired.
- Scaffolds shall not be moved horizontally while employees are on them, unless they have been designed by a registered professional engineer specifically for such movement.
- The clearance between scaffolds and power lines shall be as follows: Scaffolds shall not be erected, used, dismantled, altered, or moved such that they or any conductive material handled on them might come close to exposed and energized power lines. For exact details, please refer to 29 CFR, 1926.451(f)(6).
- Employees shall be prohibited from working on scaffolds covered with snow, ice, or other slippery material except as necessary for removal of such materials.
- Where swinging loads are being hoisted onto or near scaffolds such that the loads might contact the scaffold, tag lines or equivalent measures to control the loads shall be used.
- Work on or from scaffolds is prohibited during storms or high winds unless a competent person has determined that it is safe for employees to be on the scaffold and those employees are protected by a personal fall arrest system or wind screens. Wind screens shall not be used unless the scaffold is secured against the anticipated wind forces imposed.
- Debris shall not be allowed to accumulate on platforms.
- Makeshift devices, such as but not limited to boxes and barrels, shall not be used on top of scaffold platforms to increase the working level height of employees.
- Ladders shall not be used on scaffolds to increase the working level height of employees, except on large area scaffolds where employers have satisfied the following criteria:
 - When the ladder is placed against a structure which is not a part of the scaffold, the scaffold shall be secured against the sideways thrust exerted by the ladder;
 - The platform units shall be secured to the scaffold to prevent their movement;
 - The ladder legs shall be on the same platform or other means shall be provided to stabilize the ladder against unequal platform deflection, and
 - The ladder legs shall be secured to prevent them from slipping or being pushed off the platform.
- Platforms shall not deflect more than 1/60 of the span when loaded.
- In addition to a work lead attachment required by the welding process, a grounding conductor shall be connected from the scaffold to the structure. The size of this

conductor shall be at least the size of the welding process work lead, and this conductor shall not be in series with the welding process or the work piece.

- If the scaffold grounding lead is disconnected at any time, the welding machine shall be shut off.
- An active welding rod or uninsulated welding lead shall not be allowed to contact the scaffold or its suspension system.

10 Fall Protection

This section addresses fall protection for scaffold erectors and dismantlers.

- Each employee on a boatswains' chair, catenary scaffold, float scaffold, needle beam scaffold, or ladder jack scaffold shall be protected by a personal fall arrest system.
- Each employee on a single-point or two-point adjustable suspension scaffold shall be protected by both a personal fall arrest system and guardrail system;
- Each employee on a crawling board (chicken ladder) shall be protected by a personal fall arrest system, a guardrail system (with minimum 200 pound top rail capacity).
- Each employee on a self-contained adjustable scaffold shall be protected by a guardrail system (with minimum 200 pound top rail capacity) when the platform is supported by the frame structure, and by both a personal fall arrest system and a guardrail system (with minimum 200 pound top rail capacity) when the platform is supported by ropes.
- Each employee on a walkway located within a scaffold shall be protected by a guardrail system (with minimum 200 pound top rail capacity) installed within 9 1/2 inches (24.1 cm) of and along at least one side of the walkway.
- A competent person shall determine the feasibility and safety of providing fall protection for employees erecting or dismantling supported scaffolds. Employers are required to provide fall protection for employees erecting or dismantling supported scaffolds where the installation and use of such protection is feasible and does not create a greater hazard.
- Personal fall arrest systems used on scaffolds shall be attached by lanyard to a vertical lifeline, horizontal lifeline, or scaffold structural member. Vertical lifelines shall not be used when overhead components, such as overhead protection or additional platform levels, are part of a single-point or two-point adjustable suspension scaffold.
- When vertical lifelines are used, they shall be fastened to a fixed safe point of anchorage, shall be independent of the scaffold, and shall be protected from sharp edges and abrasion. Safe points of anchorage include structural members of buildings, but do not include standpipes, vents, other piping systems, electrical conduit, outrigger beams, or counterweights.
- When horizontal lifelines are used, they shall be secured to two or more structural members of the scaffold, or they may be looped around both suspension and independent suspension lines (on scaffolds so equipped) above the hoist and brake attached to the end of the scaffold. Horizontal lifelines shall not be attached only to the suspension ropes.
- When lanyards are connected to horizontal lifelines or structural members on a single-point or two-point adjustable suspension scaffold, the scaffold shall be equipped with additional independent support lines and automatic locking devices capable of stopping the fall of the scaffold in the event one or both of the suspension ropes fail. The

independent support lines shall be equal in number and strength to the suspension ropes.

- Vertical lifelines, independent support lines, and suspension ropes shall not be attached to each other, nor shall they be attached to or use the same point of anchorage, nor shall they be attached to the same point on the scaffold or personal fall arrest system.
- Guardrail systems shall be installed along all open sides and ends of platforms. Guardrail systems shall be installed before the scaffold is released for use by employees other than erection/dismantling crews.
- The top edge height of top rails or equivalent member on supported scaffolds shall be installed between 38 inches and 45 inches above the platform surface.
- When mid-rails, screens, mesh, intermediate vertical members, solid panels, or equivalent structural members are used, they shall be installed between the top edge of the guardrail system and the scaffold platform.
- Mid-rails shall be installed at a height approximately midway between the top edge of the guardrail system and the platform surface.
- When screens and mesh are used, they shall extend from the top edge of the guardrail system to the scaffold platform, and along the entire opening between the supports.
- When intermediate members (such as balusters or additional rails) are used, they shall not be more than 19 inches apart.
- Each top rail or equivalent member of a guardrail system shall be capable of withstanding, without failure, a force applied in any downward or horizontal direction at any point along its top edge of at least 100 pounds for guardrail systems installed on single-point adjustable suspension scaffolds or two-point adjustable suspension scaffolds, and at least 200 pounds (for guardrail systems installed on all other scaffolds).
- Mid-rails, screens, mesh, intermediate vertical members, solid panels, and equivalent structural members of a guardrail system shall be capable of withstanding, without failure, a force applied in any downward or horizontal direction at any point along the mid-rail or other member of at least 75 pounds for guardrail systems with a minimum 100 pound top rail capacity, and at least 150 pounds for guardrail systems with a minimum 200 pound top rail capacity.
- Guardrails shall be surfaced to prevent injury to an employee from punctures or lacerations, and to prevent snagging of clothing.
- The ends of all rails shall not overhang the terminal posts except when such overhang does not constitute a projection hazard to employees.
- Steel or plastic banding shall not be used as a top rail or mid-rail.
- Manila or plastic (or other synthetic) rope being used for top rails or mid-rails shall be inspected by a competent person as frequently as necessary to ensure that it continues to meet the strength requirements.
- Cross-bracing is acceptable in place of a mid-rail when the crossing point of two braces is between 20 inches and 30 inches above the work platform or as a top rail when the crossing point of two braces is between 38 inches and 48 inches above the work platform. The end points at each upright shall be no more than 48 inches apart.

11 Falling Object Protection

In addition to wearing hardhats each employee on a scaffold shall be provided with additional protection from falling hand tools, debris, and other small objects with the use of tool lanyards, and through the installation of toe boards, screens, or guardrail systems, or through the erection of debris nets, catch platforms, or canopy structures that contain or deflect the falling objects. When the falling objects are too large, heavy or massive to be contained or deflected by any of the above-listed measures, the employer shall place such potential falling objects away from the edge of the surface from which they could fall and shall secure those materials as necessary to prevent their falling.

- Where there is a danger of tools, materials, or equipment falling from a scaffold and striking employees below, the following provisions apply:
 - The area below the scaffold to which objects can fall shall be barricaded, and employees shall not be permitted to enter the hazard area. Refer to the RDO Flagging and Barricading Requirement.
 - A toe board shall be erected along the edge of platforms more than 10 feet above lower levels for a distance sufficient to protect employees below, except on float (ship) scaffolds where an edging of 3/4 x 1 1/2 inch wood or equivalent may be used in lieu of toe-boards.
- Where tools, materials, or equipment are piled to a height higher than the top edge of the toe-board, the Supervisor will ensure the following:
 - Paneling or screening extending from the toe-board or platform to the top of the guardrail shall be erected for a distance sufficient to protect employees below; or
 - A guardrail system shall be installed with openings small enough to prevent passage of potential falling objects; or
 - A canopy structure, debris net, or catch platform strong enough to withstand the impact forces of the potential falling objects shall be erected over the employees below.
 - Canopies, when used for falling object protection, canopies shall be installed between the falling object hazard and the employees.
- Toe boards shall be:
 - Capable of withstanding, without failure, a force of at least 50 pounds applied in any downward or horizontal direction at any point along the toe board.
 - At least three and one-half inches high from the top edge of the toe board to the level of the walking/working surface. Toeboards shall be securely fastened in place at the outermost edge of the platform and have not more than 1/4 inch clearance above the walking/working surface. Toeboards shall be solid or with openings not over one inch in the greatest dimension.

12 References

30 CFR, Part 56.11027 Scaffolds and Working Platforms

29 CFR, Part 1910.28 Walking/Working Surfaces; Duty to Have Fall Protection and Falling Object Protection

29 CFR, Subpart L - Scaffolds

29 CFR, Part 1926.451 General Requirements (Scaffold)

29 CFR, Part 1926.454 Training Requirements (Scaffold)

RDO Flagging & Barricading Requirement

3.08 RDO Working On or Around Water & Tailings Storage Facilities Requirement

October 2018

1 Purpose and Scope

The purpose of this document is to define the safe work practices and procedures required while conducting work on or around water and tailings storage facilities. Working on or around water is recognized as a fatal risk. This requirement addresses the fundamental principles and critical control requirements that are to be followed regarding measures to eliminate and mitigate the hazards associated with working on or around water. This requirement applies to all employees and contractors performing this work at Red Dog Operations.

2 General Requirements

- 1) If a jurisdiction has requirements more stringent than those described in this document, the more restrictive shall apply.
- 2) The equipment requirements stipulated in this document shall be added to equipment inspection processes and associated checklists.
- 3) Supervisors shall train personnel to effectively implement the requirements of this document.

3 Heavy Mobile Equipment Working On or Around Water or Tailings Storage Facilities

Heavy Mobile Equipment operating on or in close proximity to water or tailings storage facilities shall have the following where a risk of drowning exists:

- 1) A risk assessment specific to the task shall be conducted.
- 2) Radio communication must be available at all times.
- 3) The cab door shall be fixed in the open position to support rapid operator egress. In cold or hot weather, regular breaks may be required to maintain Operator comfort, but the equipment must not be operated on water or tailings or in close proximity to water or tailings with the cab door closed.
- 4) Where practicable, heavy mobile equipment working in close proximity to water will be separated from the waterbody by a berm or equivalent barrier.
- 5) Operators, Spotters, and other onsite personnel are responsible for monitoring ground conditions and the impacts of inclement weather throughout the work process.

4 Within Operator Cabs

- 1) The operator must wear a manually inflated Personal Flotation Device (PFD). This type of PFD has been shown to improve safe operator egress in the event of a submerged cab. Upon egress from the cab, the operator can activate the PFD to provide flotation. No hydrostatic PFDs shall be worn.
- 2) Cabs must contain a break glass hammer and seat belt cutter, or combination tool, in a fixed position within reach of the Operator.
- 3) Cabs must contain a bottle of emergency breathing air in a fixed position within reach of the Operator.
- 4) All Teck and long-term contractor equipment shall have an emergency escape hatch in the roof. The escape hatch shall be engineered and manufactured such that roll over and fall over protection is not compromised.

5 Heavy Mobile Equipment Working On Water or Tailings Storage Facilities

Where practicable, work on water or tailings involving heavy mobile equipment should be eliminated by implementing alternative methods.

- 1) Where a risk of entrapment and drowning within a cab exists, a suitably qualified marine design engineer shall assess specialized heavy mobile equipment for use on water or tailings prior to use. The assessment shall determine the equipment's buoyancy and stability for the intended activity. Any structural or mechanical modifications made to the equipment outside of original equipment manufacturer (OEM) specifications will require a re-assessment prior to use. A marine design assessment is not required for commercially available, non-modified boats or dredges.
- 2) Operations (or equivalent) shall develop a risk assessment specific to the scope of work to be undertaken and the equipment to be used. The risk assessment must account for the credible worst-case risks. Preventative and mitigating critical controls must be identified and resourced. If there is a change to the scope of work, equipment or methodology, the risk assessment must be reviewed and revised.
- 3) A documented equipment inspection must be completed by an experienced, qualified person prior to use at a Teck controlled location. It shall include requirements consistent with this document, regulation and manufacturer specifications.
- 4) All work involving heavy mobile equipment on water must be accompanied with a task specific emergency response plan. Rescue personnel and equipment must be available for rapid deployment to initiate emergency response plans. Emergency response plans shall consider that in 5°C/41°F water or tailings, an Operator has approximately 15 to 30 minutes before exhaustion or unconsciousness takes hold.
- 5) A Spotter must be available at all times to review the work and must not be engaged in any other work while performing as a Spotter. The Spotter must have radio communication with the Operator.
- 6) Seat belts shall be worn when operating heavy mobile equipment on or around water.

- 7) If a contractor is performing the work, the Teck Contract Manager shall ensure the contractor provides information regarding equipment inspection, alterations or modifications and marine engineering assessment prior to arrival on site. All equipment manuals, logbooks and service records must accompany the equipment to the site.

6 Personnel Working Around Waterbodies and Tailings Storage Facilities

The following requirements apply when personnel are required to work in close proximity to natural or operational waterbodies and tailings storage facilities where a risk of drowning exists.

- 1) Operational water bodies and tailings storage facilities must have a means for limiting access to essential work activity. Access for work must be limited to authorized personnel and signed accordingly. Positive communication and acknowledgement with the person responsible for the facility must be obtained prior to access.
- 2) Operational water bodies and tailings storage facilities shall be equipped with life rings and rope bag safety equipment.
- 3) All personnel working within 10 feet of water or tailings, without a means to restrict access, must wear an approved hydrostatic, automatically inflating PFD.

7 Inspection and Maintenance of PPE and Rescue Equipment

Employees will be responsible for the proper care and use of all PPE they are assigned. Supervisors shall ensure all pre and post use inspections of the required PPE and rescue equipment is conducted and in place before work commences.

- 1) Conduct visual inspections of equipment in accordance with the manufacturer's guidelines.
- 2) Inspection areas include checking for proper markings, damage to straps, buckles and components, expiration dates, gauges and charging indicators.
- 3) Damaged, defective, or expired equipment must be removed from service immediately.

8 Safe Work Plan

While no summary of safe working practices can cover all aspects or potential hazards, there are a number of important guidelines to follow. Before commencing work, conduct a jobsite walk down, identify and document existing and potential hazards by means of risk assessment, job safety analysis, SETA card, or other similar tool. The information must be communicated and acknowledged by all persons involved in the work process. Materials, equipment, the work environment, and effective hazard elimination or mitigations must be taken into consideration.

8.1 Rescue / Emergency Response

All work involving heavy mobile equipment on or near water must be accompanied with a task specific emergency response plan and risk assessment.

In the event a piece of equipment becomes submerged in water, the primary means of escape and recovery will be through self-rescue by the operator. In the event a ground worker enters a body of water, the primary means of rescue will be a life ring or rope bag.

8.2 Access & Egress

Safe means of access and egress shall be provided for ground personnel working near the water's edge when work is occurring on embankments. Locations of access, egress, and their

approaches shall be free from obstruction and kept clear of any item likely to cause a slip, trip or fall.

8.3 Training

Specific safety training will be given to personnel working near water, on the use and inspection procedures of PFDs, rescue equipment, and response for persons who have fallen into the water. Training will be recorded on MSHA Form 5000-23.

8.4 Kickoff Meeting

Prior to beginning work, a kickoff meeting will be held with the work crews to review the scope of work, execution strategy, project sequencing, working near water safety procedures, applicable SOPs, and job safety analysis briefing.

9 Key Responsibilities

9.1 Supervisor

The Supervisor is responsible for ensuring that all personnel under their control are competent and authorized to use the relevant equipment and that they are aware of the contents of this procedure and their responsibility to enforce it. All persons performing the work are to acknowledge that they have been briefed and are aware of the contents of the procedure.

9.2 HSE Representative

- 1) Attend toolbox meetings and risk assessments, and update the crew on pertinent safety information related to working near water.
- 2) Maintain records of safety documentation related to any training delivered.
- 3) Be notified immediately in the event of a health, safety, or environmental incident.
- 4) Ensure all personnel adhere to the safety policies and procedures.

9.3 Employee

Each worker shall take responsibility for his or her own personal safety and the safety of those working around them. This includes wearing the appropriate personal protective equipment and being aware of the potential hazards involved with a given task.

10 Departure from Procedure

Failure to follow this procedure could result in:

- 1) **Drowning:** In the event that ground personnel or an operator/driver and equipment go into the water.
- 2) **Entrapment:** In the event an operator is stuck inside of equipment that has gone into the water.
- 3) **Exposure - Shock/Hypothermia:** Exposure to water temperatures cold enough to induce shock and or the onset of hypothermia.

Due to:

- 1) **Environment:** Operating too close to the water's edge, failure to identify unsafe ground conditions (potential for sluffing, frozen or thawing materials, and uneven terrain).

- 2) **Lack of PPE, Rescue Equipment, Training:** Failure to inspect or have PPE and rescue equipment available for self-rescue in the event of an incident. Failure to have received the training necessary to effectively utilize PPE and rescue equipment in the event of an emergency.
- 3) **Unforeseen Hazards:** Failure to recognize and plan for all potential hazardous situations when working on or near water and tailings storage facilities.

11 Assurance

Controlled locations shall implement an internal assurance to confirm conformance to this requirements document.

12 Exemptions

In circumstances where the General Manager (or equivalent) can demonstrate through a risk assessment that a particular requirement is not practical for their location, a written exemption justification shall be submitted to the Business Unit SVP and VP Health and Safety. No exemption shall be assumed without approval of both entities.

13 References

Teck High Potential Risk Control Requirements for Working On or Around Water & Tailings Storage Facilities

3.09 Red Dog Operations Rigging & Lifting Requirement

1 Purpose and Scope

The purpose of this document is to define the safe work practices and procedures required while conducting lifting operations. This requirement applies to all employees and contractors performing lifting operations at Red Dog Operations.

Rigging and lifting operations are recognized as high potential risk activities. This requirement addresses the fundamental principles and critical control requirements that are to be followed regarding measures to eliminate and mitigate rigging and lifting hazards.

Exemptions to the Rigging and Lifting Requirements shall be requested to the Red Dog Operations General Manager for approval.

2 Key Responsibilities

Supervisor:

- The supervisor or designated person in charge of work is responsible for the implementation of this requirement.
- The supervisor has the responsibility to ensure that all persons who are working with rigging and lifting are trained and certified for the work being performed.
- The supervisor will ensure training is documented with an MSHA Form 5000-23 and maintained onsite for verification.
- The supervisor is responsible to ensure all rigging and lifting operations are consistent with the Red Dog Operations Rigging and Lifting Requirement.
- The supervisor is responsible for ensuring all standard operating procedures, federal regulations, and manufacture's recommendations deemed appropriate to ensure personnel safety while working rigging and lifting operations.

Employee:

- Shall be certified through successful completion of the Red Dog Operations Rigging and Crane training course, by a certified individual. Upon completion of the course an MSHA Form 5000-23 form will be issued and maintained onsite.
 - When training is obtained offsite, a copy of the certification or license shall be maintained onsite in the employee's training file.
 - If there is a question regarding if the offsite training meets Teck Red Dog Operations standards, please contact the RDO Training and Development Department.
 - The person working with rigging and lifting is responsible for utilization of their training, experience, and awareness of the hazards associated with their work to ensure safe work practices are followed while working rigging and lifting operations.

Lift Operator:

- Shall verify that overall lift conditions are acceptable.
- Shall perform daily pre-use inspection of the lifting devices.
- Verify riggers and signal person understand their role in the lift.

- Shall remain with or at the controls while load is suspended. In the event of an emergency, move and lower the load to a secure area.
- Responsible to facilitate the pre-job lift meeting.
- Shall execute the lift in accordance with the developed lift plan.
- Shall obey the signals of the Signal Person (if used) and stops the lift if contact with the Signal Person is broken.
- For lifting operations that require a Lift Plan (basic lift or critical lift), Lift Operator shall review the lift plan and verify all required controls are in place and effective, to include the following:
 - Lifting device is properly positioned.
 - Equipment is properly configured.
 - Proper rigging is being used.
 - The Anti-two-block System is operational (if applicable).
 - Proper footing is being used (if applicable).
 - No overhead obstructions exist.
 - Ensure that all pre-job lift meetings are conducted with all involved parties present.

Qualified Rigger:

- Shall sling, unsling, and guide loads under the direction of the lift operator.
- Shall conduct visual rigging inspections before and after each lift.
- Shall inspect loads and verify that the load will be secure and stable when lifted.
- Attend all pre-job lift meetings.
- Qualified Rigger may serve as the Signal Person.

Signal Person:

- Shall function as the sole signaler at any given time.
- Shall have a direct line of sight of the load and make sure the load never passes over anyone.
- Shall follow a clear, agreed upon standard set of signals for communicating with the Lift Operator, or if out of the Lift Operator's direct line of sight, uses an agreed upon set of verbal commands by radio.
- Shall give proper signals or verbal commands to the Lift Operator to help guide the load along a clear path from the lift point to the final resting point of the load.
- Responsible to ensure access points are properly secured before lifting operation occurs in accordance with the Red Dog Operations 3.03 Flagging and Barricading Requirement.
- Shall verify that no overhead obstructions exist.
- Shall guide loads when the Lift Operator does not have view of the load.
- Attend all pre-job lift meetings.

Safety & Health Representative: A Safety Representative, who is not part of the lifting crew, shall be notified and present when there is a critical lift. The Safety Representative must understand all the Critical Lift procedures. Responsibilities include:

- Reading and understanding the lift plan.
- Verifying proper certifications on crane and hardware.
- Reviewing hazard analysis.
- Attending the critical lift meeting.
- Monitoring the critical lift.

The Safety Representative is authorized to question any Critical Lift related activity and stop the activity at any point.

3 General Requirements

- Prior to initiating any work requiring rigging and lifting, a risk assessment shall be completed to ensure the necessary controls are in place for the hazards.
- All lifting and rigging equipment shall be in acceptable working condition and comply with OSHA 1910.179 & 1910.184.
- All lifting equipment shall be stored in a dry location free from chemicals.
- Synthetic fiber slings shall be protected from edges that may compromise the sling under load.
- Pre operational inspections shall be conducted on crane and rigging with inspection sheet completed before use and any deficiencies reported to your supervisor and corrected before the lift occurs.
- Suspended load shall have a tag line to control the load where applicable.
- Personnel shall stay clear of the fall hazard of a suspended load.
- Conduct a 360 degree walk around inspection before each use; report any deficiencies to your supervisor.
- Operator's manual is stored on the equipment and legible; it is there for the operator to reference as needed.
- Operator before making a lift shall ensure the load is secure (load will not separate, nothing will fall from the load). During the lift operation, operator will ensure the load is secure in its resting place.
- Keep all body parts within the confinement of the cab or the roll over protection device.
- Report all incidents to your supervisor.
- Every individual has the right and moral obligation to stop the job if they feel the lift is unsafe.

4 Rigging and Lifting Pre-Lift Planning Card:

The purpose of the pre-lift planning card is a simple risk assessment initiative, to identify hazards, to make sure all the controls measures are in order, and to help define if the lifting operation is classified as a critical lift or a basic lift.

When a job requires the task of rigging and lifting, the supervisor shall issue a pre-lift planning card to be filled out by the personnel doing the task.

Once the card is completed it shall be reviewed and signed off by the supervisor authorizing the task to take place.

This card shall be kept by the supervisor until the rigging and lifting tasks have been completed. Once completed the supervisor may discard the pre-lift card. In the event there is an incident during the rigging and lifting tasks the pre-lift card shall be maintained by the supervisor and entered into the Supervisor Investigation Report.

The Rigging and Lifting Pre-Lift Planning Card is a warehouse stock item. The supply code to order the card is S/C-251843.

5 Critical Lift

- A lift that exceeds 75% of rated capacity of crane or derrick, or is a non-routine lift requiring detailed planning, and unusual safety precautions.
- Critical lifts include lifts which require the load to be lifted, swung, or placed out of view of operator.
- Lifts made with more than one crane.

- Lifts involving non-routine or technically difficult rigging arrangement.
- Hoisting personnel with a crane or derrick.
- Lifting over water, or over machinery sensitive to running operation (i.e. Sag motors, generators).
- Lifting of a single load with two pieces of equipment.
- A lift which the lift truck or crane operator believes should be considered a critical lift.

6 Critical Lift Worksheet

The Critical Lift Worksheet is a vital tool in the planning process of a critical lift. At a minimum, the crane operator and qualified rigger must work together to plan the critical lift and document the information on the Critical Lift Worksheet.

Once the Critical Lift Worksheet is completed, it will be verified and approved by a qualified engineer, the crew supervisor, the crane operator, and a Teck Project Manager or Teck S&H representative.

Once the Critical Lift Worksheet is approved, the crane operator and rigger will fill out the Critical Lift Plan.

The Critical Lift Worksheet is located in Qualtrax, Document ID #5411, in the Health & Safety Handbook.

7 Critical Lift Plan

The Critical Lift Plan (CLP) is the final document in the critical lift process. The Critical Lift Plan shall be completed by the crane operator and qualified rigger.

The Critical Lift Plan includes the significant details of the planned critical lift. Once the Critical Lift Plan is completed, the lift plan will be communicated to the group in a pre-lift safety meeting.

The CLP is verified and approved by the group to include the crane operator, rigger, crane oiler, signal person, designated lift leader, supervisor, and Teck Project Manager or Teck S&H representative.

The Designated Lift Leader will keep the Critical Lift Worksheet and Plan on hand at the worksite during the critical lift.

Once the critical lift task has been completed, the Teck Area Owner General Supervisor will retain the Critical Lift Worksheet and Critical Lift Plan in their files for one (1) year.

The Critical Lift Plan is located in Qualtrax, Document ID #5412, in the Health & Safety Handbook.

8 Mobile Crane Operations

- A copy of your mobile crane operator certification shall be on record with employer before allowing operator to operate mobile crane.
- Certification is portable and not restricted to another government entity or an audited employer program.
- Certification is valid for 5 years
- Notification of work shall be sent out to the property 24 hours before the work is schedule to begin with mobile crane operations.
- Notification of work shall contain the following information:
 - detailed map of location

- date
- project name
- duration
- location
- activity
- Teck contact, and Contractor contact if applicable.
- Mobile crane operator shall communicate with RDO airport tower personnel informing them of the operation is going to start and request air traffic scheduled for the day.
- Mobile cranes when not in use the hooks shall be secured back to the crane at ground level not leaving suspended load of hook and counter weight.

9 Overhead Crane Operations:

Overhead cranes:

- Overhead Crane operator training shall be provided to promote proficient performance of a crane operator in conformance with the provisions of AMSE B30.2 and OSHA 29 CFR 1910.179
- Overhead Crane operator shall be properly trained and with a properly documented with an MSHA Form 5000-23.
- The safe working load of the overhead hoist, as determined by the manufacturer, shall be indicated on the hoist, and this safe working load shall not be exceeded.
- The supporting structure to which the hoist is attached shall have a safe working load equal to that of the hoist.
- The support shall be arranged so as to provide for free movement of the hoist and shall not restrict the hoist from lining itself up with the load.
- The hoist shall be installed only in locations that will permit the operator to stand clear of the load at all times.
- Air hoists shall be connected to an air supply of sufficient capacity and pressure to safely operate the hoist. All air hoses supplying air shall be positively connected to prevent their becoming disconnected during use.
- All overhead hoists in use shall meet the applicable requirements for construction, design, installation, testing, inspection, maintenance, and operation, as prescribed by the manufacturer.

10 Crane Inspection Requirements

Before use the operator shall conduct a Crane / Hoist Pre-Use Inspection. For this inspection the operator shall use the Teck Crane / Hoist Pre-Use inspection forms to document the inspection, which is a two part carbon copy.

Original will go to the supervisor, the copy will remain in the designated crane control box. If any deficiencies are found do not operate crane and report it to your supervisor.

The following items shall be checked prior to the first use of each shift:

- Tagged Crane: Check that the crane is not tagged out of service.
- Control Devices: Check that all the motions agree with control device markings.
- Brakes: Check for excessive drift and normal stopping distance.
- Hook: Check for damage, cracks, nicks, or other damage to the hook.
- Hook Latch: Check that the hook safety latch operates properly.
- Wire Rope: Check for broken wires, broken strands, or any damage to the wire.
- Reeving: Check that the rope parts are not twisted about each other.
- Limit switches: Check that the upper limits stops the load block.
- Oil Leakage: Check for oil leakage on the crane and floor beneath the crane.

- Unusual Sounds: Check for unusual sounds while operating the crane.
- Safety Labels: Check that warning, safety, and capacity labels are not missing and are legible.
- Visual Surroundings: Ensure personnel working at upper levels are aware of possible crane movement.

11 Qualified Rigger and Rigging Inspections:

Employers shall use qualified riggers during hoisting activities during assembly and disassembly work. Additionally, qualified riggers are required whenever workers are within the fall zone and hooking, unhooking, or guiding a load, or doing the initial connection of a load to a component, equipment, or structure.

Before each use, the sling and all fastenings and attachments shall be inspected for damage or defects by a competent person designated by the employer. Additional inspections shall be performed during sling use where service conditions warrant. Damaged or defective slings and hardware shall be immediately removed from service and destroyed to prevent further use.

12 Forklift Operations:

- Operators shall be properly trained on the forklift they are tasked to operate to include articulating loaders and skid steers with lifting attachments, and have an MSHA Form 5000-23 on maintained onsite.
- Forklifts operated inside a building shall sound the horn before beginning movement and when approaching an intersection or blind corners.
- Travel at a speed where the forklift can be stopped safely.
- Operators shall not use a sling over the forks or run the fork through an eye of a sling for lifting applications below the forks. A certified lifting attachment with a hook shall be used for these applications.
- On all grades, the load, and load engaging means shall be tilted back, if applicable, and raised only as far as necessary to clear the road surface.
- If view is obstructed from the load, travel with the load trailing, or use a spotter. Do not raise or lower the forks while the forklift is moving.
- No long distance tramping of a load; Use a flatbed truck or a trailer to tram the load.
- All wide loads will be transported on a trailer.
- When parked the forks shall be lowered to the ground surface, parking brake engaged, and equipment chocked.

13 Crane Operations Weather Thresholds and Restrictions

If the temperature is at -25F or if the wind speed including gusts is 25 MPH or greater do not continue to operate any crane, man lift, scissor lift, or man basket, as this will decrease machine stability and safe operability.

The operator is responsible for checking initial weather conditions before commencing work, and conducting frequent weather condition checks throughout the shift while conducting rigging and lifting operations.

14 Helicopter Slings Operations

Helicopters are often used to move supplies, fuel, drilling and camp equipment in an efficient way by slinging. Slinging is hazardous work requiring extreme focus by all personnel involved. Incidents may occur even with experienced pilots and ground crews. To mitigate risk, employees and contractors working for Teck shall follow safe slinging procedures. All parties involved in helicopter slinging operations refer to Teck Aviation Standard requirements for External Load.

Slinging Activity Responsibilities

Project Manager:

- Responsible to ensure briefings are conducted.
- Ensure all personnel involved have the proper training documented and filed onsite.
- Ensure the loads to be transported are 'standard' or that there is a clear understanding of the plan to rig non-standard loads.
- Ensure all loads to be transported are well within the lift capabilities of the helicopter
- Ensure all required PPE is available and is worn.
- Ensure that others working on the project are aware of the slinging activities and stay clear of danger areas.
- Ensure pilots and ground crew comply with SOP requirements.
- Accountable for fatigue management of pilot and crew.

Pilot:

- Responsible to facilitate the pre-job lift meeting.
- Check the release mechanism and sling gear serviceability.
- Follow proper slinging procedures.
- Pilot or ground crew to manually disconnect and remove the longline from the landing area.
- Coordinate the make-up, and order of loads with the ground staff.
- Manage fatigue, stop to take a break as needed.
- Participate in a load planning meeting with ground crew prior to slinging activities.
- Operations - Where the frequency of external loads is 3 or more per hour the allowable flight hours per day drops to 6 hours.

Ground Crew:

The ground crew (hook tender) shall be trained for the task, have a complete understanding of the task to be performed, and have demonstrated competency in completing the task.

- The pilot and ground crew shall confirm the signals they will use prior to beginning any sling load operations.
- Always use radio communication whenever possible. Only one person at a time shall send signals to the pilot.
- The ground crew shall wear a hard hat with a chinstrap, earmuffs, goggles, safety glasses, and hearing protection. He or she shall wear high visibility clothing such as a fluorescent-colored jacket or armbands that clearly distinguishes him or her from the other employees working in the area of the helicopter landing pad.
- Always wear gloves for protection from potential static electric shock. You can be knocked to the ground or even become entangled in the cargo net from a charge of static electricity.
- The ground crew must wear proper footwear and use extra caution when working on slippery surfaces. Wear traction devices when appropriate.
- Never step directly in front of a sling load after you hook it onto the helicopter. Exit forward but to the side to avoid being struck by the load as the helicopter aligns for take-off. Stand or crouch in full view of the pilot. Keep well away from the flight paths while sling loads are transported.
- Never turn your back to a suspended load. Always face the load.
- Allow the load to settle before you remove chokers and slings.
- Always have two ground crew members when slinging a drill rig and equipment or when slinging a complicated load. This person must also be equipped with a radio. Only one person shall give signals to the pilot.

15 Helicopter Landing Zones

All personnel working in a helicopter landing zone shall have the proper training, and the training shall be properly documented and maintained onsite. Landing zones shall be constructed and maintained to the Federal Aviation Administration standard Advisory Circular No: 150/5390-2C

16 Hoisting Personnel Application

Cranes using Suspended Personnel Platforms shall only be used when there is no other conventional means to do the job. Hoisting personnel is categorized as a critical lift, all of the regulations of OSHA 1926.1431 Hoisting Personnel shall be followed that apply to the lift. Special Tasks by a qualified person have to be taken with the crane and lifting platform before utilizing a suspended personnel platforms.

For any application where the task requires hoisting of personnel, the Teck Safety & Health Department shall be notified in a written request and a response shall be given from the S&H Department before the task can take place.

- Cranes must reduce their respective capacity charts by 30% for all hoisting personnel applications.
- The wire rope and sling assembly must be de-rated (5:1) for rotation resistant wire rope and de-rated (3.5:1) for right regular lay wire rope.
- The hoist drum on the crane being used shall have an audible alarm anti-two block device or limit device.
- A Risk Assessment, Critical Lift Plan, and JSA documents are required for each lift involving workers.
- A trial lift throughout the lift area is required prior to lifting personnel.
- A proof test of the crane is required following each trial lift.
- The platform and rigging shall be proof tested to 125% of the platforms rated capacity by holding it in a suspended position for five minutes with the test load evenly distributed on the platform.
- Radio communication is required and must be verified between the operator and the person in the suspended personnel platform before lift activity begins.
- A pre-lift meeting is required and shall be documented for each new work location and for any employees or contractors assigned to the operation.

17 Training Requirements

Trainer Qualifications:

Designated person appointed by the company to train personnel to operate cranes or the use of rigging shall be conducted by a trainer who has gone through a third party train the trainer course and is a current certified trainer.

Designated person appointed by the company to train personnel to operate Powered Industrial Trucks (Forklifts) shall be conducted by persons who have the knowledge, training, and experience to train powered industrial truck operators through an OSHA approved training course.

Overhead Cranes and Hoists:

Personnel operating Overhead Crane shall be trained by a certified individual. Employees must have a current MSHA Form 5000-23 maintained onsite before they are authorized to operate. Training requirements shall be in compliance with OSHA 29 CFR 1910.179 & 1910.184.

An operator involved in an Overhead Crane incident is required to attend post incident refresher training before being allowed to resume overhead crane operations. Post incident refresher

training shall be conducted by a certified individual. Refresher training shall relate to the incident that occurred and shall be documented on an MSHA Form 5000-23. All training shall consist of a combination of:

1. Formal Instruction (classroom environment)
2. Practical Training (hands on training)
3. Documented Evaluation

Mobile Cranes:

Personnel Operating Mobile cranes with a rated lift capacity of 2000 pounds or greater, Shall have a certification by an accredited crane operator testing organization.

This certification is the governing training document required to operate mobile cranes, therefore, an MSHA Form 5000-23 is not required if the operator holds a valid certification.

In accordance with OSHA 29 CFR 1926.1427 Operator Training, Certification, and Evaluation, the following is required:

- Copy of this certification shall be on record with employer before allowing operator to operate mobile crane.
- Certification is portable and not restricted to another government entity or an audited employer program.
- Certification is valid for 5 years

Operator Training topics

- Identification of crane types.
- Crane definitions: Rated Strength, Ultimate Strength, Etc.
- Component identification.
- Crane application.
- Operating Procedures and Red Dog Operation's SOP's pertaining to mobile crane operations.
- Quadrants of operation & adverse effects: "Over Side", "over Rear" , or "360 degree".
- Preparing for a lift.
- Describe how to pre-plan a crane lift.
- ANSI signal chart.
- The principles of leverage and stability.
- The concepts of structural competence or strength of materials.
- Understanding load charts.
- Wire Rope – Construction, Types, and Inspections.
- How to change boom section (lattice boom cranes).
- Pick and carry operations.
- Perform crane inspections.
- Be able to answer questions pertaining to the crane or its attachments.
- Required maintenance of each lifting device.

Rigger Qualification:

Personnel using rigging shall be trained by a certified individual. Employees must have a current MSHA Form 5000-23 maintained onsite before they are authorized to use rigging.

A qualified rigger is a rigger who meets the criteria for a qualified person. Employer must determine (based on the scope of work) whether a person is qualified to perform a certain rigging tasks. Each qualified rigger may have different credentials or experience. A qualified rigger is a person that:

- Possesses a recognized degree, certificate, or professional standing, or
- Has extensive knowledge, training, and experience, and

- Can successfully demonstrate the ability to solve problems related to rigging loads.

Signal Person Qualification:

Signal person shall be trained by a certified individual. Employees must have a current MSHA Form 5000-23 maintained onsite before they are authorized to perform the task of a signal person in a lifting operation.

- Know and understand signals to be used, as well as all forms of signals (i.e., voice, hand, radio, etc.)
- Be competent in the application of the type of signals to be used.
- Have basic understanding of crane operation and limitations, including the crane dynamics involved in swing and stopping loads and boom deflection from hoisting loads.
- Must be able to effectively communicate to crane operator.
- A qualified trainer must conduct the training, and the training documented on a MSHA Form 5000-23.

Forklifts Training Requirements:

Personnel operating mobile Forklifts shall be trained by a qualified individual and competent for the specific make and model of the equipment. Employees must have a current MSHA Form 5000-23 filed onsite before they are authorized to operate.

Training requirements shall be in compliance with OSHA 29 CFR 1910.178. An operator involved in a forklift incident is required to attend post incident refresher training before being allowed to resume with forklift operations.

Post incident refresher training shall be done by a qualified individual. Refresher training shall relate to the incident that occurred and shall be documented on an MSHA Form 5000-23.

All training shall consist of a combination of:

- Formal Instruction (classroom environment)
- Practical Training (hands on training)
- Documented Evaluation

Helicopter Training Requirements:

Project manager shall ensure all personnel involved with helicopter operations have the proper training documented and filed onsite, in accordance with the Teck Aviation Standard.

18 Definitions

ANSI	American National Standards Institute
Anti-two block System	A system of electromechanical devices used to prevent the crane operator from two blocking the crane. See Two Block.
ASME	American Society of Mechanical Engineers
Basic Boom	Lattice boom attachment made up of only the base and top sections of the boom.
Basic Jib	Jib attachment made up of only the base and top section of the jib.
Boom Angle	The angle above or below horizontal of the longitudinal axis of the boom
Capacity Chart	A chart for the crane which gives rated lifting capacities for the crane under different load conditions and setups. Capacity charts are found on the crane or in the Crane Rating Manual.

Concrete Bucket	Bucket for handling wet concrete, usually handled on lifting crane for hoisting to dumping location.
Counterweight	Weight used to supplement the weight of the crane in providing stability for lifting loads.
Critical Lift	A Lift that exceeds 75% of rated capacity of crane or derrick, or is a non-routine lift requiring detailed planning, and unusual safety precautions. Critical lifts include lifts which require the load to be lifted, swung, or placed out of view of operator; lifts made with more than one crane; lifts involving non-routine or technically difficult rigging arrangement; hoisting personnel with a crane or derrick, lifting over water, or over machinery sensitive to running operation (I.E. Sag motors, generators) or any lift which the lift Equipment operator, rigger, or crane operator believes to be considered a critical lift.
Designated Person	A person who is selected or assigned by the employer or employer's representative as being competent to perform specific duties.
Extension (Boom or Jib)	Sections of the boom or jib which come in various lengths and are used to increase the overall length of the basic boom or jib.
Ground Pressure	Weight of machine divided by the area of the surface directly supporting the machine.
Hoist	Function of lifting and lowering the loads.
Hoist Drum	A rotating cylindrical spool with side flanges used to wrap the winch rope during the raising and lowering of the load with the winch.
Hoist Rope	The wire rope used to reeve the winch and the attachments for lifting loads
Hook Block	Block with hook attached used in lifting service. It may have a single sheave for two or three part line, or multiple sheaves for four or more parts of line.
Jib	A pendant supported extension attached to the boom or fly head to provide added boom length for handling specified loads. The jib may be in line with the boom or offset.
Lifting	To raise an object to a higher position or level by the use of mechanical advantage that is properly load rated to pick up a load and move to a different position
Lifting Capacity	The rated load for any given load radius and boom angle under specified operating conditions and machine configurations.
Load	Means the external load, in pounds, applied to the crane or lifting device, including the weight of load-attaching equipment such as special attachments, load blocks, shackles, and slings.
Load Indicator	A device for measuring and displaying the net load being lifted.
Load Line	Another term for "Hoist Rope". In lifting crane service it refers to the main hoist. The secondary hoist is referred to as a "Whip Line".
Load Rating Chart	A substantial and durable rating chart and index, with clearly legible letters and figures shall be provided with each crane, or manufactured lifting device, and securely fixed to the cab in a location easily visible to the operator while seated from the control station.
Periodic	Time intervals usually determined by crane manufacturer when crane inspections are required

Pick and Carry	The crane operation of lifting a load and traveling with it suspended.
Pulley	A wheel with a grooved rim in which a rope, chain, or belt can run in order to change the direction or point of application of a force applied to the rope, etc.
Pulley Block	A number of pulley's pivoted in parallel in a block, used to raise heavy loads.
Qualified Person	A person who, by possession of a recognized degree or certificate of professional standing in an applicable field, or who, by extensive knowledge, training, and experience, has successfully demonstrated the ability to solve or resolve problems relating to the subject matter and work. Certified.
Radius	The horizontal distance from the centerline of rotation of the crane, with no load, to the center of gravity of the hook or suspended load.
Rated Load	The maximum allowable working load established by the rigging hardware manufacturer. The terms "rated capacity" and "Working Load Limit" are used to describe rated load.
Reeve	The physical arrangement of the wire line through a block.
Rigging	The hardware and equipment used to safely attach a load to a lifting device. The art or process of safely attaching a load to a hook (crane) by means of an adequately rated and properly applied slings and related hardware.
Rigging Inspection	Each day before used, the sling and all fastenings and attachment's shall be inspected for damage or defects by a competent person designated by the employer. Additional inspections shall be performed during sling use where service conditions warrant. Damaged or defective slings shall be immediately removed from service.
Shall	The word shall is to be understood as mandatory.
Sheave	A grooved wheel or pulley (as of pulley block
Sling	An assembly to be used for lifting when connected to a lifting mechanism. The upper portion of the sling is connected to the lifting mechanism and the lower portion supports a load.
Tag Line	A rope attached to the load to offer the rigger control of the load without putting the rigger in a position to be injured.
Two Block	The situation when the crane's hook block or hook ball contacts the attachment's head machinery.
Two Block Warning System	A system of electromechanical devices used to warn the crane operator of impending two block condition, also known as an Anti-two block system.
Whip line	Secondary hoist line.
Winch	Function of lifting and lowering loads.

Winch Drum	A rotating cylindrical spool with side flanges used to contain the winch rope during the raising and lowering of the load with the winch.
Winch rope	The wire rope used to reeve the block and the attachments for lifting loads
Working Load Limit	The maximum load rigging gear is allowed to support

19 References

OSHA 29 CFR 1926.1431 Hoisting Personnel.
 OSHA 29 CFR 1910.178 Powered Industrial Trucks
 OSHA 29 CFR 1910.180 Crawler, Locomotive, and Truck Cranes.
 OSHA 29 CFR 1926.1427 Operator Training, Certification, and Evaluation.
 OSHA 29 CFR 1926.1430 Training.
 OSHA 29 CFR 1926.1438 Overhead and Gantry Cranes
 OSHA 29 CFR 1926.1404 Assembly/Disassembly
 MSHA 30 CFR 56.16009 Suspended Loads
 Teck RDO Manitowoc 3900 Ton Crane Assembly and Disassembly Guideline. Document ID. 49114911
 Teck RDO Overhead Cranes. Document ID. 2409
 Exploration Rigging & Lifting Operations SOP
 Teck Aviation Standard / Supplemental 2.1 Requirement for External Load.
 Exploration Helicopter Operations SOP
 U.S. Department of Transportation / Federal Aviation Administration Advisory Circular No: 150/5390-2C
 ASME B30.2.2005 (Crane)
 MSHA 30 CFR

3.09a Rigging & Lifting Planning Worksheet

Title: _____ Date: _____
 Project: _____ Job Number: _____
 Description: _____
 Jobsite Address: _____
 Customer: _____ P.O/ Contract#: _____
 Lift Plan Drawing and Load Placement Drawing Attached? Yes _____ No _____
 Notes: _____

Crane Information

Manufacture: _____
 Model: _____
 Serial #: _____
 Crane Rating: _____
 Crane Inspection Date: _____
 Notes: _____

Lift Information

Crane Radius: _____
 Gross Capacity at Pick Point: _____
 Gross Capacity at Set Point: _____
 Crane Capacity: _____
 Notes: _____

Crane Configuration

Crane Carrier: _____
 Counterweight: _____
 Chart Capacity: _____
 Main Boom Length: _____
 Boom Type: _____
 Boom Sections: _____
 Parts of Line: _____
 Line Size: _____
 Capacity of Line @ Parts: _____
 Radius: _____
 Boom Angle: _____
 Tip Height: _____
 Jib Used: Yes _____ No _____
 Jib Length: _____
 Jib Offset: _____
 Jib Angle from Ground: _____
 Ground Bearing Pressure (Worst Case): _____

Load Configuration

Description: _____
 Dimensions: _____
 Load Weight: _____
 Rigging Weight: _____
 Ancillary Equip Wt: _____
 Other Weight: _____
 Total Weight: _____
 Hook Height: _____
 Sling Length: _____
 Sling Angle: _____
 Sling Equip#: _____
 Sling Type: _____
 Sling Capacity: _____
 Spreader Bar #: _____
 Spreader Bar Capacity: _____
 Hook Block: _____
 Shackle Type: _____
 Shackle Qty: _____
 Shackle Capacity: _____
 Additional Rigging: _____

Setup Information

Crane Setup: Over Rear _____ 360° _____
 Over Front _____ Over Side _____
 Setup Distance: _____
 Mat Used: Yes _____ No _____
 Mat Dimensions: _____
 Ground Bearing Pressure below First Mat: _____
 Notes: _____

Additional Rigging Capacity: _____
 % of Chart Capacity: _____
 Chart Capacity Deduct: _____ %
 Deduct Capacity: _____
 Notes: _____

Title: _____ Project: _____	Page #: _____ Job Number: _____																																
<div style="text-align: center; font-weight: bold; margin-bottom: 10px;">Jobsite Obstructions</div> Front Obstruction Name: _____ Dimensions: _____ Rear Obstruction Name: _____ Dimensions: _____ Height Obstruction Name: _____ Dimensions: _____ Right Obstruction Name: _____ Dimensions: _____ Left Obstruction Name: _____ Dimensions: _____ Notes: _____	Notes: _____ _____ _____ _____ _____ _____ _____ _____																																
Pre-Lift Checklist																																	
<table style="width: 100%; border: none;"> <tr> <td style="width: 40%;">Crane Operator:</td> <td style="width: 60%;">Name: _____</td> </tr> <tr> <td>Signalperson Assigned:</td> <td>Name: _____</td> </tr> <tr> <td>Communication Method:</td> <td>_____</td> </tr> <tr> <td>Crane Inspected by Operator?</td> <td>Yes _____ No _____</td> </tr> <tr> <td>Rigging Inspected?</td> <td>Yes _____ No _____</td> </tr> <tr> <td>All Permits Obtained?</td> <td>Yes _____ No _____</td> </tr> <tr> <td>Wind OK?</td> <td>Yes _____ No _____</td> </tr> <tr> <td>Are There Power Lines?</td> <td>Yes _____ No _____</td> </tr> <tr> <td>Are The Weather Conditions OK?</td> <td>Yes _____ No _____</td> </tr> <tr> <td>Is Operators Certification Card Current?</td> <td>Yes _____ No _____</td> </tr> <tr> <td>Is Area OK for Entry and Exit of Jobsite?</td> <td>Yes _____ No _____</td> </tr> <tr> <td colspan="2">Has a Pre-Lift Meeting between Crane Operator, Signalperson, Supervisor, and Any and All Other Persons occurred? Yes _____ No _____</td> </tr> <tr> <td colspan="2">Other Special Considerations:</td> </tr> <tr> <td colspan="2">_____</td> </tr> <tr> <td colspan="2">_____</td> </tr> <tr> <td colspan="2">_____</td> </tr> </table>		Crane Operator:	Name: _____	Signalperson Assigned:	Name: _____	Communication Method:	_____	Crane Inspected by Operator?	Yes _____ No _____	Rigging Inspected?	Yes _____ No _____	All Permits Obtained?	Yes _____ No _____	Wind OK?	Yes _____ No _____	Are There Power Lines?	Yes _____ No _____	Are The Weather Conditions OK?	Yes _____ No _____	Is Operators Certification Card Current?	Yes _____ No _____	Is Area OK for Entry and Exit of Jobsite?	Yes _____ No _____	Has a Pre-Lift Meeting between Crane Operator, Signalperson, Supervisor, and Any and All Other Persons occurred? Yes _____ No _____		Other Special Considerations:		_____		_____		_____	
Crane Operator:	Name: _____																																
Signalperson Assigned:	Name: _____																																
Communication Method:	_____																																
Crane Inspected by Operator?	Yes _____ No _____																																
Rigging Inspected?	Yes _____ No _____																																
All Permits Obtained?	Yes _____ No _____																																
Wind OK?	Yes _____ No _____																																
Are There Power Lines?	Yes _____ No _____																																
Are The Weather Conditions OK?	Yes _____ No _____																																
Is Operators Certification Card Current?	Yes _____ No _____																																
Is Area OK for Entry and Exit of Jobsite?	Yes _____ No _____																																
Has a Pre-Lift Meeting between Crane Operator, Signalperson, Supervisor, and Any and All Other Persons occurred? Yes _____ No _____																																	
Other Special Considerations:																																	

Signatures																																	
Engineer:	Name _____	Signature _____	Date _____																														
Supervisor:	Name _____	Signature _____	Date _____																														
Operator:	Name _____	Signature _____	Date _____																														
Teck Rep:	Name _____	Signature _____	Date _____																														

3.09b Critical Lift Plan

Date: _____

Location of Lift: _____

Description of Object to Be Raised: _____

Lifting Equipment Make: _____ Model: _____

Lifting Equipment Rated Capacity: _____ tons

Load

Total Weight of Lift: _____ pounds or _____ tons

Weight Of Rigging: _____ pounds

How Was Weight of Object Obtained? _____

(If lift is an existing item, weight calculations will include modifications, liquid remaining, insulation, sludge, scale, sediment, etc.)

Set Up

Boom Angle: _____ degrees

Distance From Pin: _____ feet

Crane Capacity at Set-up Configuration: _____ pounds or _____ tons

Load Including Rigging is What Percent of Rated Crane Capacity _____ %

Equipment and Lift Relationship

Maximum Operating Radius _____ feet

Planned Operating Radius _____ feet

Allowable Load (from load chart) _____ tons or _____ pounds

Ratio of Lift to Allowable Load _____ percent

Clearance between Boom and Load _____ feet _____ inches

Clearance to Existing Facilities _____ feet

Clearance to Energized Power Lines _____ feet

Ground Stability

Surface Type _____ bare ground _____ asphalt _____ concrete

Surface Bearing Capacity _____ tons per square foot

Type of Support Used _____ mats _____ cribbing

(Mats will be used on all surfaces; additional cribbing may be required)

Size and Number of Supports _____

Do Underground Installations Need Special Treatment _____ yes _____ no

Weather

Lift **Will Not** Proceed if Wind Exceeds _____ mph
Precipitation Type _____ rain _____ snow _____ none
Cloud Type overcast _____ clear _____
Lift Conducted _____ during daylight _____ with artificial light

Lift Area Restriction

Area Barricaded _____ yes _____ no
Equipment swing Radius Barricaded _____ yes _____ no
Warning Signs Required _____ yes _____ no
Unnecessary Personnel Removed from Area _____ yes _____ no
Energized Lines Isolated _____ yes _____ no

Communication

Operator View is Unobstructed (pick to set) _____ yes _____ no
Communication Used _____ hand signals _____ radio _____ other
Explain Other _____

Pre-lift Safety Meeting

Type of Critical Lift

_____ Load Exceeds 75% of Load Chart Capacity for Lifting Equipment
_____ Two or More Cranes/Booms Required for Lift
_____ Specialized Hoisting Rigging Equipment Used
_____ Load Suspended or Moved Over Loaded Lines
_____ Loads over Critical Equipment, Occupied work Area, Water, Powerlines
_____ Other (specify) _____

Items Discussed _____

Signatures

Crane Operator: _____
Crane Rigger: _____
Crane Oiler: _____
Signal Person: _____
Crane Inspected By: _____
Rigging Inspected By: _____
Client Representative: _____
Designated Lift Leader: _____
Supervisor: _____

4.01 Hazard Communication - HAZCOM

Introduction

Red Dog Operations has developed a Hazard Communication Program to enhance our employee's health and safety and to also protect the environment.

As a company, we intend to provide information about chemical hazards and the control of hazards via our comprehensive Hazard Communication Program which includes container labeling, Safety Data Sheets (SDS), and training.

The following outlines how we will accomplish this program:

- Container labeling
- Safety Data Sheets (SDS)
- Employee training and information
- Chemical listing
- Hazardous non-routine tasks
- Chemicals in unlabeled pipes
- Informing Contractors
- Hazardous waste information
- Spill reporting

Container Labeling

It is the policy of the company that no container of hazardous chemicals will be released for use until the following label information is verified:

- Containers are clearly labeled as to the contents
- Appropriate hazard warnings are noted
- The name and address of the manufacturer are listed

To further ensure employees are aware of the chemical hazards of materials used in their work areas, supervisors will ensure all secondary containers are labeled.

Safety Data Sheets (SDS)

Safety Data Sheets for hazardous chemicals to which employees may be exposed can be found using the SDS Web Service found on the Red Dog Operations internet home page "Rover" under Applications. Supervisors shall ensure all employees have access to a computer, and/or are trained on how to access the SDS Web Service and how to look up a Safety Data Sheet.

Materials Management will maintain the SDS Web Service as new information is obtained.



Safety Data Sheet



SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

Chevron Ultra-Duty Grease EP NLGI 0, 1, 2

Product Use: Grease
Product Number: 20811, 20812, 20813
Company Identification:
Chevron Products Company
a division of Chevron U.S.A. Inc.
6001 Badollet Court
San Ramon, CA 94583
United States of America
www.chevron.com

Transportation Emergency Response
CHEMTREC: 800-424-9300 or (714) 671-9887
Health Emergency:
Chevron Emergency Information Center: Located in the USA, international calls accepted: 800-351-2277 or (916) 281-0025
Product Information:
email: subinfo@chevron.com
Product Information: 1-800-852-2280, 1-800-852-2280@chevron.com

SECTION 2: HAZARD IDENTIFICATION

CLASSIFICATION: Acute aquatic toxicity Category 2, Chronic aquatic toxicity Category 2

Environmental Hazards: Hazards to aquatic life with long-term effects.

Revision Number: 0 1 of 1 Chevron Ultra-Duty Grease EP NLGI 0, 1, 2
Revision Date: June 10, 2016 SDS 4191

Did you know that you can access any Safety Data Sheet (SDS) for hazardous materials and chemicals that we have on-site on Rover? Did you ever wonder how you would get access to an SDS in the event of a network outage or if the internet were down? Well your questions have been answered. Mat-Man in cooperation with the IS department have downloaded every single SDS onto a portable hard drive. That portable hard drive is now located in the Control Room. Once every quarter, we will do another download to ensure the most current and up to date SDS' are available for your use. Because you have the **"Right to Know"**!

Employee Training and Information

Employees will receive Hazard Communication Awareness during MSHA training. More specific training regarding Hazard Communication will be given prior to the job task being performed, and new employees will be given a comprehensive health and safety orientation on the following:

- An overall view of the requirements contained in 30 CFR, Part 47, Hazard Communication (HAZCOM)
- Review of the chemicals present in their work place operations
- Location and availability of our written HAZCOM Program
- Methods and observation techniques used to determine the presence or release of hazardous chemicals in the work area
- How to lessen or prevent exposure to these hazardous chemicals through usage of control, work practices, and personal protective equipment
- Steps to lessen or prevent exposure to these chemicals
- Emergency procedures to follow if our employees are exposed to these chemicals
- How to read labels and review SDS to obtain appropriate hazard information

It is critically important all of our employees understand the training. If you have additional questions, please contact your supervisor.

When new chemicals are introduced, the Safety & Health Team will be notified by Materials Management, as well as the department who will be the end users of the chemical. The SDS

will be reviewed, and the crews will be informed as to the hazards associated to the new material.

Chemical Listing

A list of known hazardous chemicals used in the work place or transported on barges has been compiled. The chemical list is maintained by the Environmental Department.

Hazardous Non-Routine Tasks

Periodically, employees may be required to perform hazardous non-routine tasks. Prior to starting work on such projects, each affected employee will be given information by their supervisor about hazards to which they may be exposed during such an activity.

This information will include:

- Specific chemical hazards
- Safety measures which must be utilized such as proper ventilation, PPE, respirators, the presence of another employee, and emergency response procedures.

Chemicals in Unlabeled Pipes

Before starting work on unlabeled pipes, the Supervisor will make every effort to provide the following information:

- Determine what chemical is in the pipe
- Communicate the potential hazards
- Provide guidance about the safety precautions that will be taken

Informing Contractors

To ensure our Contractors work safely while on the property, it is the responsibility of the Teck Representative (the Individual or Group responsible for bringing the contractor onsite) to provide the following information:

- Hazardous chemicals to which they may be exposed while on the job site
- Precautions the employees may take to lessen the possibility of exposure by usage of appropriate protective measures

Hazardous Waste Information

Specific Waste Issues

- Proper receptacles for burnable / non-burnable waste
- Waste may be contaminated with concentrates if not washed properly
- If you are unsure, contact your supervisor or the Environmental Department.

Spill Reporting

All spills, of any size MUST be reported to your Supervisor and to the Environmental Department.

To report a spill, call the Spill Reporting Line 45367.

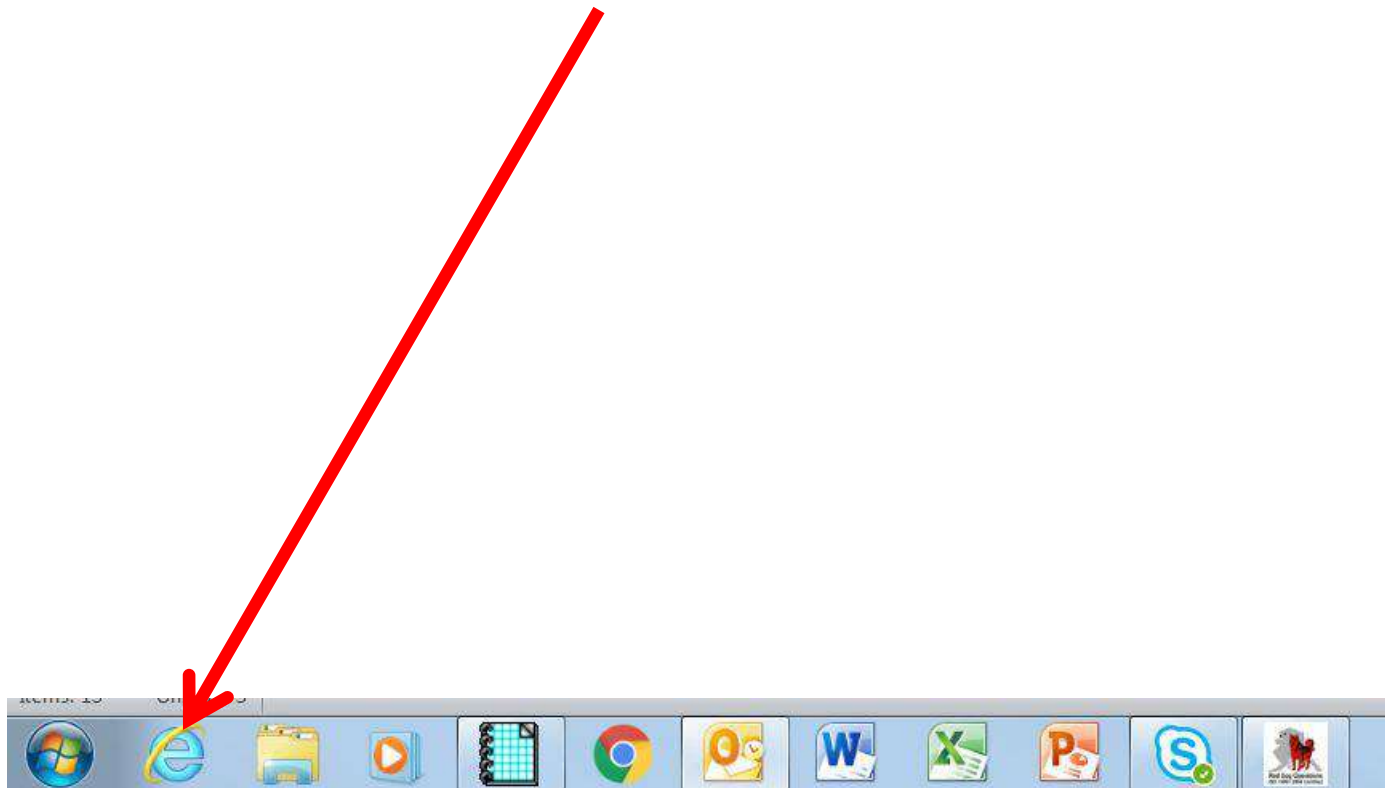


4.02 Quick Guide on How to Search for a SDS



First Step

Select Explorer to get to the Red Dog Rover
That is usually the second item on the bottom of your
computer screen



Red Dog Rover



RED DOG OPERATIONS

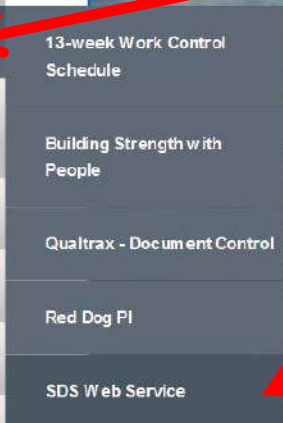
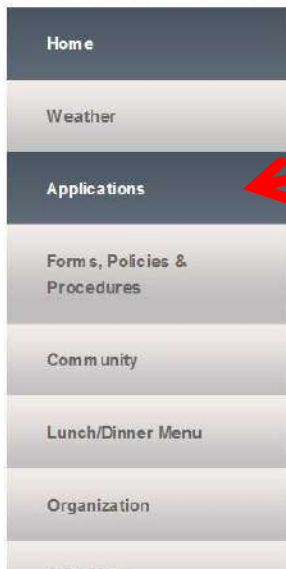


You should get to this screen, once you open explorer

Going to the SDS Application



RED DOG OPERATIONS



Click on
Applications
and scroll
slightly to the
right and down
to the SDS Web
Service

The SDS Application

Home - Red Dog VIP2 - Pr... Team Teck Community Gi... Red Dog Aviation Camera... AAWU - Alaska Aviation ...

Teck Teck Alaska Incorporated

Home **SDS** Inventory Report Center Help

SDS

Search for

Supply Code ▼ contains ▼ ✕

< choose a criterion > ▼

Search **Show All** [Simple Search](#) [Customize this search](#)

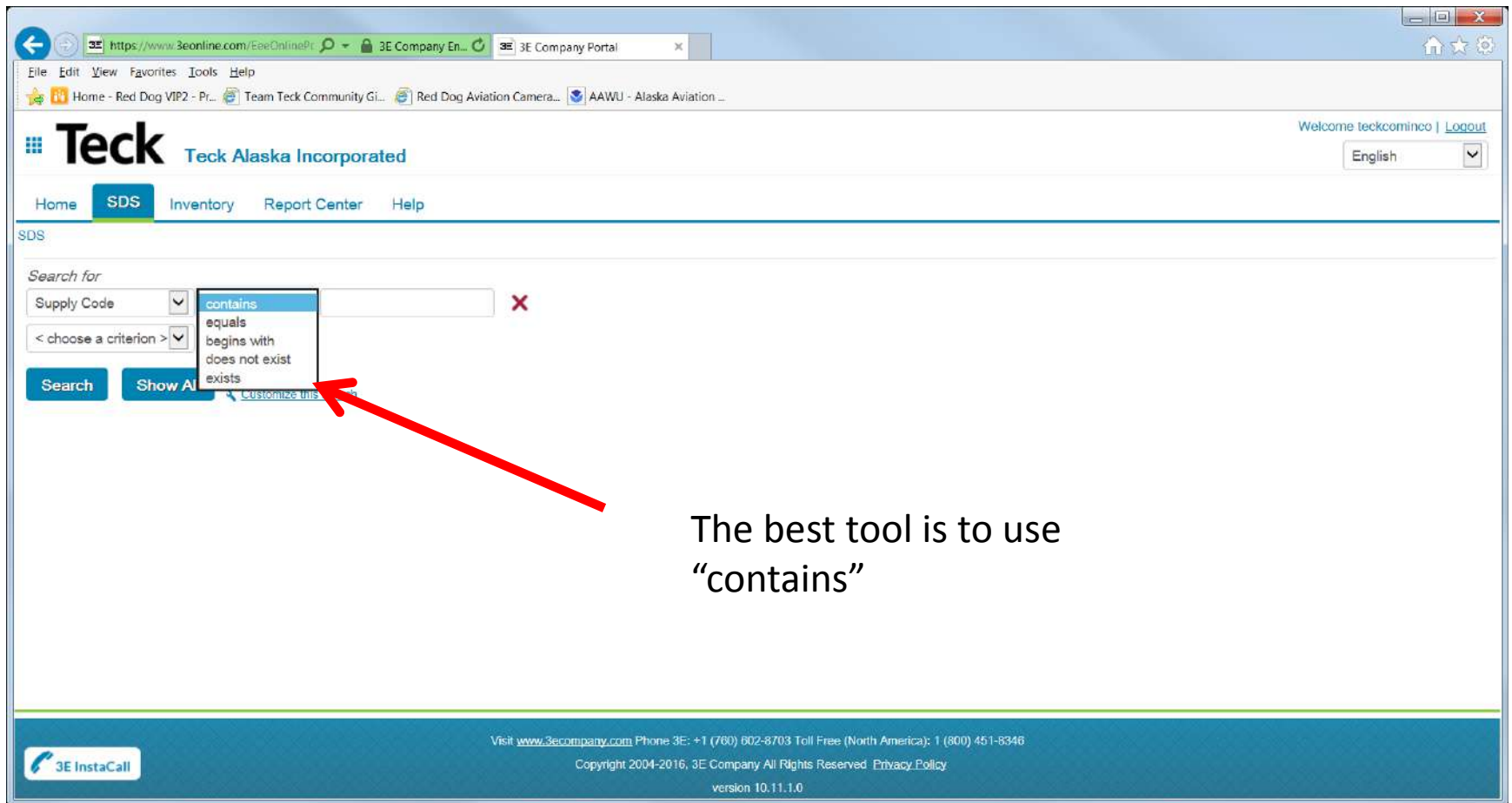
This is the next screen you should see

Finding a SDS

The screenshot shows the Teck Alaska Incorporated website. The browser address bar displays <https://www.3eonline.com/EeeOnlinePr...>. The page header includes the Teck logo and "Teck Alaska Incorporated". A navigation bar contains links for Home, SDS, Inventory, Report Center, and Help. The SDS section is active. A search form is visible with a dropdown menu for criteria. The dropdown menu is open, showing options: "< choose a criterion >", "Supply Code", "Manufacturer Name", "Manufacturer Part #", "Product Name", and "Any Custom Value". A red arrow points to the "Supply Code" option. The search form also includes a "contains" dropdown, a text input field, and a red "X" button. Below the search form are links for "Simple Search" and "Customize this search". The footer contains contact information: "Visit www.3ecompany.com Phone 3E: +1 (760) 602-8703 Toll Free (North America): 1 (800) 451-8346", "Copyright 2004-2016, 3E Company All Rights Reserved Privacy Policy", and "version 10.11.1.0".

You can search using the supply code, the manufacturer name, etc.

How to search



The screenshot displays the 3E Company Portal interface. At the top, the browser address bar shows the URL <https://www.3eonline.com/EeeOnlinePr...>. The page header includes the Teck logo and "Teck Alaska Incorporated". A navigation bar contains links for Home, SDS, Inventory, Report Center, and Help. The SDS section is active. Below the navigation bar, there is a search area with the label "Search for". A dropdown menu is open, showing search criteria options: "contains", "equals", "begins with", "does not exist", and "exists". A red arrow points to the "contains" option. The "Search" button is visible below the dropdown. The footer contains contact information for 3E InstaCall, phone numbers, and copyright details.

Search for

Supply Code

< choose a criterion >

contains
equals
begins with
does not exist
exists

Search

Show All

3E InstaCall

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version 10.11.1.0

The best tool is to use
"contains"

Lets search for: Potassium Ethyl Xanthate

The screenshot shows the Teck Alaska Incorporated SDS search interface. The browser address bar displays <https://www.3eonline.com/EeeOnlinePr...>. The page header includes the Teck logo and "Teck Alaska Incorporated". The navigation menu has links for Home, SDS, Inventory, Report Center, and Help. The SDS section is active, showing a search form with the following elements:

- Search for:** A dropdown menu set to "Product Name".
- Operator:** A dropdown menu set to "contains".
- Search Term:** A text input field containing "xanthate".
- Buttons:** "Search" and "Show All".
- Links:** "Simple Search" and "Customize this search".

Red arrows point from the text instructions to the search form elements:

- One arrow points to the "xanthate" text input field.
- Another arrow points to the "contains" dropdown menu.
- A third arrow points to the "Search" button.

Type Xanthate
Searching for under Product Name
containing "xanthate"
Press Search

At the bottom of the page, there is a footer with contact information: "Visit www.3ecompany.com Phone 3E: +1 (760) 602-8703 Toll Free (North America): 1 (800) 451-8346". It also includes a copyright notice: "Copyright 2004-2016, 3E Company All Rights Reserved Privacy Policy" and the version number "version 10.11.1.0".

Search Results

Teck Alaska Incorporated

Home SDS Inventory Report Center Help

Search for

Product Name contains xanthate

< choose a criterion >

Search Show All

Simple Search Customize this search

Items per page 15

Product Name	Manufacturer Name	Mfg Part #	Supply Code
Aero 325 Xanthate	Cytec Engineered Materials Inc.		717390
Potassium Amyl Xanthate 85%	Quadra Chemicals Ltd.	Q03082	717884
Potassium Ethyl Xanthate	Aschem International Inc.		152385, 127421, 64838
Sodium Isobutyl Xanthate	Aschem International Inc.		153141, 107549
Sodium Isobutyl Xanthate 90%	Quadra Chemicals Ltd.	Q02762	107549

Page 1 of 1 (5 items)

Visit www.3ecompany.com Phone 3E: +1 (760) 802-8703 Toll Free (North America): 1 (800) 451-8348

Since there are many types of xanthate, you will get many results, in this case we are looking for Potassium Ethyl Xanthate

To view the SDS, click on the paper icon

Search Results

The following small window will appear. You can then email it to someone or yourself, or view it on the screen where you can print it

The screenshot shows the Teck Alaska Incorporated 3E Company Portal. The search results for 'xanthate' are displayed in a table. A modal window titled 'Product Documents' is open, showing options for 'Potassium Ethyl Xanthate'. A red arrow points to the 'View Email Fax' button in the modal window.

Search Results Table:

Product Name	Manufacturer Name	Mfg Part #	Supply Code
Aero 325 Xanthate	Cytec Engineered Materials Inc.		717390
Potassium Amyl Xanthate 85%	Quadra Chemicals Ltd.	Q03082	717884
Potassium Ethyl Xanthate	Aschem International Inc.		152385, 127421, 64838

Product Documents Modal Window:

Action	Language	Format	Revision Date	Country	e-SDS
View Email Fax	English	SDS	Nov 02, 2005	USA	

Visit www.3ecompany.com Phone 3E: +1 (780) 602-8703 Toll Free (North America): 1 (800) 451-8346

Email Option

Email SDS - Internet Explorer

https://www.3eonline.com/EeeOnlinePortal/DesktopModules/M 3E Company Environmental, ...

Send by Email

*** Required Field**

Email To: *

Separate each email address with a comma (,) to send to multiple addresses.

Your Name: *

Your Email:

Subject:

Message:

Send

125%


You can email to someone else or yourself by filling out the correct fields

View Option

Browser address bar: <https://3eonline.com/ImageServer/New> Identified by G... 3E Company Portal 3eonline.com


File Edit Go to Favorites Help

Home - Red Dog VIP2 - Pr... Team Teck Community Gi... Red Dog Aviation Camera... AAWU - Alaska Aviation ...

 **ASLCHEM INTERNATIONAL INC.**

Material Safety Data Sheet

Product: Potassium Ethyl Xanthate
Cas No.: 140-89-6
MSDS No.: ASL-9088, Revised Date: November 2, 2005

NFPA Rating: 

For Emergency Assistance, please call CANUTEC (613) 996-6666 COLLECT

NAAV = Not Available N/A = Not Applicable

Section 1: Product and Company Identification

Trade Name / Chemical Name: Potassium Ethyl Xanthate
Synonyms: 25-AminoXanthateS-ethyl Ester, Potassium S-ethylthiocarbamate Acid, Potassium S-ethylthiocarbamate, Potassium Ethyl Xanthoglycolate
Molecular Formula: C3H5K2O2S2
Chemical Family: Potassium salt of Dithiocarbamate Acid Ester
Company Identification:
ASL CHEM INTERNATIONAL INC.
4610-4671 Shell Road,
Richmond, B.C. Canada V6X 3Z2
For Product Information: (604) 273-8802
For Emergency Assistance, please call CANUTEC (613) 996-6666 COLLECT.

Section 2: Composition / Information on Ingot lots

Hazardous Ingredients	%	ACGHIH L.V.	OSHA PEL	CAS#	Route, Specimen	LD50
Potassium Ethyl Xanthate Up to 50		N/A	N/A	140-89-6		N/A

Section 3: Hazards Identification

Route Of Entry-Inhalation: Yes
Route Of Entry-Skin: Yes
Route Of Entry-Ingestion: Yes

Signs, Symptoms and Effects of Exposure:

Acute:
Inhalation: Xanthate dust may cause irritation of respiratory tract. Vapor of the decomposition product carbon disulphide can cause severe disturbance of mood and behavior, including excitation, anger and violent dreams. High concentrations of vapour could cause death.
Eyes: Xanthate solution may cause mild to severe eye irritation. Acid dust may cause eye irritation.
Skin: Xanthate solution and xanthate dust may cause mild to severe skin irritation.
Ingestion: Ingestion of Xanthate salt is not a likely occupational occurrence. It may cause irritation to the ingestion of carbon disulphide including vomiting, dizziness and headache. It may burn the respiratory epithelium.
Chronic: Xanthate salt may cause irritation of the respiratory tract. Xanthate salt decomposes to produce carbon disulphide. This may result in effects on the central and peripheral nervous system, the cardiovascular system and on the gastrointestinal system.
Potential for accumulation: Potassium salt does not accumulate in the body. Xanthates are reported to be excreted. As carbon disulphide in exhaled air in the form of breath.

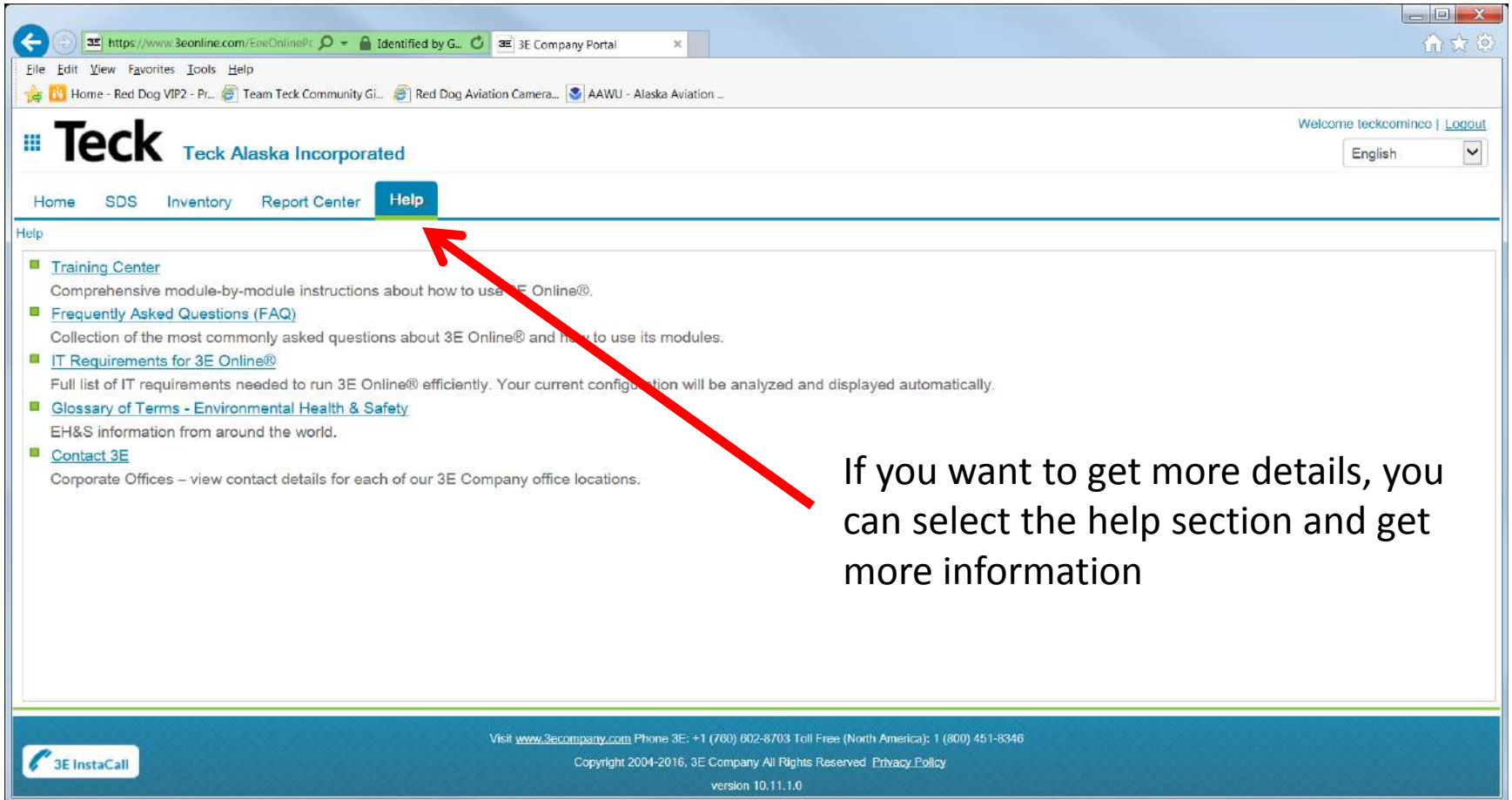
4610-4671 Shell Road, Richmond, B.C., Canada V6X 3Z2 • TEL: (604) 273-8802 / (273-8803) • FAX: (604) 273-8801
E-MAIL: info@aslchem.com • www.aslchem.com

You can review on the screen or if you move you mouse to the bottom

View Option

The screenshot shows a web browser window with the address bar displaying <https://3eonline.com/ImageServer/New...>. The browser tabs include '3E Company Portal' and '3eonline.com'. The main content area displays the 'Material Safety Data Sheet' for 'Potassium Ethyl Xanthate' from 'ASLCHEM INTERNATIONAL INC.'. The document includes sections for 'Product Identification', 'Composition/Information on Ingredients', and 'Hazards Identification'. A red arrow points to the 'Print' icon in the browser's address bar area.

Help



The screenshot shows a web browser window with the URL <https://www.3eonline.com/EeeOnlinePr...>. The page is titled "Teck Alaska Incorporated" and includes a navigation bar with links: Home, SDS, Inventory, Report Center, and Help. The Help link is highlighted with a red arrow. Below the navigation bar, the Help section is expanded, showing a list of links: Training Center, Frequently Asked Questions (FAQ), IT Requirements for 3E Online®, Glossary of Terms - Environmental Health & Safety, and Contact 3E. Each link has a brief description of its content. At the bottom of the page, there is a footer with contact information and copyright details.

Teck Alaska Incorporated

Welcome teckcominco | [Logout](#)

English

Home SDS Inventory Report Center **Help**

Help

- [Training Center](#)
Comprehensive module-by-module instructions about how to use 3E Online®.
- [Frequently Asked Questions \(FAQ\)](#)
Collection of the most commonly asked questions about 3E Online® and how to use its modules.
- [IT Requirements for 3E Online®](#)
Full list of IT requirements needed to run 3E Online® efficiently. Your current configuration will be analyzed and displayed automatically.
- [Glossary of Terms - Environmental Health & Safety](#)
EH&S information from around the world.
- [Contact 3E](#)
Corporate Offices – view contact details for each of our 3E Company office locations.

3E InstaCall

Visit www.3ecompany.com Phone 3E: +1 (760) 602-8703 Toll Free (North America): 1 (800) 451-8346

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version 10.11.1.0

If you want to get more details, you can select the help section and get more information

4.02a Safety Share – Safety Data Sheets (SDS)

Safety Data Sheets – Formerly known as Material Safety Data Sheets (MSDS)

Operators must have an SDS for each hazardous chemical they produce or use.

The SDS may be in any medium, such as paper or electronic.

The SDS must be available and easily accessible to the Operator(s) who is producing, using, or working around the hazardous chemical.

For each hazardous chemical produced at the mine, the Operator must prepare an SDS, and update it with significant, new information about the chemical's hazards or protective measures within three months of becoming aware of this information.

For each hazardous chemical brought to the mine, the Operator must rely on the SDS received from the chemical manufacturer or supplier, develop their own SDS, or obtain one from another source.

The Operator is responsible for replacing an outdated SDS upon receipt of an updated revision. The Operator is responsible for obtaining an accurate SDS as soon as possible after becoming aware of an inaccuracy.

Refer to 30 CFR, Subpart F – Material Safety Data Sheets (MSDS), 47.51.

Supervisors, please confirm the SDS are current, available, and easily accessible to your crews in their work areas. Please ensure your crew understands how to read and utilize the SDS.

Let's work together to make Red Dog Operations a safe place to live and work.

Live the Vision.
"Everyone Going Home Safe and Healthy Every Day"



4.03 Hygiene Program

The goal of the Industrial Hygiene Program is the prevention of worker's exposure to harmful agents in the workplace. Key elements are; anticipation, recognition, evaluation, and control of workplace health hazards.

Key concepts to remember for protection of your health and wellbeing include:

- Wash thoroughly before eating.
- Do not use tobacco products with dirty hands.

Tobacco products are not allowed in the milling and concentrates areas. Smoking is only allowed in designated smoking areas.

Note: (Refer to the RDO Smoking Policy)

Wash thoroughly and dry the skin completely to eliminate skin rashes, irritations and infections. Personal cleanliness is extremely important. Many skin irritations result from careless or incomplete washing or bathing.

Drink water that is specifically supplied and marked for drinking purposes. Stream or river water may look clear and clean, but may be unsafe to drink.

Do not enter lunchrooms with a hard hat, coveralls, work boots, or any clothing which has been exposed to the work environment or may be contaminated.

All employees shall wash hands, arms, and faces prior to eating in the designated lunch room areas.

In the Mill or Services Complex areas, consumption of food or beverages is not allowed in work areas with the exception of offices and approved break rooms. Discuss with your Supervisor whether your break room area is approved.

Showers are located in both the mill and mine locker rooms. All personnel coming in contact with the ore dust or reagents are required to clean-up, prior to entering the accommodations complex.

Dirty work clothes will not be taken into the accommodations complexes. These clothes are to be put into designated receptacles, located in the locker rooms. They will be picked up for cleaning by NANA Management Services and returned.

Employees will keep their respirators clean and stored properly.

Note: (Refer to the RDO Lead Hygiene Program).

4.04 Employee Safety & Health Standards for Lead Exposure

Red Dog Operations is primarily a zinc/lead mine producing sulfide minerals containing lead, which is known to be toxic. To ensure that there is no overexposure to lead and to ensure that no one's health is placed at risk; Teck Alaska has established and has in place a Blood Lead Biological Monitoring Program for personnel that work in areas that meet or exceed OSHA action levels.

Biological Monitoring Frequencies

The frequency of monitoring will be dependent upon previous blood lead level history. The higher the blood lead levels, the more frequent the worker will be monitored. Personnel with elevated blood lead levels will receive counseling and guidance on hygiene best practices and procedures to lower their blood lead levels. Our overall goal is to keep personnel lead exposures as low as possible through engineering controls, administrative controls, PPE use and proper hygiene practices.

Personnel that work in areas that meet OSHA action levels will be monitored every 6 months at a minimum.

Those employees with blood lead levels greater than 20 mcg/dl (micrograms per deciliter), shall be monitored every 3 months. This identifies who needs best hygiene practices counseling or if an over exposure exists.

An employee with a blood lead level greater than 25 mcg/dl will be monitored every month, the importance of proper respirator usage and the need for best practices regarding personal hygiene will be reinforced by the employee's Supervisor or by the Safety and Health department. The employee will review the personal hygiene and respirator use, and agree to lower their blood lead level. Documentation of counseling will be signed by the employee agreeing to adhere to the plan and will be retained in the employee's personnel file.

An employee with a blood lead level above 40 mcg/dl will be removed from their normal work area to a lower lead exposure area until blood lead levels are 25 mcg/dl or less. A Medical Removal Plan document will be retained in the employee's personnel file.

Medical Removal Protection

Medical Removal Protection (MRP) permits Teck to temporarily remove an employee from a high exposure area if blood lead levels 40mcg/dl. Under the Teck established MRP if you comply with the plan, you are entitled to protection of your earnings, service, benefits, and your regular assigned job back when your blood levels return to an acceptable level.

NOTE: Failure to comply with the MRP can be considered grounds for discipline up to and including termination.

Medical Removal is a last resort. An employee may have to be moved to a job or a shift that is not desirable to the employee. To avoid medical removal use common sense work habits and

good personal hygiene to avoid overexposure. The MRP form is found at the end of this document

Pregnant Employees

OSHA Lead standards recommend that pregnant employees maintain a blood Lead level of < 30 mcg/dL. However, in the interests of further protecting our Employees, Teck Alaska is recommending that Blood lead levels not exceed 10 mcg/dL.

- Pregnant employees are encouraged to report their pregnancy to the Company as soon as possible, in order to ensure a safe work environment.
- Pregnant employees are encouraged to consult with their Primary Health Care Provider as soon as possible, to discuss their current work environment, and possible lead exposure risks.
- Pregnant employees will report to the Red Dog Operations Medical Staff (Clinic PA's) for counseling and advice. A written record of this counseling will be maintained in the Employee's Medical Record and can be found at the end of this document.
- Pregnant employees will be considered for increased lead surveillance monitoring, as needed. This will be determined on a case-by-case basis, dependent on several factors, to include current risks and historic lead levels.
- Pregnant employees may be considered for work reassignment, also on a case-by-case basis, dependent on current risks and historic lead levels.

Record Keeping

Teck is required to keep your medical records on file for 40 years or for at least 20 years after your termination of employment, whichever is longer. These records must show your name, results of any blood lead tests or physical examinations and any opinions written by a physician.

If you have been temporarily removed from a job under our MRP, this must also be kept on file and must include, in addition to your name and PIN number, the dates of removal, return, and the reason for removal.

After your blood sample has been taken and sent to the lab for testing, the results are usually received within 2 weeks and recorded in your medical records. You have the right to see these records by contacting the Red Dog Medical Clinic. Any questions arising from your results should be asked at that time.

Permissible Exposure Limit (PEL)

While you are working in a lead-related industry, you are being exposed to lead in the form of dust and fumes. This airborne lead presents a threat to your health and for your protection, OSHA has set a standard of 50 micrograms of lead per cubic meter of air (50 mcg/m³) averaged over an eight-hour workday as the highest level of air lead to which you can be exposed. For a 12 hour workday the standard would be 33 micrograms of lead per cubic meter of air (33mcg/m³). This is called the Permissible Exposure Limit, or PEL.

The PEL is an average, so you may be exposed to airborne lead which exceeds 50mcg/m³ for short periods during the day, just as long as your average exposure for an eight hour work day does not exceed the limit.

$$70 \text{ mcg/m}^3 \text{ (for 4 hours)} + 30 \text{ mcg/m}^3 \text{ (for 4 hours)} = 50 \text{ mcg/m}^3 \text{ (for 8 hours)}.$$

What happens when you work more than eight hours? In that case you can use the following formula to determine if you are exceeding the PEL.

PEL =

$$\frac{400}{\text{Total Number of Hours Worked}}$$

In other words, let's assume you have worked two hours overtime, that would make your total hours worked that day equal to ten (your regular eight plus two hours overtime). Apply the formula:

$$\frac{400}{10} = 40$$

That means your PEL for that particular day could not exceed 40 mcg/m³. Anything over that total would be in violation of the standard.

Air Monitoring

To determine if you are being exposed to levels in excess of the PEL, you need to know what the exposure is at each work place. In order to learn this, OSHA requires employers to measure the exposure of a representative number of employees who probably have the highest risk. The measurement must be done for a full shift, by use of the personal air sampler, and without regard to respirators.

If the testing reveals lead concentrations at or above the Action Level of 30 mcg/m³, the following OSHA regulations will be implemented:

- Teck Alaska must establish an Air Monitoring Program to determine your exposure at each job classification.
- The monitoring must be repeated every six months.
- Teck Alaska must provide medical surveillance (blood lead test).
- Teck Alaska must provide a training program.

During the Initial Determination or follow-up Air Monitoring Program, you may be required to wear a personal particulate dosimeter for a full shift. This is the most effective way to measure exposures to lead particulate.

If the Initial Determination reveals air lead exposures lower than 30 mcg/m³, following a written report no further monitoring is required unless the production, process, or personnel change occurs.

If the Initial Determination reveals air lead exposures at or greater than the PEL, OSHA requires:

- Teck conduct air monitoring every three months.
- Teck may require you to use a respirator to reduce your lead exposure below the PEL.
- Teck must, however, use engineering or administrative controls to reduce lead exposure below 50mcg/m³.
- Teck may implement other elements of the Standard regarding Hygiene, Housekeeping, Respirator Usage, and Protective Work clothing.

Your Rights Concerning Monitoring

Under the OSHA Final Standard for Lead you are entitled to:

- An explanation of the monitoring procedures.
- Observe the monitoring (you or a representative).
- The opportunity to record results or to receive a copy of the results.
- A statement of corrective action if your exposure exceeds the PEL.

Your Responsibilities Concerning Monitoring

In order to best protect your own health, you ought to:

- participate constructively in the air monitoring program by wearing a personal air sampler
- be aware of your personal exposure level
- follow common sense procedures to reduce your exposure
- make constructive suggestions for reducing air lead levels

Respirators

Most of the lead that enters your body enters through the lungs. It is inhaled as dust or fumes which are produced during operating or maintenance processes. The best way to solve this problem would be to eliminate lead from the air entirely. The next best thing to do is to keep it from entering your lungs. That is why, even though they are uncomfortable to wear, respirators may be required for certain jobs. They can help to protect your health; of course, they must be worn, and worn properly.

Teck's Responsibility

Under the OSHA Standard, Teck must;

- Provide a respirator for you whenever your exposure exceeds the PEL.
- Provide the respirator at no cost to you.
- Provide a respirator if you request one, even if the air lead level is below the PEL.
- Select an MSHA or NIOSH approved respirator for your use.

In addition to providing a respirator for your use, Teck is obliged to:

- start a respiratory protection program
- ensure that your respirator face-piece fits properly
- provide the opportunity for you to change filters whenever necessary
- permit you to leave the work area to wash your face and your respirator face-piece whenever necessary to prevent skin irritation

Employees Responsibility

In order for Teck to meet these requirements and for your own good health, you must cooperate by carefully and seriously following the rules for the proper use of respirators.

Respirators are made for different jobs. Make sure that the one you select or are issued is suitable for the job you are doing. Look for the NIOSH or MSHA approval. You may be issued a respirator that is suitable for higher concentrations of air lead then you will be exposed to but, you should not accept one that is not sufficient for your level of exposure.

Fit Testing Your Respirator

In order for a respirator to work well, it has to fit well. Everybody's face is different and all respirators are not alike. You will have to "fit test" different respirators until you find one that works on your face. If the respirator doesn't fit properly, it will "leak" dust and fumes around the edges.

Using the Respirator

Now that you have selected the proper respirator, you must use it properly. First of all, you must wear it whenever the job you are doing exposes you to lead in excess of the PEL, or whenever special circumstances require it. Secondly, you must never borrow a respirator. It is both unhygienic and self-defeating. Both straps must be securely fastened around your head, one strap below your ear and one above. Facial hair is not allowed to interfere with the seal or the valves of the respirator. There can be no facial hair between the sealing surface of the respirator and the face.

Caring For Your Respirator

Continual care of your respirator will insure that it is working to its best ability and also that it is clean and hygienically safe to wear. Change the pre-filter on a regular basis, or anytime that you notice difficulty inhaling. Clean the respirator and filter. This should be done at a special station designed for the task. In order to properly clean the respirator you should wash the face-piece, valves, filter holders, covers, and straps. If a respirator is assigned to several different people, it should also be washed in a disinfectant solution before being used again. The respirator should be rinsed in warm water and dried with a paper towel. Check for damage. While cleaning, you can look for worn or broken parts. If any part of the respirator is damaged, report the defect and do not use the respirator until it has been repaired. Store your respirator where it will not become contaminated. Plastic bags are very useful, or specially designed storage area.

Inability to Use a Respirator

If you have difficulty breathing during a fit test or while using a respirator, report this to your supervisor. You will be given a medical examination to determine whether or not you can wear a respirator. As a result of the examination, other forms of protection may be provided.

Personal Hygiene

What Can Be Done About It?

We are responsible for cleaning-up the work place, lowering blood leads, and keeping lead out of the Dog House.

There are some things Teck has to do to comply with the OSHA Standards. For example, we must use engineering controls to reduce air lead below 50 mcg/m³, but no amount of engineering can totally eliminate all the lead from the operation. So no matter what Teck does, it will be ineffective if you don't do your share. Let's look at what we can do together.

Work Habits

You have already been instructed in the selection, use and care of your respirator. You know how important it is to your health. So make sure that you always wear your respirator and care for it properly.

Clothing

If you are exposed to forms of lead that can cause skin or eye irritation, you are provided coveralls. Such clothing is provided to you in a clean and dry condition weekly or daily. We provide the clothing as well as cleaning, so make sure that you do not take any work clothes into the Dog House.

The best arrangement to avoid taking contaminated clothing into the Dog House is the dual locker room set-up with a shower between. In this situation, you change out of your work clothes in one locker room, shower and change into your leisure clothes in a second locker room, leaving all the lead contamination in the dry where it belongs.

If you wish to protect your fellow workers, it is of vital importance that you leave *all* contaminated clothing in the dry including work shoes. If you fail to change your clothing properly or to shower thoroughly, you will be defeating the purpose of Teck's efforts to help you, endangering your own health, and endangering the health of those whom you work with. It would be foolish to wear a respirator all day, and then go to the Dog House at night covered with lead dust.

Do

Use vacuum scrubbers to clean-up, or if that is not possible, wet down contaminated areas before cleaning up. Vacuum cleaning is best, but it is not always possible, especially in small areas around machinery. Dampen down dust before cleaning it up in these areas.

Wash your hands, arms and face before smoking, chewing, eating, and drinking. If you fail to do this, you will be putting lead dust directly in to your mouth. You wouldn't eat lead paint; why eat lead dust? Poor cleaning-up habits are one of the major causes of lead poisoning. Wash Up!

Don't

Eat, drink, smoke, or chew in a contaminated area. Bringing food into an area filled with lead dust will result in your direct ingestion of lead which has settled on your food, cup or cigarette and hands. This is always dangerous. Always eat, drink, or smoke in a separate, non-contaminated area.

Do

Leave all work clothes in the work place, and shower completely before going to the Dog House. You don't want to be responsible for your fellow worker's becoming ill from lead dust which you brought in to the living accommodations.

Don't

Put your hands in your mouth, bite your fingernails, or wipe your face on your sleeve while at work. During the work day, dust accumulates under nails, gloves and clothing. Make it a habit to rinse off with water rather than "wipe on" lead.

Do

Use the ventilation systems properly. Close all dampers on equipment not in use.

The following is the form used as a record of counseling:

RECORD OF EMPLOYEE BLOOD Pb COUNSELING

EMPLOYEE NAME _____ PIN _____

I have received my blood lead level which is _____ mcg/dl. (micrograms per deciliter)

Due to my current blood lead level, I have been counseled on the following protective measures and agree to adhere to the guidelines checked and discussed.

_____ Proper use of respirators.

_____ Areas of respirator protection required.

_____ Tobacco use of any kind.

_____ Food and drink in non-permitted areas.

_____ Personal Hygiene.

_____ Copy of the Blood Lead Policy.

_____ Other _____

I will make every effort to lower my current blood lead level following the checked guidelines and will have my level checked again on _____.

Signed: _____ Date: _____
Employee

Signed: _____ Date: _____
Safety and Health Representative

Cc: Personnel File
Employee
Department Supervisor
Employee Medical Record

TECK ALASKA, INCORPORATED
MEDICAL REMOVAL PLAN

NAME: _____ DATE: _____

Date removed from normal work area: _____

This form acknowledges my current blood level of _____ mcg/dl. (micrograms per deciliter).

I was counseled in the appropriate protective measures and personal hygiene on _____. I understand that I am being removed from my normal area of work until my level returns to the proper level. (less than or equal to 40mcg/dl)

My next blood lead level will be checked on _____. If at any time my level has dropped to the proper level, I will be medically cleared to return to my normal work area:

Date returned to normal work area: _____.

Signed: _____ Date: _____.
Employee

Signed: _____ Date: _____.
Safety and Health Representative

ORIGINAL: Personnel File
cc: Employee
Department Supervisor
Employee Medical Record

RECORD OF EMPLOYEE PREGNANCY AND LEAD EXPOSURE RISKS COUNSELING

This will serve as a record of employee counseling, regarding Pregnancy and Lead exposure risks at the Teck Alaska Inc., Red Dog Operations.

Employee Name _____ PIN _____

Employee Job _____

Employee Work Areas _____

Historic Lead Levels for Work Area: _____

Employee's Historic Lead Levels: _____

I have been advised that exposure to Lead can be a health risk to my Pregnancy, and that I need to diligently continue my protective measures and adhere to all guidelines as outlined in the Red Dog Operations lead exposure policies.

OSHA Lead standards recommend that pregnant employees maintain a blood Lead level of < 30 mcg/dL. However, in the interests of further protecting our Employees, Teck Alaska is recommending that Blood lead levels not exceed 10 mcg/dL.

To ensure that a safe lead level is being maintained, I have been advised that my Lead Surveillance (blood lead level monitoring) frequency will be increased to:

I have been advised to seek further evaluation by my Primary Health Care Provider for additional advice regarding my work environment and health risks, to ensure the continuation of a safe and healthy pregnancy.

I have also been advised that it is in my best interests that both my Supervisor and the HR Dept. be advised of my current Pregnancy, and with my Signature below, I am hereby consenting to have this medical information released to them.

Signed: _____ Date: _____
EMPLOYEE

Signed: _____ Date: _____
RED DOG OPERATIONS – MEDICAL STAFF

cc: Employee Medical Record

4.05 Exposure to Cadmium

Purpose and Scope

The purpose of this policy is to familiarize you with the hazards of cadmium and to communicate what you and Teck must do to provide a safe working environment. It is important you fully understand the material presented. If you do not understand or have any questions or concerns on the material covered in this booklet, please contact your supervisor or Safety and Health Department for more information or clarification.

Cadmium is noted as: A Probable Human Carcinogen. Your health can be adversely affected by overexposure to Cadmium. However, with an awareness and understanding of these effects, and by following the proper procedures for protecting yourself, Cadmium exposure can be controlled so that it will not become a health hazard. Employees exposed to action levels of cadmium will be enrolled in a cadmium surveillance program

Cadmium Monitoring

Participation in the Cadmium Monitoring Program is required to maintain a healthy safe work force. It is the responsibility of the Medical Clinic to monitor all Cadmium levels, keep all records and files, as well as ensuring that each individual is aware of their own results. All questions and requests for information and explanation should be made to the Medical Clinic.

Medical Surveillance

Employees in the Cadmium Monitoring Program will have their cadmium levels checked according to the following frequencies:

- Employees who work for 30 days or more (in a 12 month period), in areas that are at or above the “action level”, will be monitored for Cadmium. New workers assigned to areas or the Mill, Mine, or Port, that have been identified as being above the “action level”, will be initially checked when hired, and at least annually thereafter.
- Those employees who's last results were:
 - less than, or equal to 3(ug/g creatinine) (CdU) Cadmium in urine
 - less than or equal to 300(ug/g creatinine) (B2-M) macroglobulin
 - less than or equal to 5(ug/liter whole blood) (CdB) Cadmium in blood
 - will be tested annually and be given a medical examination biennially

- Those employees whos last results were:

- Greater than 3 ug/g (CdU), but less than 7 ug/g (CdU), and
- Greater than 300 ug/g (B2-M), but less than 750 ug/g (B2-M)
- Greater than 5 ug/l (CdB), but less than 10 ug/l (CdB)

Will be tested semiannual and be given a medical examination annually.

- Employees found to have the above levels will be scheduled to report to the Medical Clinic (along with their supervisor) and a Safety and Health Representative. The employee will review the Cadmium monitoring program, as well as Teck Alaska's Respirator Program. A counseling sheet will be signed by the employee agreeing to adhere to the plan, and acknowledgement of the conference.

- Those employees who's last results were:
 - Greater than 7 ug/g (CdU), and
 - Greater than 750 ug/g (B2-M), and
 - Greater than 10 ug/l (CdB)

Will be tested quarterly, and be given a medical examination semiannually.

- If an employee's (B2-M) B2-microglobulin level is greater than 750ug/g, and if one of the following: their (CdU) level is greater than 3 ug/g creatinine, or their (CdB) level is greater than 5 ug/liter whole blood, then they will be medically removed from their normal work area to an area of lower exposure to Cadmium. The Medical removal form will be placed in the employee's personnel file.

Counseling

Employees with elevated cadmium levels will receive counseling and additional training on the effects of cadmium and measures on how to minimize exposure.

Key Documents/Tools/References

29 CFR 1910.1027

4.06 Respiratory Protection

Respiratory protection equipment is required for protection against chemical, dust, and oxygen deficient atmospheres. Chemical and dust the protection is required when exposure exceeds recommended action levels or exposure limits. This program addresses the different types of equipment available, employee training responsibility, and the fit testing of a respirator which will provide the best possible employee protection. This program applies to all Red Dog employees and contractors.

OSHA and MSHA Requirements

OSHA and MSHA standards require that the use of respirators follow procedures designed to protect workers health. These include:

- Use of equipment approved by the National Institute of Occupational Safety & Health (NIOSH) and/or Mine Safety & Health Administration (MSHA).
- Train workers as to the need, use, care, and limitations of respirators, including instruction on how to fit and test the respirators.
- Written operating procedures governing selection and use:
- Monitoring of the overall program to assure respirators are being used safely and correctly.
- Medical screening of all employees who may wear a respirator prior to being fit tested to evaluate the employees physical ability to work while wearing a respirator.

Responsibilities

Red Dog Operations is responsible for maintaining an effective respiratory protection program. The employee and operational responsibilities are as follows:

Employee Responsibilities

- **Employees who may have to wear a respirator during their work shift shall be clean shaven to ensure proper fit and protection. This includes the use of loose-fitting PAPRs, tight-fitting half face respirators, full face respirators, and SCBAs.**
- The proper use, inspection, care, cleaning and storage of his/her assigned protective equipment in accordance with manufacturer's recommendations and the instructions and training received.
- Notify supervisors of any malfunction or if you are uncertain of which type of respirator or respirator cartridge to use.

- Assuring that an adequate respirator-to-face seal is achieved each time the respirator is worn by performing a positive and negative pressure check.

Red Dog Operations Responsibilities

- Ensure employees have access to the appropriate respiratory protection for their task which includes respirators and respirator cartridges.
- Provide assistance in determining when respiratory protection is required.
- Provide environmental monitoring of potentially harmful atmospheres.
- Provide training in selection, use, and maintenance of respiratory protection to all employees who may wear a respirator.

Respirator Selection

Different types of respiratory protection equipment are available to offer protection against various occupational respiratory hazards. The following factors should be considered in selecting a respirator.

- Nature of Hazard
- Extent of the Hazard
- Contaminant(s) Present
- Concentration of the Contaminant(s)
- Characteristic and Limitations of the Available Respirators
- Expected Activity of the Worker

Type of Respiratory Protection Equipment

Respirators fall into two broad categories: Air Purifying and Air Supplied. At Red Dog Operations the following types of respirators are available:

Air Purifying Respirators include:

- Half-face respirator
- Full face respirator
- Powered air-purifying respirator (PAPR)
- Welding PAPR

Air Supplied Respirators include:

- Self-Contained Breathing Apparatus (SCBA)
- Supplied Air breathing apparatus

Dust Respirators (including disposable masks)

Dust respirators (e.g. N-95, P-95) are not suitable protection for respirator required work. Dust respirators only provide 95% filtration of particulates, do not provide a sufficient face-to-respirator seal, and fit testing cannot be conducted to ensure a proper fit and effective respiratory protection. A dust respirator is not suitable protection for any chemical exposures.

Although a half-face respirator with P100 cartridges would be recommended, a dust respirator is considered acceptable for the following tasks:

- Mill operations tours for guests that have not completed MSHA training or been issued a respirator. Tours of the mill must be brief in nature.
- Maintenance activities within the PAC facility where employees may be exposed to minimal dust.

Oxygen Deficient Atmospheres / Immediately Dangerous to Life or Health (IDLH) Conditions

No employee will be permitted to work in an oxygen deficient atmosphere which is defined as less than 19.5% oxygen, or conditions determined to be IDLH unless proper breathing apparatus equipment is provided and applicable procedures are followed.

Examples of tasks at Red Dog Operations which may involve IDLH precautions:

- Working in Cyanide Mixing area
- Working with or removing process equipment known to contain residual HCN
- Confined space entry work. (i.e. Fuel Storage Tanks)
- Reagents Chemical Lines or mixing area

A standby person equipped with an SCBA or Air-Line Respiratory protection is required of work in IDLH atmospheres.

Care, Maintenance and Storage of Respirators

- Wash the face piece in soap and warm water after removing filters and cartridges. Disinfect it using a universal disinfectant. Rinse it and hang it up, or use a soft cloth to dry it before returning it to storage in a clean storage bag.
- Do not wear a mask that has been passed onto you unless it is clean and sanitary.
- Replace the respirator cartridges regularly. If you can smell or otherwise detect vapors while wearing the respirator or if you experience difficulty breathing, the cartridges should be changed.
- Store the mask to protect against dust, sunlight, extreme temperatures, excessive moisture and damaging chemicals. Do not distort the face piece.

Respirator Training Policy & Requirements

All personnel subject to the use of respirators will be trained in the use of that equipment before use.

The various training requirements are as follows:

- Review of the respiratory protection program.
- Examine and discuss the nature, extent and effects of the respiratory hazards in the workplace.
- Discuss the proper use of different types of respirators.
- Perform quantitative fit testing as described in this section.

All training records are to be documented on the respiratory protection training record and maintained in the personnel file.

Clean Shaven Requirements

Employees who may have to wear a respirator during their work shift shall be clean shaven to ensure proper fit and protection.

[29 CFR 1910.134(g)(1)(i)] States that tight fitting respirators are not permitted to be worn by employees who have facial hair that comes between the sealing surface of the face piece and the face or that interferes with valve function.

Clean shaven requirements also apply to the use of PAPRs. In accordance with manufacturer's recommendations as part of approval and testing from NIOSH, users of loose fitting face pieces and hoods with an elasticized face seals must be clean shaven where the elasticized face seal contacts the wearers face.

For hoods and helmets with an inner neck collar or an inner shroud that form a partial seal in the neck region of the wearer, beards and facial hair shall not extend into the sealing surface area of the inner shroud or helmet.

Respirator Fit Testing

Always inspect the respirator before use to ensure that all parts are present and in good working order.

[ANSI Z88.10-2010]The respirator fit test shall not be conducted if there is any hair growth between the skin and the face piece sealing surface, such as stubble beard growth, beard, mustache or sideburns which cross the respirator sealing surface. Any type of apparel which interferes with a satisfactory fit shall be altered or removed.

Respirators shall not be worn when conditions prevent a proper face seal. To ensure proper respirator fit, the following points must be observed:

- The employee shall be clean shaven to ensure a proper and effective respirator seal. ANSI Z88.10-2010 prohibits fit testing when facial hair is at the sealing surface of the respirator.
- The respirator shall be worn only in accordance with its intended purpose and design.
- The respirator and all functional parts including straps must be in place, secure, and worn in the appropriate positions.
- The employee using the respirator shall perform a positive and negative pressure check each time a respirator is donned.

Positive and Negative Pressure Fit Checking

- **Negative Pressure Test:** Close off the inlet opening of the canister or cartridge(s) by covering with the palm of the hand(s) or by replacing the seal(s). Inhale gently so that the face piece collapses slightly and hold your breath for approximately 5-10 seconds. If the face piece remains in its slightly collapsed condition and no inward leakage of air is detected, the fit of the respirator is considered satisfactory.

- **Positive Pressure Test:** Close the exhalation valve and exhale gently into the face piece. The face piece is considered satisfactory if a slight positive pressure can be built up inside the face piece without any evidence of outward leakage of air at the seal. For most respirators, this method of leak testing requires that the wearer first remove the exhalation valve cover and then carefully replace it after the test.

Special Challenges

- **Eye glasses:** safety glasses can cause leakage around the face masks: therefore, plain safety glasses should be removed when wearing full face piece respirators. A special respirator eyeglass insert is available for personnel who must wear corrective glasses to work with.
- **Medical suitability:** there are several temporary and permanent physical conditions which could possibly interfere with the respirator usage. Individuals with breathing disorders or that experience shortness of breath when using a respirator should immediately notify their supervisor.

Quantitative Fit Test Method

Although several methods are accepted by OSHA for respirator fit testing purposes, Teck has adopted the use of the Quantifit respiratory fit test machine and the Redon Protocol method for respirator fit testing.

At a minimum, respirator fit tests will be conducted annually for employees who may be required to wear a respirator in their respective line of work. Additionally, the following conditions require a new fit test:

- 1) A large weight gain or loss
- 2) Major dental work
- 3) Major facial surgery or injury
- 4) Significant scarring in the area of the respirator seal

Questions or concerns regarding respiratory protection should be directed to your supervisor.

4.06a Respirator Fit Testing

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Anchorage, AK USA 99517

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www.teck.com

Teck

Date: _____

Subject: Respirator Fit Testing

Name: _____

Company: _____

PIN #: _____

Department: _____

Your Supervisor or Teck Alaska Contact Name: _____

Contractor: Yes / No

Check statement below which applies.

A respirator IS required for my job duties. ☐

I have been issued a (PAPR) Powered Air Purifying Respirator. ☐

A respirator is NOT required for my job duties. ☐

If my job scope changes and it is determined I will need to wear a respirator, I understand I will be required to take a respirator fit test before commencing work.

Print Employee Name: _____

Employee Signature: _____

Date: _____

Supervisor, Safety & Health, or other Teck Representative Signature: _____

Date: _____

Reference: RDO Respirator Protection Program

4.07 Hearing Conservation

HEARING CONSERVATION PROGRAM

Purpose and Scope

Red Dog Operations will provide a safe and healthful workplace for its employees and will strive to prevent occupational noise induced hearing loss. This will be accomplished through implementing engineering and administrative controls, the use of hearing protection, employee training and counseling, audiometric testing, and medical referrals where necessary. The program will be under the direction of a medical professional, who will evaluate audiometric testing and ensure early detection of any deficiencies.

Procedure

Employees which, during their normal work shift, may exposed to workplace noise levels equaling or exceeding an 8-hour time-weighted average sound level (TWA_8) of 85 dBA will be enrolled in the Hearing Conservation Program. Employees in the Hearing Conservation Program will receive a baseline audiogram, annual audiograms and hearing conservation training.

Sound Level Monitoring

Sound level monitoring will be conducted using a sound level meter and/or a personal noise dosimeter to ascertain those work areas where exposure to sound levels greater than 85 dBA (TWA) may occur. Employee noise exposure assessments will be evaluated using accepted Industrial Hygiene practices.

Employees will be notified in advance of monitoring and given an opportunity to observe the monitoring and results of the monitoring will be given to the affected employees.

Safety and Health Department must notify an employee of his or her exposure when the employee's exposure is determined to equal or exceed the action level, exceed the permissible exposure level, or exceed the dual hearing protection level, provided the mine operator has not notified the miner of an exposure at such level within the prior 12 months. The mine operator must base the notification on an exposure evaluation conducted either by the mine operator or by an authorized representative of the Secretary of Labor. The mine operator must notify the employee in writing within 15 calendar days of:

(1) The exposure determination; and (2) the corrective action being taken.

A copy of the exposure evaluation will also be placed in the employee's hearing records

Areas Requiring Hearing Protection

Those areas (buildings, rooms, equipment, etc.) where the noise levels equal or exceed 85 dBA will be posted, where practical. All employees entering into these areas must wear hearing protection.

Audiometric Testing

Audiometric Testing Equipment:

Audiometric tests shall be pure tone, air conduction, hearing threshold examinations, with test frequencies including at least 500, 1000, 2000, 3000, 4000, and 6000 Hz, testing each ear separately. The audiometer and booth shall be calibrated according to currently accepted standards and manufacturer's instructions.

Baseline Audiometric Testing:

- A baseline audiometric test will be conducted on all new-hired employees.
- The tested individual will complete a questionnaire in conjunction with the baseline test on past work experience, hobbies, and other activities or conditions relevant to the individual's hearing status.

Annual Audiometric Testing:

- Hearing conservation program participants will be offered audiometric testing every 12 months.
- The tested individual will review a questionnaire in conjunction with the annual test to denote health or hearing occurrences in the past year.

Standard Threshold Shift (STS):

- Those employees who show an STS will be notified. If the audiogram indicates an STS, the individual will be referred for follow-up as necessary.
- Employees experiencing an STS will receive retraining in the Hearing Conservation Program and an opportunity to select new or different hearing protection devices.
- Safety and Health Department will review the effectiveness of any engineering and administrative controls to identify and correct any deficiencies within 30 days of receiving evidence or confirmation of a standard threshold shift and a copy of this evaluation will be placed in the employee's hearing records.

Hearing Protection

Where feasible, engineering and administrative controls will be used to reduce noise exposures to levels below 100% of the allowable dose. However, in cases where these controls are not adequate or are not feasible hearing protection will be used.

- Hearing protection will be available to all employees, including at least two types of earplugs and earmuffs.
- Additional types of hearing protection will be made available where these are not adequate or for individuals who are unable to wear one of the two types of hearing protectors.
- Hearing protection devices must be maintained in good condition according to manufacturer's requirements.
- Hearing protection devices will be fitted, where required.
- Each individual is required to wear appropriate hearing protection in designated areas.
- Areas or tasks that expose the employee to the Dual Hearing Protection Level (TWA_8 of 105 dBA), will be required to use BOTH earplugs and earmuffs.

Training

Newly Hired Employees:

During new hire training, employees will receive the following information:

- An overview of the Hearing Conservation Program
- Information on the different types of hearing protectors available
- How to care for and fit hearing protectors

Regular Employees:

Regular employees may receive additional training on the Hearing Conservation Program as necessary, depending on noise exposures, during safety meetings as deemed necessary by department supervisors.

Those employees enrolled in the hearing conservation program will receive training in at least the following topics:

- The Effects of Noise Loss on Hearing
- The Purpose and Value of Wearing Hearing Protectors
- The Advantages and Disadvantages of the Hearing Protectors
- The Care, Fitting, and Use of the Hearing Protectors Worn
- Available Hearing Protectors
- Responsibilities of the Company and Workers in Maintaining Noise Controls
- Purpose and Value of Audiometric Testing and Summary Procedures.

Record Keeping

Training and noise exposure records and/or notices will be retained by the Safety and Health Department during the time each respective employee's exposure exceeds the action level plus 6 months.

Audiograms will be filed electronically and copies of audiograms will be retained by the Medical Clinic. The audiograms will be retained for the duration of employment and plus at least 6 months. Employees may obtain copies of their audiograms at any time by written request to the Medical Clinic.

Key Responsibilities

Employees:

- Wear hearing protection in designated areas and for designated tasks.
- Maintain hearing protection devices in good condition according to manufacturer's instructions.
- Receive a baseline audiogram and an annual audiogram, as required.
- Assist in monitoring personal noise exposures by cooperating with noise sampling.
- Attend an appointment with the audiologist or physician when asked to do so.
- Report deficiencies in engineering controls or personal protective equipment to supervisor.

Supervisors:

- Ensure that employees working in posted areas or in high noise activities properly use hearing protection.
- Ensure that an adequate supply of hearing protection devices is available.
- Ensure engineering and administrative controls are maintained.
- Ensure that when administrative controls are used, a copy of these controls is posted; a copy is given to each effected employee and to the Safety and Health Department.
- Ensure all employees under their direction have an annual audiogram, as required.

- Ensure that individuals requiring follow-up receive it.
- Ensure all employees under their direction receive initial, annual, and retraining, as required, in the Hearing Conservation Program.

Safety and Health Department:

- Provide advance notice of noise monitoring.
- Conduct noise level monitoring.
- Assist operating groups in determining noise exposures and in defining noise areas and activities.
- Evaluate Hearing Conservation Program.
- Develop and assist in presenting hearing conservation training.

Medical Clinic

- Provide for baseline and annual audiograms.
- Select an appropriate audiologist or physician for medical referrals.
- Notify employees with STS.
- Ensure appropriate calibration and maintenance of testing equipment.
- Maintain records.
- Ensure that all persons performing audiometric testing maintain competency.
- Supervise and ensure the accuracy of audiometric testing.
- Determine if audiograms meet the criteria for follow-up set by the audiologist or physician.

Definitions

14-Hour Quiet Period – The 14-hour period immediately preceding an audiogram, in which the employee should avoid loud noises (greater than 80 dBA). Ear protection can be used during the 14-hour period to aid in avoiding loud noises.

Action Level - An 8-hour time-weighted average sound level (TWA_8) of 85 dBA, or an equivalent dose of 50%, integrating all sound levels from 80 dBA to 130dBA.

Permissible Exposure Level - An 8-hour time-weighted average sound level (TWA_8) of 90 dBA, or an equivalent dose of 100%, integrating all sound levels from 90 dBA to 140dBA.

Dual Hearing Protection Level - An 8-hour time-weighted average sound level (TWA_8) of 105 dBA, or an equivalent dose of 800%. This level requires the use of dual-hearing protection in the form of both earplugs AND earmuffs.

Standard Threshold Shift or STS – A change in hearing acuity for the worse relative to the individual's baseline audiogram of an average of 10 dB or more at 2000, 3000, and 4000 Hz in either ear. In making the STS determination age, disease and other physical changes will be taken into consideration.

Reportable Hearing Loss. A change in hearing sensitivity for the worse, relative to the miner's baseline audiogram, or the miner's revised baseline audiogram where one has been established in accordance with § 62.170(c)(2), of an average of 25 dB or more at 2000, 3000, and 4000 Hz in either ear.

Key Documents/Tools/References

30 CFR Part 62

4.08 Sulfur Dioxide (SO₂) Detector Action Plan

Purpose and Scope

The purpose of this policy is to provide required actions in the event fixed facility Sulfur Dioxide (SO₂) gas detectors go into alarm. SO₂ gas detectors are mounted in the Service Complex, in the Mill Hallway, and the PAC. This policy affects all personnel in these areas in the event the detector alarm sounds in one or all of these areas.

Procedure

In the event a SO₂ gas detector goes into alarm status, employees working in the affected area are required to respond to the alarm. This procedure outlines actions required in order to determine the significance of the gas problem in the area, notification requirements, and personnel actions required to minimize workforce exposure to SO₂ gas.

Determining Significance of the SO₂ Gas Problem

SO₂ gas detectors are in constant operational status awaiting detection of SO₂ gas. The SO₂ gas detector will go into low level alarm status when SO₂ gas levels reach 2 ppm and high level alarm status when SO₂ gas levels reach 4 ppm. Employees may begin to experience irritating health affects below the 2 ppm low level alarm. These health effects may include; a cough, throat irritation, and eye irritation. As SO₂ gas concentration levels rise, health effects may also increase in their severity i.e.; irritation when breathing.

SO₂ gas is heavier than air and settles into low areas. SO₂ gas can enter buildings from outside sources and does not remain constant as the outside temperature. Wind direction will affect the levels of SO₂ in different areas of the PAC, Service Complex, and the Mill.

Notification Requirements

In the event a SO₂ gas detector goes into alarm status, worker(s) in the area that notice the alarm must respond to the alarm by checking the SO₂ level on the gas detector's LED screen. If the level of SO₂ gas is above 2 ppm, Safety & Health Department must be notified for response in order to confirm the levels of the SO₂. Once levels have been confirmed by Safety & Health and the Area Supervisor they will decide follow-up actions. The actions could include using respirators or area evacuation depending on the levels of SO₂. An announcement will be made by Safety & Health and/or Area Supervisors on the PA system and all radio channels.

Personnel Actions

2 ppm is the recommended 10-hour work shift 40 hours per week exposure limit without a need for respiratory protection. Any SO₂ gas levels greater than 2 ppm require employee to wear respiratory protection until the gas level decreases to 2 ppm or less. Employees that experience irritating symptoms with SO₂ levels below 2 ppm are encouraged to wear respiratory protection until SO₂ gas presence subsides. Employees or visitors who do not have respirators may have to evacuate the affected area until SO₂ levels subside. Permission must be given by the Area Supervisor to employees who must evacuate. Safety & Health and Area Supervisors will determine a safe area to evacuate to if the PAC and Service Complex have readings higher than 2 ppm.

Key Responsibilities

This policy affects all workforce groups. It is the Management and Area Supervisors responsibility to ensure that all employees are following the required actions during SO₂ gas presence in the work areas.

Definitions

ppm - Parts Per Million

SO₂ - Sulfur Dioxide

Recommended Exposure Limit – Time-weighted average concentrations for up to a 10-hour workday during a 40-hour workweek (NIOSH)

General Requirements

The permissible exposure limits described in this policy are derived from the National Institute of Occupational Safety & Health (NIOSH). Other sources for SO₂ gas permissible short term or long term exposure limits are available from the Occupational Safety & Health Administration and Environmental Protection Agency.

5.01 Conveyor Belt Safety

All conveyor systems at Red Dog Operations (RDO) have audible start up warning alarms or horns that will sound for 30 seconds before the conveyor is allowed to start. If you hear this alarm, immediately stand clear of the conveyor belt.

De-energize and lock out all conveyors before performing work even if the task is brief. Always follow the RDO “Lock Out / Tag Out / Try Out” SOP when working on conveyor belts.

When a fully loaded conveyor shuts down, be aware of the potential for stored energy. Securely block all conveyor equipment against all hazardous motion before performing any maintenance work.

Perform a thorough hazard recognition inspection prior to performing all conveyor belt maintenance work.

Never attempt to cross a moving conveyor belt. Always cross at a bridge or designated crossing point.

Be alert for materials falling from the conveyor systems. Never walk under a conveyor belt while it is in operation, unless it is designed to do so safely.

All RDO conveyors are equipped with “Emergency Stop” pull cords along the entire length of the conveyor. These devices are installed so that a person falling on, or against the conveyor can readily deactivate the conveyor drive motor. These are tested quarterly for proper operation.

Keep all guards securely in place while conveyor is in operation. Inspect and report any faulty protective guards around drives, pulleys, idlers, rollers, and drive motors.

Conveyor belt “Zero Speed” switches, belt “Rip Detection” devices, and belt “Tracking / Alignment” switches all provide protection against equipment damage.

Before assigning miners to clean up spillage, have them identify hazards and demonstrate how they would safely complete the tasks.

Never shovel material under, or on to a moving conveyor belt. Do not attempt to clean rollers while the conveyor is in operation. Never use a D-Handled shovel around a conveyor belt.

D-Handled shovels are prohibited at Red Dog Operations.

Keep the travel-ways around conveyors clear of material and equipment.

Supervisors will take measures to ensure all personnel are trained in safe conveyor system work procedures.

5.02 Electrical Safety & Maintenance

Electrical Safety

Only qualified and authorized personnel shall repair, install, or adjust electrical equipment.

Operate only those switches that you are trained to use.

When electric-driven equipment becomes unsafe to operate, it shall be locked and tagged out immediately.

Inspect all extension cords or plug-connected hand tools for any sign of damage or missing parts prior to use. Tag defective appliances and turn in for repair.

All three pronged electrical cords shall be ground tested annually. Please contact the E&I Supervisor to make arrangements to have your extension cords and equipment tested.

All portable electric tools and lights used in damp or wet locations shall be used with ground fault circuit interrupters (GFCI).

Ground fault circuit interrupters are to be installed as close to the electrical outlet as practical.

Maintenance

Electricians must notify operators before beginning work on electrical equipment which is in service. The main switch must be locked out in conjunction with Operations.

A Dig Permit or Dig Permit Waiver is required for **any** ground breaking activity including excavation, drilling, or snow removal occurring anywhere at Red Dog Operations.

Never close a circuit without full knowledge concerning the circuit.

When installing lines over roadways, passageways, or in the path of traveling machinery, an employee must be stationed to warn others of the hazard until the lines are permanently secured. Employees installing electrical lines will carry the lines in their hands so they can be released readily in the event of an emergency. These lines will never be attached to the employee's belt or person.

All employees working on poles or elevations must use proper safety equipment and take any other necessary precautions to ensure their safety.

No circuit breakers, limit devices or other safety appliances shall be blocked or otherwise rendered inoperative, without proper authorization.

Do not depend on insulation; it may be defective.

It is prohibited to be on an overhead crane runway without proper authorization. When there is such authorization, the crane operator must be notified and safety guards stationed or have the crane locked out.

Certified rubber gloves must be worn when working on fuse cutouts and disconnects carrying 2300 volts or higher.

Never operate safety switches with the door open, except when the fuses are being tested.

Use only an approved voltage tester when making a voltage test.

Always use a fuse puller when fuses are removed or replaced.

When testing, checking, troubleshooting or repairing live control panels and switch gear, keep covers closed, except those required to be open for the work.

Be aware of "Arc Flash" hazards and wear the appropriate safety protection.

Ensure all MCC rooms are kept clean and dry.

Ensure that all switch gears are suitably identified using standardized labeling. Taped labeling with marker or pen is unacceptable.

5.03 Radiation Safety

Red Dog Operations possesses radiological devices used in process analysis and quality assurance applications.

Every effort is extended to ensure the safety of personnel working in proximity of these devices. Inventories are conducted every six months or more frequently. Surveys and leak tests are conducted on a scheduled basis as required by the regulatory agency (USNRC).

Only licensed individuals, Radiation Safety Officers, are permitted to manipulate a gauge. If device lock-out is required for work in the immediate vicinity of the gauge, call extension 45207/45208 and request the Radiation Safety Officer for appropriate action. Do not attempt to lock-out these devices.

By following a few simple rules, you can be assured that working with or around nuclear gauges will pose no threat to your health and safety.

Time: Limit the amount of time spent in the immediate vicinity of an active gauge.

Distance: The intensity of radiation and its effects fall off sharply as you move further away from a radioactive source.

Shielding: In nuclear gauges, this protection is provided by the source housing.

In case of fire or catastrophic failure of the device, leave the area immediately. Call 911.

Note: (Refer to Teck Alaska's Nuclear Source Inventory and Emergency Procedures)

5.04 Tool Safety

Always use the proper tool for the task. For example, never use a wrench as a hammer or a screwdriver for a pry bar.

The heads of all tools used in striking operations shall be dressed and maintained in such a condition that there is minimal danger from pieces of flying metal.

D-handled shovels are prohibited at Red Dog Operations.

When using electric hand tools, be sure you check the condition of the tool, cord and electrical ground.

Assure hand tools with three pronged electrical cords have had an annual ground check performed and the color code tape is in place.

Use an appropriate means to mark or identify equipment, tools or components so the marking or identification will remain in place and not cause any damage.

When using air impact tools always examine the condition of the air hose and implements.

All pneumatic hose couplings that are not fitted with automatic shut off valves, or quick disconnects, must be shut off and bled down before being disconnected.

All hose line connections with an inside diameter of 3/4 inch or larger must be fastened securely with appropriate whip checks or safety clips.

Safety clips or retainers must be installed on all pneumatic tools to prevent accidental expulsion of the tool from the barrel.

Ensure trigger locks have been removed.

When starting up a grinding wheel, stand to one side. In the event of a defect, there is a possibility the wheel may break during start up.

Make sure the tool rest is close to the wheel (1/8" maximum) to prevent a piece from slipping through and catching your hand. Check the speed rating on the grinder and use the appropriate wheel.

Never grind on the side of a wheel. All grinders must have properly installed and adjusted guards and handles.

Sandblasters, using silica sand, must wear an air-supplied hood, furnishing type 1, grade B Breathing Air. (Refer to ANSI Standard Z88.2.10.5.1).

Report all defects to your supervisor, and have the tool replaced or repaired before starting or continuing the job.

5.05 Flammable Liquids and other Hazardous Materials

General Rules

When handling or sampling corrosives, flammables, gases, poisons, and other hazardous materials, use appropriate goggles, gloves, face shield, apron, respirator, and other necessary personal protective equipment. Safety glasses shall not replace goggles when handling hazardous materials.

A safe means of egress shall be maintained at all times when working with hazardous materials.

Know the location of safety showers, eyewash stations, and other safety equipment prior to starting work, and ensure they are in proper working order before starting work.

Non-metal secondary containers are prohibited for flammable liquids storage. Ensure all secondary containers are labeled correctly.

Ensure engineering controls i.e. exhaust fans, gas alarms and detectors are in good working order.

Report any spill immediately.

Storage of Acids and Chemicals

All acids and chemicals must be properly labeled and stored in a cool, dry place.

Chemicals and acids which may cause a reaction when mixed together must be stored in separate areas.

Each chemical or acid will have a definite "marked area" for storage.

Lids, caps or seals must be on their respective containers and securely tightened.

Store chemicals and acids in such a manner that the containers cannot come in contact with each other.

Safety Data Sheets (SDS)

Safety Data Sheets for hazardous chemicals to which employees may be exposed can be found using the SDS Web Service found on the Red Dog Operations internet home page "Rover" under Applications. Supervisors shall ensure all employees have access to a computer, and/or are trained on how to access the SDS Web Service and how to look up a Safety Data Sheet.

Materials Management will maintain the SDS Web Service as new information is obtained.

5.06 Warehousing and Storage

Receiving – Issuing – Storage and Materials Handling

Carefully check all loads for possible load shifts, prior to unloading or when removing from storage.

All forklift operators will be task trained to properly operate, pick, deliver, and offload materials with the equipment they will be required to operate. Training will be documented with the MSHA Form 5000-23.

Ensure all materials are properly palletized and loads are secured in order to alleviate possible toppling or falling off of trucks during movement to storage.

Ensure that material placed in storage locations does not extend into aisle-ways and is stored in a safe manner.

Do not obstruct your view when carrying bulk items.

Ensure that incompatible products are correctly separated.

Read SDS information prior to handling hazardous materials for the following:

- Type of hazard.
- Protective clothing requirements.
- What to do if you come in contact with the product.

Hazardous Materials will be handled only by appropriately trained personnel.

5.07 Water Safety

Red Dog Operations Vessel Operations:

Operators of water vessels (boats) will have received the appropriate task training for operations being performed. All task training will be documented with MSHA Form 5000-23.

Anti-Exposure Coveralls “Mustang Suit” (Type V U.S.C.G. approved) will be worn at all times while working on any vessel when the ambient air temperature is below 35 degrees Fahrenheit.

Life jackets (Type III U.S.C.G. approved) may be worn in lieu of an Anti-Exposure Coveralls “Mustang Suit” (Type V U.S.C.G. approved) while working on a vessel if the ambient air temperature exceeds 35 degrees Fahrenheit.

Each Red Dog Operations designated port vessel will be equipped with a flare set and a life ring with 100’ of polypropylene line. The name of the vessel at Red Dog Port will be stenciled on the lift ring.

When maintenance work is being performed on the tailings impoundment freshwater pond or main pit reservoir, a back-up boat must be operational and in the water ready to respond. A standby crew must be notified that they are on standby and readily available, until the work is completed.

A minimum of three persons is required in each vessel.

The type of the personal flotation device worn on the vessel will be determined and enforced by the vessel operator.

The above applies to the Port Site and Freshwater Pond, Tailings Impoundment, Main Pit Reservoir at the Mine Site, or any other body of water involving employees working on or around water at Red Dog Operations.

Dock and Cell Areas, and Reclaim Barge:

Life Jackets (Type III U.S.C.G approved) or an Anti-exposure Coveralls “Mustang Suit” will be worn while working within 10’ of the shallow water dock, 10’ of any water bodies edge, and anywhere on the Cells.

Life Vest or fall protection will be worn when there is danger of falling into water.

The Ship-loader Control Room Operators may travel to and from the Ship Loader Control Room without a personal flotation device.

A life jacket must be worn while performing any work outside of the building on the reclaim barge.

Walking down the catwalk and working inside of the Reclaim Barge buildings does not require a life jacket.

The dock, each cell, Reclaim Barges or where there is danger of falling into water, a life ring that has a minimum of 100 feet of polypropylene line attached will be provided. The life rings used at the Port are to be labeled Red Dog Port.

3.03 Firearms Policy

Purpose and Scope

The purpose of this document is to define the procedures and practices required while in possession or use of firearms, at or initiated at Red Dog Operations, and are applicable to all who are on Red Dog Operations facilities. Firearms are to be used only for the purposes of hazing of wildlife, protection from wildlife, property security and the training required to possess and use a firearm for these tasks. Under no circumstances will Red Dog Operations circumvent or contradict any local, state, federal law or regulation regarding the possession or use of a firearm.

Safety and Health

The use or possession of a firearm should always be given the upmost respect; improper use of a firearm may result in serious injury, including death. The minimum required PPE will include eye protection and hearing protection. All other PPE will be determinant of work environment and in accordance with Teck Alaska's Safety and Health Safety Standards. There are four "Life Safety Rules" that will always be followed:

1. All firearms will be treated as if they are loaded.
2. Never point a firearm at anything you are not willing to destroy.
3. Always keep your finger off the trigger and the safety engaged until you are ready to fire.
4. Always know what is in front and behind what you are pointing a firearm at.

These rules will be maintained at all times and will be adhered to whenever in possession of a firearm.

Procedure

Employees are not normally permitted to possess firearms at Red Dog Operations. However there are operational needs of the property that require the use of firearms. All firearms coming to, departing from and onsite will be accounted for by the Safety & Health Department. There are also special occasions where a firearm may be in possession of an employee only with the authorization of the Safety & Health Department.

Transportation of Firearms to and from Red Dog Operations

Any employee wishing to bring a firearm to Red Dog Operations must obtain pre-authorization from the Safety & Health Department prior to placing the firearm on any aircraft to transport to Red Dog Operations. The firearm must be secured in a locked hard case and meet all other policies imposed by the air carrier. The Safety & Health Department will inform the Travel Department, the Travel Department will contact the air carrier authorizing the transportation of the firearm to Red Dog Operations.

Failure to obtain pre-authorization will result in seizure of the firearm and it will be returned to the point of origin at the individual's expense.

Valid reasons for bringing a firearm to Red Dog Mine would include completing a sale, in transit to or from employee travel destinations, working on, repairing parts, or as a raffle item.

Once authorization has been granted, the Safety & Health Department will immediately take possession of the firearm from the arriving aircraft and lock it in a security cabinet during the time the firearm is onsite. The Safety & Health Department will deliver the firearm to the Materials Management group to be loaded onto the departing aircraft.

Authorization for Use and Possession of a Firearm for Operational Requirements

There are operational needs of Red Dog Operations that require the possession and use of a firearm; these are hazing of wildlife, protection of life from wildlife and property security. In all instances specific training in the proper use of a firearm will take place and be documented.

The Safety & Health Department, Environmental Department and the Exploration Group are the only groups who may possess and use a firearm for operational needs; this will only be permitted after documented training. The Safety & Health Department may approve the possession and use of a firearm on an as needed basis to other groups, but only after all applicable training is completed.

All personnel authorized to possess or have access to a firearm at Red Dog shall undergo a background check upon first being selected for a role which encompasses the possession and/or use of a firearm and subsequently on a biennial basis to verify that they are legally authorized to possess a firearm. Non United States resident employees must provide a valid firearms possession permit or equivalent from their home country or undergo a background check.

Transportation and Storage of Firearms at Red Dog Operations

It will be necessary to transport firearms at Red Dog Operations; all firearms will be transported in a safe manner. At no time will it be acceptable to transport a firearm with a cartridge in the firing chamber.

Safely transporting a firearm by person will include ensuring the safety is engaged, "on", the firing chamber cleared by performing a "press check" and pointed in a safe direction.

Firearms transported in a vehicle will have the safety engaged and the firing chamber cleared, it will be acceptable to have ammunition stored in a magazine, in a hard or soft case or in a rack designed to secure firearms. If a firearm is in a soft case it will be required to have a trigger lock or bolt block installed.

Firearms transported by helicopter will be completely cleared of all ammunition and stored in a compartment designated by the pilot.

Firearms will be stored in designated areas. At no time will a firearm be transported into a building with a cartridge in the magazine or firing chamber, the firearm will be completely cleared. For example: to remove from a pickup and secure in a designated storage area.

Red Dog Operations

3.03 Firearms

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Firearms are to be secured for storage using the “two lock system” or in an appropriate gun safe.

Human Resources: NICS background checks

Background checks are a prerequisite for attending Red Dog Operations firearms training course. (For example, federal law prohibits individuals from possessing a firearm if they have been convicted of domestic violence, even if it is only a misdemeanor.)

- Notification of required background checks will be provided to employees in advance of the training course.
- Written permission to perform these checks is required from each employee.
- Red Dog Operations will use the information provided by the reporting agency to determine the eligibility for employees to participate in a firearms training course. RDO will not discriminate against any employee or otherwise misuse this information.

Before taking adverse action based on a report Red Dog Operations will:

- Provide the employee a copy of the report used to determine eligibility for the training course.
- Provide the employee a copy of the summary of the employee’s rights under the fair credit reporting act from the reporting agency.

After taking adverse action Red Dog Operation will:

Provide the employee with the name, address and phone number of the reporting agency.

- Include a statement that the reporting agency who supplied the report did not make the unfavorable decision and can’t give specific information regarding the findings to RDO.
- Include a notice of the employee’s right to dispute the accuracy or completeness of any information the reporting agency furnished, and to get an additional free report from the company if the person asks for it within 60 days.

Hazing and Protection from Wildlife

The hazing of wildlife may be required at Red Dog Operations and is governed by the Public Safety Permit issued to Red Dog and maintained by the Environmental Department. Hazing of wildlife will only be performed by employees with the proper training and certification in accordance with the Public Safety Permit.

Using lethal force to protect employees from wildlife may be required at Red Dog Operations. *This shall only be done as a last resort and only by employees properly trained with the training documented.* Employees who are exposed to this environment will be given specific training in Bear Behavior, how to use, maintain and store a shotgun and live fire exercises. This training is conducted onsite by the Safety and Health Team, but can also be obtained by a reputable firearms training organization upon approval by the Safety and Health Department.

Facility Security

It is required to have employees trained in armed security at Red Dog Operations. These employees will be trained in accordance with State and Federal Law.

Training

All employees who may be required to possess or use firearms at Red Dog Operations will be required to receive the training specific to the task asked to perform. No employee will be asked to possess or use a firearm if for personal reasons they can or will not. Employees will be required to annually demonstrate knowledge, proficiency and competence with the firearm before being allowed to possess or use in the work environment.

When performing “Live Fire” exercises a Range Safety Officer will be designated by the Safety & Health Department to ensure the safety of the employees. The Range Safety Officer will have the authority to stop any training or remove any employee from the exercise if for any reason the safety of the range is compromised.

Key Responsibilities

Safety & Health Department will be responsible for the authorization of possession and use of firearms at the Red Dog Operations.

Any Department who is authorized to possess and use a firearm at Red Dog Operations will be responsible to maintain and store firearms in accordance with the policy and maintain training in accordance with this policy.

Departure from Procedure

This SOP was written to comply with applicable laws and regulations pertaining to the possession and use of firearms at Red Dog Operations. Failure to follow this procedure could result in possible consequences to health or safety. Departure from procedures may also lead to criminal or civil penalties for you and the Company as well as adverse affects on corporate performance and reputation.

Definitions

Cartridge - also called a “round”, packages the bullet and propellant.

Firing Chamber - Is that portion of the barrel or firing cylinder in which the cartridge is inserted prior to being fired

Magazine – A container designed to store ammunition. This is to include the ammunition tube of a shotgun or similar type firearms.

Press Check – A procedure to ensure the status of the firearm, loaded or empty, firing. This procedure is done by sliding the action back and visually verifying the status of the firing chamber.

Safe Direction – For the purposes of the document, safe direction is pointing the muzzle in a direction that will not cause harm to life or property.

1 General Requirements

Regulation 33 CFR 105.205/210/215
Alaska Law - AS 18.65.470 - Firearms training

2 Key Documents/Tools/References

33 Code of Federal Regulation
Alaska State Law
Teck Alaska's Port Security Plan
Teck Alaska's Airport Security Plan
Teck Alaska's Public Safety Permit
MagPul's "The Dynamic Art of the Shotgun"
NRA

5.09 Environmental

All spills must be reported immediately to your supervisor, who will inform the Spill Reporting Officer or his designee by calling x45367. All spills must be reported immediately.

If properly trained personnel and equipment are available and it is safe to do so, begin spill containment and clean up immediately. Safety concerns need to be considered by checking SDS information and conferring with the Environmental and Safety & Health Departments. A "Spill Clean-up SOP" (Qualtrax ID: 1065) and "Hazardous Material Operations Manual" (Qualtrax ID: 2382) are available in Document Control and should be consulted and adhered to at all times.

The management and disposal of all wastes must comply with the guidelines set in the Waste Information System. If a waste is not listed contact the Environmental Department.

Before wetlands, which includes tundra, may be disturbed, permission must be obtained from the Environmental Department when disturbance of wetlands includes digging, filling, and vehicle travel.

Upon any sign of a cultural resource site (arrow heads, knapped or flaked stone, etc) do not touch, disturb or remove anything. If using equipment, shut equipment down in place.

Before water or any other substance is discharged to the ground, tundra, wetland or water body, permission must be obtained from the Environmental Department.

Before streambeds, or any other watercourse, may be disturbed by crossing or with construction activity, clearance must be received from the Environmental Department.

Before water may be withdrawn from any water body, natural or manmade, permission must be obtained from the Environmental Department.

Any activity which does or may have the potential to adversely affect the environment should be reported through your supervisor to the Environmental Department.

Any change to an existing system, procedure, process, or supply that controls or has an impact on the environment must first be approved by the Environmental Department.

Any unusual wildlife activities or death noticed within the site (port, road, or mine) must be reported to the Environmental Department.

Harassment of, or feeding of wildlife is prohibited and if this happens should be reported as a Wildlife Incident.

Hunting and trapping of wildlife is not allowed during work rotation at Red Dog Operations.

Excessive dust emanating from areas within the mine, haul road or port must be reported immediately to your supervisor or the Environmental Department.

Any procedural violation of environmental policies should be reported using an EMS Non Conformance Incident Report.

Internal Spill Reporting

1 Purpose and Scope

This Standard Operating Procedure (SOP) describes the proper procedures for reporting spills internally to the Environmental Department. Proper spill reporting is required to meet regulatory and Teck Alaska requirements for spill notifications.

2 Procedure

2.1 Environmental Department – Spill Reporting Office

The Spill Reporting Officer (SRO), or the designated SRO, will be responsible for making all outside agency and non-agency notifications for Teck Alaska related spills. Contractors please refer to the Spill Reporting Instructions for Contractors for required internal notification requirements.

2.2 Spill Notification

Supervisors, instruct your team that any and all spills must be reported immediately to you. Supervisors are then responsible for reporting spills to the Spill Reporting Officer in the Environmental Department as described below. Supervisors must follow guidelines and timeline for reporting, below:

Report all spills immediately (see Section 2.3 for exceptions)

Contact the Spill Reporting Officer by calling the Spill Reporting telephone number at 754-5367, or extension 45367.

- If there is no answer at this number, contact the Control Room at 45222, 911, or if you don't have access to a phone, use Radio Channel 4.
- Control Room Personnel will contact the on call Spill Reporting Officer.
- **You must speak to the Spill Reporting Officer. *Email or voice messages do not satisfy this notification requirement.*** In the event the Spill Reporting Officer cannot be reached, notification can be made to an Environmental Coordinator.

When reporting a spill, provide the following information:

- Name and telephone number
- Date and time of spill
- Details of spill
- Substance spilled
- Quantity spilled
- Location of spill
- Cause of spill
- Actions being taken to stop and contain the spill
- Where will contaminated substances be placed
- How will contaminated clean up materials be disposed

- Equipment Unit #
- Maintenance Work Order # (if applicable);
- Type of System (i.e. hoist, steering, brake);
- Type of failure such as hose failure, hardline failure, seals, or fittings.

If you do not have all of the information listed above, then report all information that is available to you at the time; however, information gaps must be filled in later. In any event, do not delay reporting to the Spill Reporting Officer.

2.3 Exceptions - Report Certain Spills by End of Shift

Report the following oil, petroleum, or glycol spills by the end of the shift in which they occurred:

- Less than 55 gallons oil, petroleum or glycol to ground/gravel (any spills to tundra, water, or on the Port Haul Road within the Park Boundary must be reported immediately);
- Any amount of oil, petroleum or glycol to secondary containment – i.e., bermed/walled impermeable containment structures, or tanks with double-walled containment.
- Call the Spill Reporting Office, as described above in Section 2.2

The above are regarding only oil, petroleum or glycol spills to ground/gravel or secondary containment only – NOTE that any spill of any substance to water, tundra, or National Park (Cape Krusenstern) land is immediately reportable.

2.4 Spill Reports

Spill reports are completed by entering a new Supervisor's Investigation Report (SIR) into SiteLine.

This is very important: *do not delay* submitting the spill report – even if you do not have all the required information to immediately complete the report.

The Spill Reporting Officer or their designee is responsible for ensuring copies of spill reports are provided to agencies or other groups as required.

3 Key Responsibilities

Supervisor: Responsible for completing incident reports and reporting spills to the Spill Reporting Officer.

Contractors: NANA/Lynden is responsible for reporting spills to regulatory agencies and other parties. All other contractors follow the procedures in 2.1.5 above.

Spill Reporting Officer: Responsible for reporting spills to regulatory agencies and other parties. The Spill Reporting Officer will assign a designated Reporting Officer when he is off-site.

4 Departure from Procedure

This SOP was written to comply with applicable laws and regulations pertaining to spill notifications. Failure to follow this procedure could result in consequences to health and safety and/or the environment. Departure from procedures resulting in pollution may also lead to criminal or civil penalties for you and the Company as well as adverse effects on corporate performance and reputation.

5 Definitions

Spill Reporting Officer: A position held by an Environmental Coordinator or Environmental Technical Supervisor within the Environmental Department.

6 General Requirements

18 AAC 75: ADEC reporting

40 CFR 110: Oil Spill Reporting

40 CFR 112: Clean Air Act

40 CFR 117: Clean Water Act Reporting

40 CFR 302: CERCLA reporting

ISO 14001 – 4.4.6 Operational Control

5.11 Heavy Equipment Safety

Heavy Equipment Safety Rules

Make sure the way is clear before moving any mobile equipment. When entering or leaving the Maintenance Shop, movement of any equipment will be under the control of an H.E. Shop ground guide, with whom you must maintain visual contact. If visual contact cannot be maintained, do not move the equipment.

Wheel Chocking-production mining equipment i.e. loaders, 777 haul trucks, graders and other designated equipment will adhere to 30 CFR 56.14207. This requires that when parked on a grade, the wheels or tracks will either be chocked or turned into the bank. 777 Haul Trucks have a designated parking ditch on the crusher pad that acts as a wheel chock when parked there

Tracked vehicles will have all ground engaging tools set down on the ground when parked.

When working around loaders or other moving equipment, stay alert and make sure the equipment operator knows where you are at all times.

Haul truck drivers must remain inside the cab while being loaded.

Do not stand near a truck that is being loaded or dumped.

Loader operators should constantly monitor for possible blasting misfires. The supervisor is to be contacted if any are found.

The dig face must NOT be higher than 5 feet above the maximum reach of the extended loader bucket.

Undercutting the face is prohibited.

Do not swing the loader bucket over the truck cab during the loading process.

During loader operations, it is essential that employees keep out of the range of the articulation points and rocks which may fall from the loader bucket.

Do not walk under the loader bucket when it is in a raised position.

Keep a safe distance when behind a truck. 400ft of clearance behind a haul truck on uphill ramps and at least 200ft on downhill or level grade.

After the dumping process is completed, always check to make sure the dump bed is lowered before moving a haul truck.

When leaving mobile equipment, the operator must lower all implements to the ground, apply the parking brakes (if equipped), and shut down the equipment. Place wheel chocks, or turn the wheels into the bank.

Be careful when exiting mobile equipment. Do not jump down; if provided, utilize the steps and handrails provided, maintaining a three point contact.

When working near the crest of high banks, dozer operators must exercise caution in order to prevent the dozer from going over the bank. Never work parallel to a high wall or edge.

5.12 Mobile Equipment Maintenance

Repairing Mobile Equipment

Do not work between the high wall, or active face, and the equipment.

Do not remove the engine hood from equipment while the motor is running except to check fluid levels.

Before removing a wheel, be sure equipment is blocked with load rated cribbing or approved safety stands. Never depend on crane or hydraulic jacks.

Before raising the dump body, check to make sure it is free of all loose and/or frozen material. All potential fall material will be removed from underside of the dump body. The equipment will be cleaned outside of the shop.

Before starting to work on a truck when the dump body is raised, make sure the dump body is securely locked, in order to keep it from falling or being pushed down.

Before raising the dump body, make sure you have enough clearance.

Use the proper Flagging & Barricading procedures to warn and keep unauthorized personnel safety out and away from the work area.

Tire Safety

Never remove a tire assembly from a wheel without first deflating the tire to 20 psi maximum; with duals, both tires must be deflated.

Never inflate a tire after mounting it on a split or lock ring type wheel or rim, without using an approved safety device.

Never remove an approved safety device from an inflated tire, without first ascertaining that the lock ring and band, etc., are properly seated. A broken or slipped ring can cause the tire to blow out.

Never weld, torch cut or heat a mounted tire rim assembly. Always remove the tire from the rim before any burning, heating or welding is done.

Never inspect deep cuts by probing or prying out deep embedded rocks, without first deflating the tire.

Never use a cracked, bent or otherwise defective rim, lock ring, bead seat band, etc. If in doubt, check with your supervisor.

Never change, check air pressure, or inflate tires on equipment without first making a visual inspection. Inspect for dangerous conditions, such as a slipped or damaged lock ring, band, rim or bulge on the tire. Keep clear, warn others and notify your supervisor immediately.

Heavy Equipment Shop Equipment Tag Out

The first and most important step to be taken when work is required on any moving or mobile equipment is to follow the Energy Isolation Requirement.

(The only acceptable exception is where a lock out device is not provided)

Energy Isolation is intended for personal protection of individuals while working on or in the vicinity of machines, equipment or other apparatus which, if operated or energized, could endanger the person's safety.

Mobile equipment follows a tagging procedure when lock out is not available.

Prior to performing repairs or servicing on any mobile equipment, all energized systems to be worked on will have all stored energy removed.

A "Do Not Operate Tag" shall be signed and dated by the person who is performing the repairs, and attached to the disconnect switch. If there is no disconnect switch, a tag must be attached to the ignition switch, or steering wheel.

If repairs are not completed by shift change, a departmental "Do Not Operate" tag will be issued by the on shift supervisor. The departmental "Do Not Operate" tag is installed and the personal "Do Not Operate" tag removed. The mechanic coming on shift will then install his or her personal "Do Not Operate" tag and the departmental "Do Not Operate" tag will be removed and returned to the supervisor on shift. Department "Do Not Operate" tags will stay on equipment at all times while in the shop.

The informational tag is then placed on the Lock out/Tag out Keyboard in the HE Shop supervisor's office".

The fueling and oiling service personnel will use departmental "Do Not Operate" tags.

"Do Not Operate" Tag: This tag will not be removed by anybody except the mechanic who signed and placed the tag. This is his or her personal "Do Not Operate" tag.

Departmental "Do Not Operate" Tag: This tag is considered to be a supervisor's tag and if left on a piece of equipment, it can be removed by the on shift supervisor after a complete inspection of that piece of equipment.

Informational Tag: This is for information purposes and to ensure all keys are removed and stored in an area where the keys will not be handed out.

Remember: It is the responsibility of the mechanic to ensure all tags are removed before the piece of equipment is released.

5.13 Mine Operations

Mine Engineering

Do not traverse a slope without having the uphill hand free, or carrying a securing device such as a rock pick or staff. If necessary, make additional trips to transfer equipment.

No one on foot is to walk any closer than 6 feet from the crest of a bank.

Do not climb or walk along a slope above or below another person. If this is unavoidable, only one person may move at a time.

Care should be taken while working near the toe of a slope.

No personnel on foot will approach the toe of a pit working face (including ore stockpiles) any closer than the height of that face. This would be 25-feet for a normal bench height.

Wear shoe spikes or cleats when working around slippery surfaces.

Be alert and make your presence known when working around heavy equipment.

Prior to any personnel exiting their vehicles in the pit, they must first have on personal protective equipment (PPE) that will include hard hats, close fitting safety glasses, safety toed foot wear, safety reflective vests, reflective jackets or reflective coveralls.

Blast Warning Procedure

Notification of blasting times and locations will be issued property wide via email notification and daily meetings. A copy will be posted outside the Pit Shifters office and Safety & Health.

Personal contact and radio communication will be used to update blast times and monitor the activity in and around the blast area.

Placement of guards and clearing of equipment and personnel will begin approximately 30 minutes before the blast will be fired. Notification of pit closure will be made on all four radio channels.

The blaster in charge of the blast will inspect the blast site, in person, and check on the radio with the blast guards that the blast area is secure.

The blaster will turn off his radio to “put the caps on” and connect the blasting machine, when using electric initiating systems.

A warning will be given at 5 minutes and at 1 minute prior to the blast over all 4 radio channels. After the 1 minute warning, Radio Silence will be requested on Channel 1. This is to allow anyone to stop the shot at any time up until detonation by announcing “Stop the Shot” on Channel 1.

Following the blast, the blaster will wait until fumes have cleared before inspecting the blast area and will announce the “All Clear” over all four radio channels. No person is to enter the blast area, nor are the guards relieved from their positions until this “All Clear” signal has been given.

Gas monitors are available for testing the area after a blast to make sure no dangerous gases are present.

Drilling and Blasting

Observe and follow all instructions on the warning signs posted in the blast site.

No person or equipment will enter a blast site, demarcated with green cones, without first contacting the D&B Supervisor, a Driller, Blaster, or Pit Shifter for authorization and then escorted to their destination.

No person may remove explosives from the property for other projects, without written approval from the RDO General Manager.

At the beginning of the shift, check the area to be drilled for any unsafe conditions and report them to your supervisor.

Watch for misfires and report any found to the Pit Shifter.

When “drill a hole – load a hole” operation is required, refer to the procedures set out in our variance docket NO. M-94-32M. Request for the use of this procedure at times other than the period specified shall be made to the MSHA District Manager and shall be limited to a time period of 5 consecutive days.

Do not raise the mast to begin drilling without using the stabilizing jacks to level and stabilize the drill. The mast pins must be in the locked position.

Mine Safety & Health Administration (MSHA) and Teck Alaska Inc. onboarding Requirements for Red Dog Mine

Ensuring personnel receive proper safety training is critical to the safe operation of Red Dog Operations. This training checklist will assist in understanding the MSHA training requirements and Teck Alaska's Safety & Health Requirements.

Red Dog Mine operates under Title 30 of the CFR (Code of Federal Regulations) Part 48B training requirements. There are two types of miners that MSHA has established:

A1 Miner: Any person working in a surface mine or surface areas of an underground mine and who is engaged in the extraction and production process, or engaged in shaft or slope construction, or who is regularly exposed to mine hazards, or who is a maintenance or service worker employed by the operator or a maintenance or service worker contracted by the operator to work at the mine for frequent or extended periods.

MSHA Program Policy Manual (PPM) states: *"Regularly exposed" means either frequent exposure, that is exposure to hazards at the mine on a frequent rather than consecutive day basis (A pattern of recurring exposure), or extended exposure of more than 5 consecutive workdays, or both.*

A2 Miner: Any person working in a surface mine, including any delivery, office, or scientific worker or occasional, short-term maintenance or service worker contracted by the operator, and any student engaged in academic projects involving his or her extended presence at the mine. MSHA Program Policy Manual (PPM) states: *The determination of whether an individual is classified as a 48.22(a)(1) "miner" for purposes of comprehensive training or as a 48.22(a)(2) "miner" for purposes of hazard training must be made on a case-by-case basis. A specific job title does not necessarily determine how the individual is defined; neither does the fact that the worker is physically present on mine property. A determination must be made as to the kind and extent of mining hazard exposure*

**** A1 Miners** taking their 48.25 MSHA New Miner training online, Red Dog Mine will only accept HSI/VIVID as an approved cooperative trainer. All other online training will NOT be accepted and all new miners shall complete "Introduction to Work Environment" by an approved MSHA instructor before assigning work duties.

- Please schedule the remaining onsite training with the T&D Department

**** A2 Miners** will need prior authorization before travelling to Red Dog. This is a case-by-case basis and we must follow MSHA regulations.

MSHA Onboarding Training Requirements

A1 Miners

Teck Employee:

- ☐ 30 CFR, 48.25 MSHA New Miner Course (24 Hours) / MSHA Form 5000-23 or
- ☐ 30 CFR, 48.26 MSHA Experienced Miner Course / MSHA Form 5000-23
 - Previous mining experience will be verified to ensure the miner has 12 months of mining experience. If not, 48.25 will be required. This also starts the miner's 48.28 annual refresher date.
 - If an employee transfers from a contractor or previous mine operator they must receive 48.26 to establish their annual refresher date.
- ☐ 30 CFR, 48.27 Task Training for all equipment to be operated (If applicable)
- ☐ Complete the "New Employee Induction Checklist" (Qualtrax #7153)
- ☐ Sign the Red Dog Operations Health & Safety Handbook Acknowledgement Form
- ☐ Respirator Fit Test Form (Qualtrax #5128)

Contractor:

- ☐ 30 CFR 48.25 MSHA New Miner Course (24 Hours) / MSHA Form 5000-23 or
- ☐ 30 CFR 48.26 MSHA Experienced Miner Course / MSHA Form 5000-23 or
- ☐ 30 CFR 48.28 MSHA Annual Refresher Training (8 hours) and
- ☐ 30 CFR, 48.27 Task Training for all equipment to be operated (If applicable)
- ☐ 30 CFR 48.31 MSHA Hazard Training "Site Specific"
- ☐ Sign the Red Dog Operations Health & Safety Handbook Acknowledgement Form
- ☐ Respirator Fit Test Form (Qualtrax #5128)

A2 Miners

Contractor/Consultant/Visitor:

- ☐ 30 CFR 48.31 MSHA Hazard Training "Site Specific"
- ☐ Sign the Red Dog Operations Health & Safety Handbook Acknowledgement Form
- ☐ Respirator Fit Test Form (Qualtrax #5128)

****Please Submit ONLY the forms listed below to RDOTraining.DocumentsOnly@Teck.com along with the information needed.**

Forms:

- ✓ New Employee Induction Checklist
- ✓ Red Dog Operations Health & Safety Handbook Acknowledgement Form
- ✓ Respirator Fit Test Form & any
- ✓ Contractor MSHA training records (All Teck training will be recorded on the training calendar on Rover)

Information Needed:

- Employee/Contractor's Last name
- Employee/Contractor's First name
- Employee/Contractor's Pin # & Name of document

For MSHA 30 CFR 48.27, training shall be:

- Specific to Red Dog's equipment make/model #'s and only required for
- Miners assigned to a task in which they have had no previous experience
- For miners with previous experience they shall demonstrate this and receive an MSHA form 5000-23 applicable to Red Dog Mine's specific equipment.

**** All training and supervised practice and operation shall be given by a qualified trainer, or a supervisor experienced in the assigned tasks, or other person experienced in the assigned tasks.**

5.15 Red Dog Operations Health & Safety Handbook

To all employees and contractors,

Here at Red Dog Operations our goal is to provide you with a safe workplace by identifying and implementing safety guidelines to be followed by everyone across the property.

The Red Dog Operations Health & Safety Handbook defines standards of safety conduct, guidelines, and best practices to be used to ensure a safe work shift for all. It explains your individual responsibilities as a courageous safety leader, and the responsibilities of your supervisor.

You are expected to understand and use these safety guidelines while you are here working at Red Dog Operations. It is a requirement of your employment. You are highly encouraged to “take safety home” and practice these same principles while conducting similar tasks during your time off. Your commitment and compliance to these safety guidelines is also an obligation to your Red Dog team members, to your family, and to yourself.

If you have any questions or concerns regarding the content of this handbook, please contact your supervisor for clarification.

Live the Teck vision, “Everyone Going Home Safe & Healthy Every Day”.

5.16 Red Dog Operations Health & Safety Handbook Acknowledgement Form

I hereby certify I have read and understand the safety requirements and guidelines in the Red Dog Operations Health & Safety Handbook. I acknowledge I will obey them to the best of my knowledge and ability. I further acknowledge I will do everything in my power to be accountable for my own safety, to look out for my fellow workers, and to always strive to eliminate, mitigate, and control hazards to prevent incidents from occurring.

Employee's Name – Please Print: _____

Employee's Signature: _____ Date: _____

Department / Contractor Name: _____

Supervisor's Signature: _____ Date: _____

Note: All employees must sign and submit this form to their supervisors within one week following receipt of the Health & Safety Handbook.

Supervisors will provide a copy of this completed form to their Teck Alaska Contract Manager or to the Teck Safety & Health Department.