



EMPLOYEE/CONTRACTOR HEALTH & SAFETY HANDBOOK

2nd Edition

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The Sinopec Canada Energy Vision & Health, Safety and Environment Policy

Vision Statement

We, the Sinopec Canada Team, commit to being a top performer in the innovative development of our world-class assets, delivering sustainable and profitable growth. WE will do this in a way that reflects commitment to our social, safety and environmental responsibilities in the communities we are privileged to operate in, maximizing shareholder value so that Sinopec Canada is known by our employees and stakeholders as the company of choice.

HSE Policy

In support of the Sinopec Canada Vision Statement; is committed to conducting all activities ensuring that the Health and Safety of employees, contractors, and public while maintaining the quality of the environment for future generations.

Sinopec Canada management, employees and contractors will act with the responsibility, accountability and leadership needed to fulfill our business goals and expectations of our many stakeholders.

Our commitment is to integrate the following objectives on all operations striving to be best in class:

- Promote consultation with public, government agencies and all stakeholders regarding operations and being responsive to their concerns.
- Demonstrate strong visible and active leadership that includes employees and contractors to manage health, safety and environmental performance.
- Ensure employees and contractors meet or exceed all regulatory requirements.
- Ensure effective emergency response measures and capabilities are in place to respond to all unforeseen events.
- Encourage innovative thinking and active leadership to improve safety and environmental performance.
- Maintain reporting commitment of incidents and investigations resulting in improvement and preventing recurrence.

Excellence in Health, Safety and Environmental performance shall be achieved through active participation and commitment of Sinopec Canada employees and contractors.

Original Signed by

Derek McCoubrey
Chief Operating Officer
2014

PRINCIPLES OF FIELD BOOK:

This health and safety handbook is to provide health and safety requirements and company policies, standards and procedures to our contract and employee workforce. These procedures form the foundation of an effective safety program. Such a program can only be achieved by people who are committed to working together safely. Your personal active participation and cooperation are essential to the success of our safety program and its continuous improvement.

Workers must follow the safety procedures contained in this handbook and all applicable government regulations while working on Sinopec Canada worksites. Contractors will make this information available to their employees and subcontractors and ensure the safety requirements are met.

In a dynamic environment, rules cannot be established to cover all conditions and situations. It is mandatory that you, for your safety and the safety of your fellow workers, be alert and exercise good judgment at all times. When in doubt, do not take chances; consult your supervisor.

Sinopec Canada has the right to inspect any company worksite employing contract workers to ensure they are adhering to appropriate provincial regulations and Company policies, standards and procedures.

If anyone has concerns or comments, they are encouraged to contact a Health and Safety Representative in Calgary.

Prepared:

May 2014

CONTRACTOR PRACTICE

Contractor Selection (Service Providers)

Contractors can be companies from whom Sinopec Canada has selected one or more specific individuals to perform a service (eg. professional or technical specialists, temporary staffing agencies), or companies that Sinopec Canada has selected to perform a service without specifying the individuals who will provide the service (eg. document reproduction services; services for drilling, completions, reclamation, construction, facilities and workovers).

All contractors must comply with:

Sinopec Canada's requirements for liability insurance and WCB coverage, appropriate training, and ensure all employees or subcontractors are competent to undertake such work.

Periodic Reviews

The services and deliverables provided by contractors are reviewed periodically through the course of the terms of their agreements.

Only Service Providers on Sinopec's Safety Approved Service Provider List within Complyworks can work on Sinopec Canada sites. Any Service Providers working on a Sinopec Canada worksite must be properly approved and orientated. All Sinopec Canada Service Providers and their employees must meet or exceed the following requirements:

- Proof of Coverage
 - WCB proof of current coverage in the province where work is being conducted.
 - Comprehensive Liability Insurance (\$5 Million minimum)
- COR
 - Service Providers required to have a valid Certificate of Recognition (COR) or Small Employers Certificate of Recognition (SECOR)

1.0 GENERAL REQUIREMENTS

1.1 Onsite Supervisor (Sinopec Canada Representative) Responsibilities

An onsite supervisor may be a Sinopec Canada employee or an individual designated by Sinopec Canada who is representing Sinopec Canada on site and is generally responsible for directing all workers involved in the daily workplace activities.

- Ensure all contractors on site are pre-approved by Sinopec Canada and have been orientated.
- Ensure all workers are aware of the contents of the tri-fold and follow the policies and procedures outlined in it as well as have the necessary training.
- Accept appointment as the Sinopec Canada Representative to perform supervisory duties and functions as assigned by Sinopec Canada.
- Insist on performance and behaviors that meet the standards of Company and government expectations. Outline the consequences if these expectations are not met.
- Supervise contractors, as far as it reasonably practicable, to ensure Company and government requirements are being followed.
- Ensure the proper use and maintenance of personal protective equipment.
- Ensure the site specific emergency response procedures are in place and that all workers are prepared to follow them.
- Ensure that workers are aware of their rights and responsibilities under OH&S legislation including their right and obligation to refuse to do unsafe work.
- Have sufficient knowledge, training and experience to provide supervision, instruction, and training as they relate to work activities and the competence of the workers.
- Be involved in hazard identification, hazard analysis, and encouraging workers to report hazards. This includes prompt follow-through and corrective action.
- Ensure proper resources for manpower and equipment are provided for the task at hand.
- Conduct inspections of equipment, and observe workers doing the work on a regular basis. Follow through so that unsafe acts or conditions are being properly addressed and corrections made.
- Ensure that accurate documentation is kept of all training, equipment inspection / maintenance and any other information deemed relevant.
- Ensure regular safety meetings are being held and recorded.

- Know and practice the Company policy on incident prevention and reporting and investigating in a timely manner.
- Ensure the procedures for handling, transportation, disposal, storage and use of all hazardous substances, follows applicable regulations and safe practices.
- Perform the necessary Safe Work Permitting and Hazard Assessments, and Pre-Job/Tailgate Safety Meetings as required for the specific job.
- Notify Sinopec Canada immediately if unable to adequately carry out the supervision of the work assigned.

1.2 Contractor Responsibilities

- Report to the Sinopec Canada Representative upon arrival at a Sinopec Canada worksite.
- Participate in the Sinopec Canada safety orientation including familiarization with potential job site hazards and emergency procedures.
- Take all reasonable steps to protect the health and safety of all workers on site.
- Be made aware of and follow requirements of OHS legislation and Sinopec Canada.
- Ensure the accurate documentation is kept of all training, equipment inspection/maintenance and any other information deemed relevant by Sinopec Canada
- Ensure that Workers Compensation Board (WCB) is in good standing for the province in which the contractor company is working and the appropriate amount of liability insurance is carried.

1.3 Worker Responsibilities

- Present yourself physically and mentally fit to start work at the beginning of each shift
- Refuse to work under unsafe conditions or perform work for which they are not adequately prepared.
- Protect the health and safety of themselves as well as others.
- Follow, as a minimum, all Company operating standards, codes of practice, safe work practices and verbal instructions from their supervisor.
- Wear or use all personal protective equipment (PPE) required by a hazard assessment, government regulations or supervisor direction.
- Report to their supervisor any unsafe practices, hazards, conditions or acts which may come to their attention.
- Report all incidents, near misses, injuries or illnesses to their supervisor.

- Notify their supervisor of any prescribed over-the-counter medication that could impair their work performance.
- Know where the emergency equipment, alarms and emergency response numbers are located, and how to evacuate when working at facilities or work sites.
- Participate in all safety meetings and training courses.

1.4 Visitors

A visitor is anyone who will be on a worksite for a short period of time (eg. Less than a day) and who must be accompanied at all times to ensure they are protected from the hazards on the site. Visitors can include government representatives, senior Company employees and others. Visitors will meet the following safety and environmental responsibilities:

- Visitors are not permitted on Company property or worksites except when permission has been granted by a Company supervisor, and only when accompanied by a Company representative, unless otherwise approved.
- Participate in a site orientation.
- Visitors must follow the instructions of the site supervisor or escort.
- Visitors must wear appropriate personal protective equipment for the area and work conditions.
- Visitors that do not have the minimum safety tickets (H2S Alive, First Aid, WHMIS & TDG) will be permitted on site as long as a Company Representative with the minimum safety tickets accompany the visitors at all times.

1.5 Workers Right to Refuse Unsafe Work

According to regulations, all workers not only have the right but the obligation to refuse to perform a task if they feel that the work might be dangerous. No employee or contractor shall perform any task that would put them or any other worker in a situation where they might be injured. If a worker feels that a task is unsafe the following steps need to be taken:

- The worker notifies their employer or supervisor of their refusal explaining the reasons for the decision.
- The employer or supervisor together with a Sinopec Daylight Representative (if not already included) must investigate the situation and take the necessary actions to eliminate or control the danger if it exists.
- The task cannot be completed until either the risk is controlled or the worker feels that the hazard is no longer present.
- OH&S can be contacted by either party to adjudicate unresolved issues.

NOTE: A worker cannot face any disciplinary action for invoking his obligation of refusing to do unsafe work.

1.6 Safety Meetings

Pre-Job/Tailgate Safety Meetings (On-Site)

The Sinopec Canada Representative is required to hold and actively participate in pre-job/tailgate safety meetings to discuss the scope of the project, including all of the known hazards involved and all of the associated control measures implemented with personnel present on the worksite at the time of the meeting.

General Safety Meetings

All Sinopec Canada Production groups must conduct safety meetings on a monthly basis with formal minutes and review of past meeting minutes with their workers. These meetings facilitate open discussions of health and safety issues that may be on concern and allow Sinopec Daylight management to be proactive in addressing concerns before they turn into incidents.

1.7 Reporting of Incidents

ALL incidents, injuries and near misses that occur on the job, no matter how small, must have a preliminary report within 24 hours submitted through our online incident reporting tool (www.beyondcompliance.com).

Any injury that results in a worker being transported to hospital for further evaluation an immediate notification to HSE Calgary is required.

**Reference: Incident Reporting
Sinopec Canada HSE Manual, Section 8**

1.8 Housekeeping

Good housekeeping practices are a basic part of incident prevention. Clean worksites encourage pride in workmanship and prevent hazards that lead to incidents. Such practices include, but are not limited to, the following:

- Work sites shall be left in an orderly fashion after each job has been completed and at the end of a worker's shift. All equipment, tools, extension cords, materials, and supplies must be stored in a safe and orderly manner.
- Put all refuse in the appropriate containers, all flammable material (ie. Rags) must be stored in a covered metal container.

- Keep the work areas clean and free of oil, grease, mud, and other slippery materials to prevent “slip, trip and fall” hazards. Post signs to warn others of slippery floors.
- Ensure that aisles and walkways, entrances and exits, access to firefighting and first aid equipment are kept clear of obstructions (ie. Equipment deliveries, materials and waste).
- Hazardous wastes or WHMIS-controlled products shall be collected and disposed of properly.
- Never set tools or materials on raised areas, such as pipe racks or ledges, where they might fall and strike another worker.
- Remove all sharp objects when noticed. This includes scrap metal, broken glass, nails in wood, scrap welding rods, reinforcing steel, and tin.
- Electrical and mechanical rooms are not to be used for equipment storage.
- Always leave washing and toilet facilities in good sanitary condition for others.

1.9 Head and Facial Hair

Head hair must be trimmed to collar length or tied back, so it will not:

- Become entangled in rotating equipment or machinery.
- Absorb large quantities of airborne hazardous materials.
- Catch fire from a spark

Where respiratory protective equipment may be required to be worn, workers must be clean-shaven and under no circumstances are beards of any type (ie. Goatees, or Manchurian moustaches) permitted, as they may directly interfere with the ability to obtain a proper seal with air masks and/or resuscitation equipment.

1.10 Smoking, Matches, and Lighters

Smoking is not permitted on our work sites except in designated areas as determined by the on-site supervisors. “No Smoking” signs must be obeyed.

Designated smoking areas will not be within 25 metres (75 feet) of wellheads, drilling or service rigs, process or storage facilities, other hazardous areas, and motor vehicles within this distance. Never smoke near flammable liquids or gases. Signs should be posted so that smoking areas are clearly identified.

1.11 Alcohol and Drugs

Sinopec Daylight prohibits the possession and use of illegal drugs and alcoholic beverages at their work sites. Additionally:

- All workers are expected to be fit for duty when reporting for work and to remain fit for the duration of the workday. This means that workers must not be impaired or suffering from the after effects of alcohol, illegal drugs, and/or over-the-counter or prescription drugs.
- The possession (includes drug paraphernalia) or use of alcoholic substances or illegal drugs on the job may result in disciplinary action, including dismissal.
- Workers must advise their supervisor, prior to starting work, of any performance impairment which might be expected due to the use of over-the-counter or prescription medication. These drugs must remain in their original containers.

1.12 Working Alone

Sinopec Canada has conducted a hazard assessment to identify the additional risks associated with working alone. Procedures have been put in place to mitigate these hazards. All employees are expected to comply with the Sinopec Canada Working Alone Code of Practice Requirements.

Contractors are expected to have their own working alone program which equals the Sinopec Canada requirements or fall within the Sinopec Canada program.

***Reference: Working Alone Code of Practice
Sinopec Canada HSE Manual***

1.13 Electronic Devices in Hazardous Areas

Follow these guidelines when using electronic devices in hazardous locations:

- Cellular phones, pagers, laptops, PDA's, and other commercially available electronic devices are not permitted to be taken into hazardous locations. The only exceptions are if these devices have recognized certifications for the hazardous location into which they shall be taken or if under the provisions of a Hot Work Permit.
- Know the locations where these devices are not permitted at the work site.

1.14 Call-out Procedures

A call-out is a response by personnel to an alarm (or other notification) at an unmanned production facility during “off” hours. A one-person response to an alarm may be acceptable where there is no risk of exposure to hydrogen sulphide (H₂S), fire, or security threats.

A worker who conducts a one-person response will have their own transportation and communications systems, and be equipped with appropriate personal protective equipment (including a functional portable gas detector).

- Any worker on call-out duty must ensure they are deemed fit to respond to a call-out and that they are able to safely perform their duties without suffering from the use or after-effects of alcohol, illicit drugs or prescription drugs (cause drowsiness, etc.).
- Any call out of an H₂S release must be responded by a minimum of two workers.
- The worker responding to the call-out will follow the site-specific working alone plan.
- Personnel should not approach suspicious looking individuals; they should contact local police and provide detailed descriptions of all suspicious activity at or near company property. All security incidents (ie. Theft, vandalism, and trespassing) are to be reported to local police and documented on the incident report form.
- A two person call out should be considered during extreme weather/road conditions.

1.15 Jewelry

All jewelry and personal accessories such as necklaces, bracelets, and watch bands should be close fitting or contained/enclosed or protected to prevent entanglement. Break-away closures are recommended. Rings should have split bands.

1.16 Firearms and Weapons

The possession and use of firearms on Sinopec Canada premises or in vehicles is prohibited.

1.17 Eye Wash Stations

Emergency eye wash stations are placed at all locations where chemical and other hazardous materials are handled. The location of all eye wash stations will be identified during the work site orientation.

1.18 Workplace Violence

Violence is not acceptable at any company work site. Violence means the attempted or actual exercise of any physical force, threatening words or behavior by a person so as to cause injury to another person or damage to property.

1.19 Community Relations

Maintaining positive relationships with those living near Sinopec Canada operations is important

- Conduct operations in ways that reduce landowner concerns. Key landowner concerns include flaring, odour, noise, traffic and dust.
- If concerns are identified, ensure that they are addressed in a timely manner.
- When concerns cannot be resolved at the field level, notify and involve Sinopec Canada Surface Land Management.

Note: Do not make any commitments to a landowner or resident without approval from Sinopec Canada Surface Land Management.

1.20 Training

Sinopec Canada expects that employees and contractor personnel will have all training required to perform their job legally and safely. It is the responsibility of the employer to ensure that their personnel have all necessary safety training required prior to the commencement of the job.

All workers **SHALL** have the following training:

- First Aid
- WHMIS
- TDG
- H2S Alive (sour locations)

Additional site specific training requirements will be determined and communicated by Sinopec Canada.

Sinopec Canada Calgary based employees traveling to an active work site more than once a month are required to complete the minimum training requirements outlined above.

Refer to Section 15 for Specific Training for Employees/Contract Operators and On-Site Supervisors.

1.21 Site Specific Orientation

Workers entering onto a Sinopec Canada work site **SHALL** receive a site specific orientation of the hazards, work site procedures, and the

emergency response and rescue procedures for that particular site. They may also expect to be quizzed on these issues to ensure they have understood the information presented. Completed orientations are usually documented and retained on file by the company.

The site specific orientation will include:

- Work site hazards and the controls and safeguards to reduce/eliminate hazards.
- Emergency Response “need to know” items.
- Acknowledgement signature/record of orientation
- Location of safety equipment

2.0 PERSONAL PROTECTIVE EQUIPMENT

Personal protective Equipment (PPE) helps reduce the consequences of worker exposure to various worksite hazards. The intent of PPE should be to provide a last line of defense in the event other hazard control measures fail.

Sinopec Canada site representatives are responsible for ensuring employees and contractors are aware of and use their protective equipment and clothing required for each job.

2.1 Head Protection

CSA/ANSI approved hard hats must be worn by all personnel & visitors on Sinopec Daylight work sites where there is potential for materials to fall or collide.

2.2 Eye or Face

Safety glasses with side shields must be worn by all personnel and visitors on Sinopec Daylight work sites. Safety goggles and/or face shields must be worn if there is a specific job hazard. All eye or face protection must be CSA approved.

Sinopec Daylight will allow the use of contact lenses in most work environments provided the same approved eye protection is worn as required of other workers in the area (ie. Chemical/splash goggles, safety glasses to protect against the hazards)

2.3 Hearing

CSA approved hearing protection is required where a noise hazard exists. The protection must attenuate noise levels to below occupational exposure levels.

2.4 Foot

CSA approved Class 1 footwear is required by all workers on Sinopec Daylight worksites. Footwear must cover the ankles and be chemicals resistant.

2.5 Hand

Gloves are required when working on site. The appropriate type of glove must be worn based on a proper hazard assessment for the specific task.

2.6 Respiratory

Respiratory apparatus is required when the atmosphere at the work site is:

- Oxygen deficient (<19.5% O₂ by volume).
- Contaminated with concentrations of hazardous gases, mists or aerosols in excess of acceptable Occupational Exposure Limits (OELs) or if Immediately Dangerous to Life and Health (IDLH).
- Contaminated due to a work activity that produces excessive dust or releases noxious gases.

Sinopec Canada will supply all work sites (where exposure to toxic gases is a possibility) with respiratory protective equipment suitable to the nature of the hazard and the most appropriate hazard control.

We expect that all contractors who are required to use respiratory protection will be trained in its use, care, and limitations. Contractors are responsible for ensuring that their workers have been fit tested as required and be prepared to send in all documentation to the Calgary HSE Department.

***Reference: Respiratory Protection Code of Practice
Sinopec Canada HSE Manual***

2.7 All Terrain and snow vehicles

Operators of all terrain / utility or snow vehicles must wear protective headgear meeting DOT or a nationally accredited testing association such as CSA or UL requirements and hold a valid training certificate

2.8 Personal Gas Monitors

Personal monitors are designed to provide continuous monitoring of the atmosphere and intended to monitor for changes while in the work space. Personal monitors must be calibrated and bump tested according to methods specified by the monitor manufacturer at the start of each work day and after each time an over-range alarm is activated on the monitor. Ensure calibrations and function tests are properly documented either on a paper log or in the form of an electronic docking station.

2.9 Body

Fire retardant outer wear is required on Sinopec Daylight work sites where the worker may be exposed to flammable or explosive atmosphere.

The following table identified some typical worksites and their inherent clothing requirements. This list is for clarity purposes only and job specific hazard analysis should be used to identify any additional clothing required.

Worksite	Potential Threat/Hazard	Minimum Requirement (Hoodies are not allowed on Sinopec Daylight work sites)
Undisturbed forest/grassland	Foreign objects, insects, weather	Natural fabrics pants and long sleeve shirt
*Green construction site	Mobile equipment, foreign objects	Natural fabric pants, long sleeve shirt and high visibility vest
**Brown construction /reclamation site	Flammable or explosive environment, mobile equipment, foreign object	Flame resistant outer layer with approved high visibility marking
Drilling or Completion site	Flammable or explosive environment, mobile equipment, foreign object	Flame resistant outer layer with approved high visibility marking, Job-specific protective clothing as indicated in the hazard assessment
Plant/ Facility/ Wellsite, pipeline right of way	Flammable or explosive environment, mobile equipment, foreign object	Flame resistant outer layer with approved high visibility marking, Job-specific protective clothing as indicated in the hazard assessment

* A “green” construction site is a work site that has never been used for industrial purposes

** A “brown” construction/remediation site is a work site that has been used for industrial purposes

At all Sinopec Canada field facilities or worksites “NO HOODIES” are to be worn. Head office and field offices that are not on an active worksite are exempt from the no hoodie policy as long as they are not travelling or working on any Sinopec Canada work site involving Drilling, Completions, Facilities & Construction, or Production Operations.

3.0 SAFE WORK PRACTICES

3.1 Safe Work Permits

A Safe Work Permit is a written record which authorizes specific work, at a specific location, for a specific period of time. The Permit itemizes the correct procedural sequences and necessary controls to ensure that all foreseeable hazards have been considered, and the appropriate precautions are defined before work commences.

The Safe Work Permit is an agreement between the Permit issuer and the Permit Receiver (workers) and identifies the following:

- All potential hazards associated with the job (including adjacent work areas) and the measures taken to control or eliminate the hazards.
- The conditions (ie. Equipment preparation, atmospheric testing, waste disposal, etc.) under which the work can proceed.
- The required safety equipment (ie. PPE, rescue equipment, SCBA, etc.) to complete the job.

The Safe Work Permit will aid in the identification and control of hazards at the work site, but it will not by itself make the job safer.

A Safe Work Permit is primarily issued for non-routine work at work sites and facilities. Occasionally, a Safe Work Permit will be required for routine work if workers are exposed to hazards over and above those normally associated with routine work. Workers must check with their on-site supervisor if a Safety Work Permit is required.

The Sinopec Canada Representatives must receive a Safe Work Permit from the Production group to perform the operations if the location the work is on is an existing production site.

Once the Sinopec Canada Representative is issued a Safe Work Permit for the site the operator has handed over the responsibility of the site to the Sinopec Canada Representative who will then be responsible to issue Safe Work Permits to the service providers on site under their direction.

- Within the permit job description a list of all the main tasks to complete the operation must be listed so that all parties have a clear understanding of the work tasks that are required to complete the operation. Note: Any deviation from normal operations or non-routine work to the operation will require a permit to be issued to complete the associated tasks.
- Ensure that a safe work permit is issued for each work task on site not just to the service provider. One permit CANNOT be issued for all tasks on one site.
- The permit must be reviewed with all workers performing work on the Sinopec Canada work site associated with the operation. The permit should be referenced and reviewed at the initial pre-job safety meeting and as workers are given a site specific orientation.

Some of the most common permits are noted below:

- Hot Work: permits work involving open flames, sparks, or other sources of ignition which could create a fire or explosion hazard in a hydrocarbon atmosphere.
- Vessel Entry/Confined Space Entry: permits entry into spaces with restricted access or egress such as fuel tanks, pipelines, pumping stations, process vessels, and pits, etc.
- Ground Disturbance: permits excavations and other ground disturbance activities
- Maintenance Work: permits work for general maintenance on equipment or facilities where there could be potential hazards (ie. Energized electrical equipment, H2S, or pressure, etc.)
- Working from Heights: fall protection plan must be in place.

Workers are not permitted to deviate from the conditions recorded on the Safe Work Permit, even if an alternative method seems necessary or appears to incorporate a safer procedure. In all circumstances, a new Safe Work Permit must be issued if conditions change.

Note: After an emergency, all type of permits must be re-issued by permit Issuer before work can re-commence.

**Reference: Work Permit Code of Practice
Sinopec Canada HSE Manual**

3.2 Site Specific Safe Work Procedures

Site specific safe work procedures are step-by-step instructions for high-risk work that identify the hazards, hazard controls, materials, tools and equipment, including PPE, needed to complete the work. These safe work procedures have identified the hazards typically associated with the work and usually contain emergency response and rescue procedures.

We expect that each area will develop site specific procedures for the critical jobs that are required at their work sites and expect all workers to follow for all high risk jobs they perform.

**Reference: Risk Assessment Matrix
Sinopec Canada HSE Manual**

3.3 Equipment Isolation - Purging and Blinding

All harmful substances must be removed before any repair or modification work is begun on equipment, pipes or pipelines, and a blind flange should be installed. Any unit in which a blind flange has been installed must be clearly marked as containing the device.

Written procedures must be available that instruct the worker on the purging method and medium to be used, the use of a “blind list” to ensure placement and removal of the blinds (where suitable), and step by step instructions on performing the job.

3.4 Fire and Explosion Hazard Management

Sinopec Canada expects that all contractors engaged in completions and well servicing operations will have fire and explosion prevention plans in place, that these plans will be available to workers, and that workers will be trained and have a clear understanding of fire and explosion hazard management. It is also expected that the services and equipment provided by the contractor address fire and explosion hazard management.

3.5 Fire Prevention

Fire protection is a critical part of safe operations. Good housekeeping is essential in the prevention of fires. Fires can start anywhere and at any time. This is why it is important to know which fire extinguisher to use and how to use it. Always keep fire extinguishers visible and easy to get at. Fire extinguishers have to be properly maintained to do the job. Where temperature is a factor ensure that care is taken in selecting the right extinguisher. Some fire extinguishers are indicated as being multi-purpose (ie. ABC).

Classification of Fires and Extinguishing Agents

Class A Fires

- Ordinary combustibles (ie. Wood, cloth, paper, and other organic materials).
- Extinguishing Agent: Most common is water or multi-purpose dry chemical.

Class B Fires

- Flammable liquids (petroleum products, paints, and varnishes) or substances which liquefy upon being heated (tars and some plastics).
- Extinguishing Agent: Dry chemical, carbon dioxide or dense foam. Do not use water except for cooling personnel or equipment.

Class C Fires

- Electrical fires in and around equipment (transformers, motors, generators, switch panels). It may also become a Class A fire if surrounding material becomes ignited.
- Extinguishing Agent: Carbon dioxide or dry chemical. Do not use water.

Class D Fires

- Combustible metals (e. magnesium, titanium, sodium, potassium).
- Extinguishing Agent: Cover with dry chemical (or sand) using a shovel. Do not use Type A, B, or C fire extinguishing equipment.

Wildfires

Personnel are expected to act to prevent uncontrolled fires and to follow applicable regulations regarding fire prevention. When working in prairie and forested areas, there may be a regulatory requirement (Forest and Prairie Protection Act/Regulations for additional firefighting equipment (on the work site).

Forest Fires

Forest fires present a potential risks to workers and property, and workers must be familiar with fire prevention measures and methods.

- Every worker must be familiar with the initial response and notification procedures to be followed in the event of a forest fire.

- When required, workers must co-operate in fighting forest fires and any equipment that can assist must be made available.
- When travelling by means of a vehicle through a forest protection area during fire season, the following equipment must be in your vehicle: shovel, axe (polaski), receptacle (at least 5-litre capacity), and a 20 lb. ABC classification fire extinguisher at a minimum.
- When a forest fire is discovered, attempt to extinguish small fires and immediately report the fire to the Forestry Officer. When fire endangers an installation or pipeline, the supervisor must be contacted immediately and the required course of action will be determined.

3.6 Fired Equipment

All workers who are required to light fired equipment must be properly trained, must follow the manufacturer's instructions, and must have demonstrated their competency to the on-site supervisor. Improper lighting of fired equipment is a common source of injury and fire. Safety guidelines for lighting fired equipment include:

- A wand designed for lighting fired equipment should be used.
- Never use a "torch" made of rags and flammable liquids to ignite fired equipment.
- Never light fired equipment manually if it is equipped with an automatic ignition system. Get an instrument technician to determine why it is not lighting.
- Prior to any adjustments or repairs to a burner, check the wind direction and ensure all vents and hatches are closed.
- When fired equipment has been down for maintenance for an extended period of time or during freezing weather, a worker should remain at the location (along with a fire extinguisher), during the firing-up operation until it is determined through checks that the equipment is operating properly.

3.7 Fall Protection (safety belts, harnesses and lifelines)

All workers must use or wear fall protection equipment at temporary or permanent installations if a worker could fall:

- More than 3.0 metres.
- Less than 3.0 metres, when there is a possibility that a worker could sustain injuries more serious than those likely to result from landing on a solid, flat surface (e. over moving or rotating equipment, open water or tanks, ice, heated surfaces, etc.).
- More than 1.2 metres but less than 3.0 metres, in the case of a permanent installation where guardrails or other similar means of fall restraint have not been provided.

Fall Protection System may include:

- Personal fall arrest system (full body harness with lanyard and/or lifeline).
- Travel restraint system (safety belt and vertical/horizontal lifeline).
- Control zone (area within 2 metres of an unguarded edge) that is clearly marked.
- Any other system (ie. Guardrails, scaffolds, work platforms, aerial lifts, safety net, etc.) as determined by the hazard assessment or site-specific procedures which provide the necessary safeguards or alternative worker access.

**Reference: Fall Protection Code of Practice
Sinopec Canada HSE Manual**

3.8 Excavation and Trenching

Before a worker begins working in a trench that is more than 1.5 metres in depth and the trench is narrower than its depth, workers must be protected from cave-ins and sliding material:

- Block or tie back any mechanical equipment so it is a least 1.0 metres from the excavation.
- Back slope the walls of the excavation at a slope of 45° from the vertical (or comply with OH&S regulations).
- Install engineered temporary protective structures as per the regulations.
- In a trench or excavation of 3 metres in depth or less, proper engineered shoring must be used.
- Ensure proper entry into and out of the excavation has been established. Ladders or ramps are two choices for a safe means of exit. Individuals in an excavation shall not have to travel in excess of 7.6 metres to the closest means of exit.
- Spoil piles must be at least 1 metre from the side of the excavation and have a slope of 45° or less. Power line poles, adjacent to excavations, must be protected from cave-ins.
- Proper barricades must be installed to warn people of the dangers of an open trench and to protect co-workers, the public, livestock, and wildlife from falling into the excavation.
- There shall be no workers working within the excavation while equipment is operating within the confines of the excavation

- Workers shall remain a safe distance from the swing radius and the extension of the boom for operating equipment during excavation work.
- At a minimum two access/egress shall be established prior to workers entering trench or excavation.

Hazard of working in a trench can include:

- Collapse
- Falling objects
- Hazardous gases

Regulations require that any ground disturbance or excavation deeper than 30 cm must be conducted under the supervision of a competent Sinopec Canada Representative who has successfully completed Ground Disturbance Training.

***Reference: Ground Disturbance Code of Practice
Sinopec Canada HSE Manual***

4.0 VEHICLE OPERATIONS

Sinopec Canada recognizes driving as the predominant hazard in our industry and expects that contractors have the means to ensure that their workers are continuously competent to operate vehicles or equipment.

Employees and Contractors must be aware that their actions on roadways reflect directly on our Company's image and reputation with the public and our neighbors. Please obey all posted and imposed conditions for roadway use.

A company vehicle includes any vehicle that is owned, leased or rented by the company. It also includes all-terrain vehicles and snowmobiles. All personnel who operate a company vehicle must meet the following safe driving and vehicle operation requirements.

- Drivers shall not exceed posted speed limits and shall drive according to the weather and road conditions.
- Traffic fines are the sole responsibility of the driver.
- No vehicle shall approach or park within 7.5 metres of any wellhead, piping, process vessel, or tank containing combustible fluids [***Reference: Sinopec Canada Vehicle Entry Classified Area Policy***]
- It is against the law in all jurisdictions to speak on a hand held phone while driving. If you have to answer your cell phone, use the hands-free features of your phone.

- Ensure your vehicle is in good running order and is equipped with basic emergency equipment (**Reference: Sinopec Canada Company Vehicle Policy**)
- Ensure all loads are properly secured to prevent them from shifting or falling off the vehicle by use of a cargo net.

4.1 All-Terrain Vehicles (ATVs)

ATVs include 4-wheel quads, snowmobiles and side by side (UTV). All personnel operating an ATV must have a valid certificate of competency in ATV operations. ATV safety precautions are listed below:

- Wear a CSA-approved helmet with face shield, glasses, or goggles.
- Check your communications and safety equipment prior to departure.
- Passengers are not allowed on ATVs (except if allowable as per manufacturer's instructions).
- Consider the wind chill factor and dress warmly in winter.
- Always start your trip with a full tank of fuel. Check your oil and inspect the ATV for oil or fuel leaks.
- Travel off-road only and at safe speeds.
- Look ahead for possible obstacles such as fence lines, branches or rough terrain.
- Follow working alone procedures when travelling long distances to remote areas.
- Trailering of ATV's & UTV's is a preferred method of transport.

4.2 High Loads

Personnel who transport overweight, high, wide, or long loads are to contact the appropriate regulatory agencies or utility companies (within the province where work is being carried out) regarding possible permit requirements. Prior to transporting loads, drivers shall ensure power line clearances on route and on site are adequate and can be safely navigated.

High voltage wires or other equipment can only be handled safely by someone with proper qualifications, training, and tools. Never attempt to move or raise an electrical conductor with a board or stick. Never approach or touch an electrical conductor that is lying on the ground; it may be energized, or become energized. If possible, the area around the conductor which is lying on the ground should be barricaded or guarded to prevent injury until a qualified person determines it is safe. No one should approach within 32 metres of a downed power line (500kV assumed)

See "Safe Limit of Approach Distances from Overhead Power Lines for Persons and Equipment".

4.3 Powered Mobile Equipment

All personnel operating powered mobile equipment must be properly trained in its operation, must follow the manufacturer's instructions, and must have demonstrated their competency to the on-site supervisor. This equipment category includes hoists barrel movers, elevating platforms, and man lifts.

Some safe operating guidelines are listed below:

- Do a walk around check of the equipment before and after operating it. Check the fluid levels, hydraulic system, lights, tire pressure and check for loose parts.
- Always operate the equipment within its rated load capacity.
- On elevating platforms and man lifts, ensure the fall restraint system is in place (ie. Guardrails and/or safety belts) and the outriggers are deployed.
- Never use mobile elevating platforms to travel between work areas.
- Check the emergency shutdown devices and the backup alarm.
- When walking or working near any mobile equipment, always make sure the operator sees you.

4.4 Towing a Trailer

Vehicles that are used for towing must be properly equipped. Hitches, receivers and wiring must meet the vehicle manufacturer's specifications and government regulations.

4.5 Winching/Towing - Vehicle Breakdowns

In the case of vehicle breakdowns, we expect that vehicle recovery activities will be conducted in a manner which ensures personal safety and prevents property damage.

- Only approved towing apparatus (tow ropes, straps, tow bars) **SHALL** be used and the towing apparatus shall be connected to an appropriate anchor point such as a heavy hitch or tow hook. The anchor point must be capable of withstanding stress in excess of the rope or strap rating.
- Do not use ropes, slings or straps in conjunction with chains. Ropes, slings and straps stretch under tension. If a chain were to break the recoil from the rope would throw the chain pieces with immense force.
- Do not allow anyone to stand near or in between either vehicle or the tow rope or strap while the vehicles are in motion.
- Make sure to have proper communication prior to towing vehicle so each party understands plan

- Assess if you can tow safely and if not have a tow truck pull out vehicle.
- Caution should be considered when offering assistance to public. Provide comfort and call to appropriate towing company.

5.0 HAZARDOUS MATERIALS

Before undertaking any work involving handling or exposure to any hazardous materials, workers must ensure:

- They are aware of the hazards and take appropriate precautions
- Approved personal protective clothing and appropriate safety equipment is used
- Adequate ventilation is provided
- Approved fire protection is provided
- First aid supplies and facilities are available.

5.1 Workplace Hazardous Materials Information System (WHMIS)

WHMIS is a national information system designed to ensure that all employers obtain the information that they need to inform and train their employees properly about hazardous materials used in the workplace. Through legislation, WHMIS establishes uniform requirements to ensure that suppliers and employers using standard classification criteria identify the hazards of materials produced or sold in, imported into, or used within workplaces in Canada.

WHMIS focuses on three main requirements to protect worker safety; labeling of controlled products, material safety data sheets and training programs.

There are two types of labeling required for products provided by a supplier: supplier labeling, which is applied to the controlled product by the supplier, and workplace labeling which the employer applies to the product if the original label becomes illegible or the product is transferred to another container. Supplier and workplace labels must contain the following information:

Supplier Label:

- Product identifier
- Supplier identifier
- SDS statement
- Hazard symbol(s)
- Risk phrases
- Precautionary measures
- First aid measures

Workplace Label:

- Product identifier
- Hazard symbol(s)
- Personal Protective Equipment
- Other information on safe use handling and storage
- SDS (Safety Data Sheet) statement

Labels must also appear on the containers of any hazardous products produced at the worksite that fit the hazard criteria of the Controlled Products Regulation of the federal Hazardous Products Act. These labels must include a product identifier, information about the safe handling of the product and reference to a material safety data sheet for the products. Containers of hazardous products include jugs, barrels, cans, hoses, piping systems, tanks, vessels and anything else that will hold the product.

Safety Data Sheets (SDS) provide more detailed information about the content, hazards, precautionary and emergency response measures for controlled products. They must be available to workers for all controlled products on a worksite, whether the products are provided by a supplier or created at the worksite.

Worker training is also required under WHMIS for all workers who may be exposed to hazardous materials at the worksite.

WHMIS HAZARDOUS SYMBOLS AND CLASSES



CLASS A: Compressed Gas



CLASS B: Flammable & combustible material

Division 1: Flammable gases
Division 2: Flammable liquids
Division 3: Combustible liquids
Division 4: Flammable solids
Division 5: Flammable aerosols
Division 6: Reactive flammable materials



CLASS C: Oxidizing material



CLASS D: Poisonous & infectious material

Division 1: Materials causing immediate and serious toxic effects

Sub-Division A: Very toxic material
Sub-Division B: Toxic material



Division 2: Materials causing other toxic effects

Sub-Division A: Very toxic material
Sub-Division B: Toxic material



Division 3: Bio-hazardous infectious Materials



CLASS E: Corrosive material



CLASS F: Dangerously reactive material

5.2 Transportation of Dangerous Goods (TDG)

The Regulations related to the safe handling and transportation of dangerous goods are encompassed federally in the “Transportation of Dangerous Goods Regulations (Clear Language)”

The purpose of the Regulations is to promote public safety while transporting dangerous goods throughout Canada, and applies to all modes of transportation.

The Regulations apply to all involved in offering for transport, handling and transporting of dangerous goods. Handling includes loading, packing or placing, unloading, removing or reloading, repackaging or replacing dangerous goods in or from any container, packaging or means of transport or at any facility for the purpose of, in the course of, or following transportation and includes storing dangerous goods in the course of transportation.

Dangerous Goods Classification

Class 1	Explosives
Class 2	Compressed Gases
Class 3	Flammable Liquids
Class 4	Flammable Solids, Spontaneously Combustible and Water Reactive Solids
Class 5	Oxidizers and Organic Peroxides
Class 6	Poisonous and Infectious Substances
Class 7	Radioactive Materials
Class 8	Corrosive Substances
Class 9	Miscellaneous Dangerous Goods

A shipping document containing certain information about the dangerous goods must accompany each shipment of the goods, unless a permit exempts the goods from this requirement.

When the total mass of the dangerous goods exceeds 500 kg, the vehicle or transport carrying the dangerous goods must be placarded on all four sides with the appropriate placards.

Spills, bulk container damage, fire, explosion and transportation incidents involving dangerous goods must be reported immediately.

Further information concerning TDG and related products can be found in:

- TDG Training courses
- TDG Regulations

6.0 WORKPLACE HAZARDS AND CONTROLS

6.1 Alarm Systems to Detect Explosive Gases, H₂S, and Fire

Alarm systems are installed in some facilities to detect explosive gases, hydrogen sulphide (H₂S) and fire. Operations personnel at the facility must familiarize themselves with the detection and alarm systems installed, and must be adequately trained in the use of, and response to, plant alarms.

Sinopec Canada expects that monitor and alarm systems will be inspected regularly and that alarm systems will not be left in a bypass mode or be altered in any way (even minor changes could introduce hazards). If the detection system malfunctions, make arrangements for immediate repairs by a qualified service technician.

Should an alarm (gas, H₂S, fire) occur, notify all personnel at the work site of the alarm condition, suspend all hot work immediately, evacuate the area to a safe location (especially when LEL readings exceed 10% or where H₂S readings exceed 10 ppm), and proceed with emergency response and investigation of alarm conditions.

Gas Alarms are identified at all Sinopec Canada facilities with a blue flashing light. All other alarms are identified with a red flashing light.

6.2 Atmospheric Monitoring

Atmospheric monitoring is applicable to any area where the work environment is, or may become, hazardous due to the presence of combustible or toxic gases, or when the oxygen content is less than 19.5% or greater than 23% by volume.

All work locations must have combustible gas, toxic gas (when H₂S may be present) and oxygen detection equipment available, as required, for monitoring the atmosphere prior to and during work procedures. All work site locations that have portable and permanent atmospheric monitoring equipment must develop site-specific procedures that govern instrument use, documentation, repairs, and training.

6.3 Blanking and Blinding (equipment isolation)

Positive isolation is required whenever the act of opening pipes, equipment, or vessels (including entering confined spaces) could present a potential for injury or equipment damage due to Energy Sources, including electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or any stored energy. Blanking and blinding separating or plugging are the most positive methods of isolating these systems.

A hazard assessment must be conducted and a Safe Work Permit issued when isolating pipes equipment or vessels.

**Reference: Lockout/Tagout Code of Practice
Sinopec Canada HSE Manual**

6.4 Bonding and Grounding

The usual precaution to avoid static electricity sparking is proper bonding or grounding. Proper bonding and grounding is required to prevent ignition due to static electricity sparks when:

- Drawing samples into containers
- Transferring flammable liquids between containers
- Unloading or loading tank trucks
- Using portable electrical equipment and tools
- Entering or working in a confined space

Workers must discharge potential static buildup in their clothing by grounding themselves prior to undertaking these activities.

The terms “bonding” and “grounding” should not be used interchangeable, because the two processes have distinctly different functions. Bonding eliminates a difference in potential between objects, while Grounding eliminates the difference in potential between objects and the ground. Bonding and grounding are only effective when applied to conductive bodies.

6.5 Building Entry

Employees and contingent workers entering well sites or facility process buildings must understand and exercise their responsibilities to ensure that the activities can be carried out safely and with minimal risk to people, the environment, public, private, or company property. Hazard assessment and use of precautionary measures must be considered as “routine work practice” when entering well sites and facilities.

Typical hazards include:

- Flammability, explosive, pressure.
- Confined spaces, oxygen displacement, and toxic atmospheres.
- Static electricity.
- Chemicals such as methanol, biocide, demulsifiers, scavengers, etc.

Typical precautionary measures include:

- Hazard assessment
- Bonding and grounding practices before entry.
- PPE appropriate to the nature of the hazard
- Working alone practices and emergency preparedness.

6.6 Bypassing Safety Shutdown Equipment

Under normal operating conditions, safety devices such as pressure safety valves (PSV) and emergency shutdown (ESD) equipment must not be bypassed. When there is no alternative but to bypass:

- A Hazard Assessment must be conducted by a qualified and competent person
- Site specific procedure must be developed and approved to maintain safe operations
- A Safe Work Permit must be issued with a follow-up inspection
- All bypassed devices must be returned to original service

***Reference: Sinopec Canada Bypassing Safety Device Policy
www.beyondcompliance.com***

6.7 Chemical Storage

All chemicals must be properly labeled, and the Material Safety Data Sheets must be reviewed by the on-site supervisor before being allowed on the premises.

Storage of chemicals and other potentially hazardous materials should be limited to quantities that are reasonably needed at the work site.

Workers must ensure they comply with the requirements specified in the Workplace Hazardous Materials Information System (WHMIS) and the Transportation of Dangerous Goods (TDG) Regulations.

6.8 Compressed Air

All workers who are required to operate compressed air equipment must be properly trained, must follow manufacturer's instructions and must demonstrate their competence to the on-site supervisor. Guidelines for using compressed air include:

- Never use compressed air to blow debris or to clean dirt from your clothing. If it is directed to your eyes, ears, or other parts of your body, it can cause serious injuries.
- Never use compressed oxygen as a substitute for compressed air.
- Wear appropriate PPE such as goggles and/or face shields, and protective footwear.
- Cleaning machinery and/or parts with flammable solvents must not be done with pressures above 25 psi (170 kPa) in hazardous areas. Solvents are easily atomized creating a flammable atmosphere which could be ignited by any ignition source.
- Ensure intake air for compressors is taken from outside buildings and from an area free of hydrocarbon gases and flammable.

6.9 Compressed Gas Cylinders

- Storage areas shall be located away from general traffic paths and not adjacent to vehicle paths
- Cylinders shall have valve protection caps in place whenever they are not connected
- When transporting or storing, cylinders must be upright and secured with protective caps in place

6.10 Confined Space Entry

A “confined space” is an enclosed or partially enclosed space having restricted entry or exit, a potential for a hazardous atmosphere, and which due to its nature may form a trap and become a life threatening environment. Such spaces are usually not designed or intended for human occupancy. Examples may include but are not limited to tanks, heights, vessels, deep pits, trenches etc. Sinopec Canada defines these work spaces as either Class B or C confined spaces.

The entry supervisor must have formal training in confined space entry and must provide all workers associated with the confined space work with a site specific discussion of the confined space hazards and the controls that will be used. This discussion will serve as site-specific confined space entry training only, and is not transferable to other work sites or other confined

space entries on the same work site. This discussion must be documented on the pre-job safety meeting.

A hazard assessment must be conducted prior to entry into a confined space and must be documented on a Confined Space Hazard Assessment form (or equivalent mechanism). A Safe Work Permit is required for all confined space entries.

A “restricted space” is an enclosed or partially enclosed space, not intended for continuous human occupancy that has a restricted, limited or impeded means of entry or exit because of its construction. All other hazards are either non-existent or have been eliminated or controlled. Restricted spaces are therefore not subject to the permitting, atmosphere testing and tending worker requirements of a confined space. Examples may include but are not limited to electrical or communication utility vault, building crawl space, trench with a temporary protective structure, deep excavation requiring ladder or lift access etc. Sinopec Canada defines these work spaces as Class A.

Work Spaces identified as Class A a Sinopec Canada Work Permit, including task-specific hazard assessment and associated safe work procedures would apply.

***Reference: Confined Space Code of Practice
Sinopec Canada HSE Manual***

6.11 Diesel Engines

We expect that all diesel engine powered equipment which is routinely used within 25 metres of a wellhead or an oil and gas facility will be equipped with a positive air intake shut-off. Sinopec Daylight recommends an automatically activated air shut-off to minimize the potential for workers to enter or re-enter a potentially hazardous area.

6.12 Drum and Barrel Handling

Drums and barrels should be moved with a barrel truck or forklift whenever possible. However, if they must be moved manually, follow these safety precautions:

- Before attempting to move a drum or barrel, identify the load or its contents.
- Read the label on the drum and look for symbols, words, or other marks which indicate if its contents are hazardous, corrosive, toxic or flammable.
- Check to see if the drum or barrel is leaking. If so, ensure that you have the correct materials for cleaning up the chemical.

Make sure you have been trained in the hazards of the chemical and review the appropriate SDS if required.

- Roll the drums or barrels by pushing on the center rolling rings. Do not grasp the ends as this places your hands in a position to be pinched between the barrel and some other object. Never kick barrels with your feet.
- Never roll or push the barrel or drum off the back of a truck; use a low angle ramp or the loading dock.

6.13 Electricity and Electrical Equipment

When performing electrical work, always take appropriate precautions against the hazards (shock, arc flash, fire, etc.) likely to be encountered with this type of work. In particular:

- All electrical guards and protective devices (including lockout and isolation) must be in place and functioning properly.
- Only qualified electricians, or apprentices under the direct supervision of a journeyman electrician, are permitted to make electrical repairs.
- Employees and contractors must follow electrical safe work practices and procedures when working around electrical equipment and power lines.

1. Electrical Work Hazard Assessment

A written hazard assessment must be completed, a work plan developed, and a Safe Work Permit issued when working on energized or de-energized electrical circuits.

2. Electrical PPE Requirements

Employees and contractors are expected to provide and use PPE that meets regulatory, industry and manufacturers' requirements. It must be in serviceable condition (has current certifications) and appropriate to the nature of the job.

PPE requirements for **electrical workers** include the following:

- Safety eyewear/face shield/flash hood (rated for arc flashes).
- Protective footwear (CSA ohm rated).
- Hearing protection.
- Arc rated, fire-retardant clothing with reflective tape (striping) or vest (all clothing should be properly fitted).
- Arc rated flash suit (when applicable).
- Appropriate hand and arm protection (rated for expected voltage levels).

- Voltage detector.
- Rubber mats

3. Use of Extension Cords

Most power tools and portable electrical test equipment are not rated for use in hazardous areas and are equipped with standard U-ground plugs. It may be necessary, under hot work permit conditions only, to use a “short cheater” cord to connect hazardous-location-rated electrical receptacles or extension cords to non-hazardous-location-rated electrical tools or equipment.

Due to the hazards of arcing electrical equipment or connections, the following safety precautions must be adhered to:

- All extension cords used in a confined space must have hazardous-location-rated connections.
- All “cheater cords” must be less than 0.6 metres (2 feet) in length with one male hazardous-location-rated end and one female standard U-ground plug, and must be connected directly to the power cord for the tool or equipment.
- All connections at standard U-ground plugs must be made and adequately taped (to prevent them from pulling apart), before plugging into the hazardous location rated receptacles.
- When the work is completed, connections must be broken at the hazardous-location-rated receptacle first.
- All portable electrical equipment that is approved for use in hazardous locations must have cords in good condition.

4. Temporary Power Lines

If temporary power lines are installed, they must be clearly marked in a manner that prevents storage of material beneath the line and vehicles or mobile equipment from travelling under or near the power lines. All lines must be properly supported.

5. Safe Work Clearances - Overhead Power Lines

When working near energized overhead power lines:

- Equipment operation is **not permitted** within 7 meters (horizontal or vertical distance) of an overhead power line without first contacting the utility or power line owner/operator to obtain the voltage of the overhead power line. **Note that typically 48 hours should be allowed to give the utility or power line owner/operator time to reply**

and/or make arrangements to be on site. Note; for unknown line voltage remain 7 meters in distance both horizontally and vertically.

- If the voltage has been obtained, then work may proceed closer to the power line, but no closer than the safe limits of approach. It is at the discretion of the utility or power line owner/operator as to whether a utility or power line owner/operator representative is required on site for direct supervision. If work is to proceed closer than the safe limits of approach, then an on-site utility or power line owner/operator representative must directly supervise the work, and the work shall not proceed if this is not the case.
- When working within a 7 metre distance from an overhead power line, a designated Safety Watch or flag person must assist in the work to ensure that the safe limit of approach is not violated when the work is being carried out near the limits set out in the Safe Limits of Approach. The utility may also install warning flagging or guarding, raise lines, de-energize lines, deactivate re-closers as they deem necessary.
- “Danger Overhead Power Lines” signage shall be posted 7 metres away from overhead power lines.
- Work in the vicinity of power lines shall only be conducted during daylight hours.
- Do not store material or equipment directly under or adjacent to an overhead power line.
- Do not place earth or other material under or adjacent to an overhead power line in such a manner that the minimum ground clearance would be reduced.
- For travelling under power lines at a safe distance, flagging shall be in place.
- If mobile equipment contacts a power line:
 - 1) Stay on the machine until the boom or equipment is cleared or the current is shut off.
 - 2) Don't let anyone approach the machine.
 - 3) If you have to leave the machine, jump off; do not step off. When you jump, ensure you are not touching the machine and the ground at the same time. Bunny hop with feet together until you are at least 10 metres from the equipment.

If you were to step off, part of your body (either a foot or a hand) would be in contact with the machine when the other foot touches the ground. You then become part of the completed circuit, possibly causing electrocution.

- All contacts with sources of electrical energy must be reported and investigated.

**Safe Limit of Approach Distances from
Overhead Power Lines for Persons and Equipment**

Operating Voltage of Overhead Power Line Between Conductors	Safe Limit of Approach Distance for Persons and Equipment
0 - 750 V Insulated or Polyethylene Covered Conductors (see Note 1)	0.30 m (12")
Above 750 V Insulated Conductors (see Notes 1 & 2)	1.0 m (40")
750 V - 40 kV	3.0 m (9'10")
69 kV, 72 kV	3.5 m (11'6")
138 kV, 144 kV	4.0 m (13')
230 kV, 260 kV	5.0 m (16'5")
500 kV	7.0 m (23')

Notes:

- 1) Conductors must be insulated or covered throughout their entire length to comply with these groups.
- 2) Conductors must be manufactured to rated and tested insulation levels.

6. Excavation in the Vicinity of Underground Electrical Cables

Excavation is not allowed to proceed within 1 metre of any underground electrical cable without first contacting the utility or power line owner/operator to receive permission to do so. The utility or power line owner/operator shall determine if it is necessary for direct on-site supervision by their representative.

Note that typically 48 hours should be allowed to give the utility or power line owner/operator time to reply and/or make arrangements to be on site.

Cable locating shall be conducted by the utility or power line owner/operator by first contacting Alberta One-Call. If stake locations are disrupted or 14 or more days elapse before the excavation proceeds, locating must be performed again.

Non-destructive excavation techniques are required, following policies and procedures of the cable owner/operator. This may include hand excavation with non-conductive-handled tools, or use of approved hydrovac services following specific safe work procedures.

7. Static Electricity

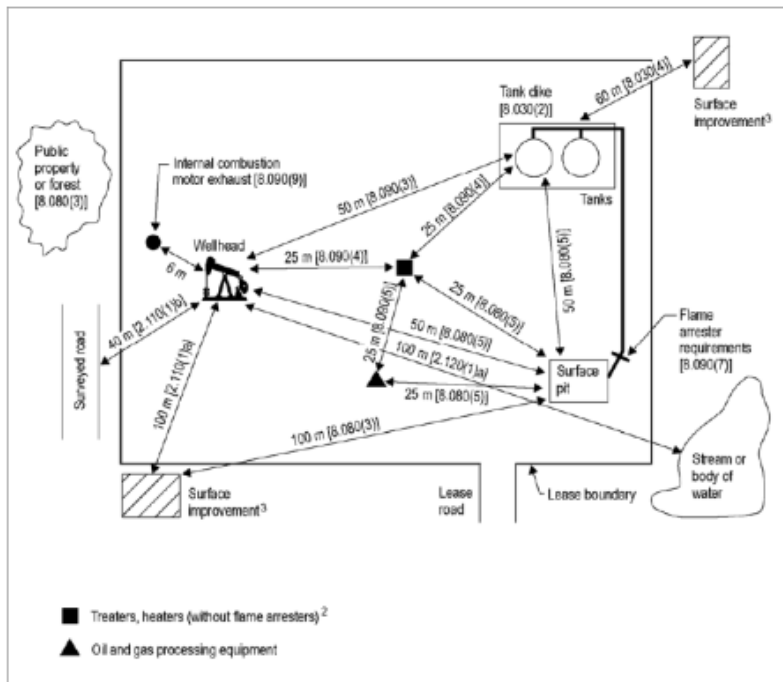
Sparks resulting from the accumulation of static electricity are often the cause of fires and explosions. Static electricity can be generated from friction of oil passing through a pipeline, pouring liquids from one container to another, or even steam passing through a hose. Steam, sand or hydrocarbons moving at a high speed through a hose can generate an extremely high static charge. Operators should only open sample lines or drains as wide as necessary. For more information on how to reduce the hazards associated with static electricity, *refer to 6.2 Bonding and Grounding in this Handbook.*

No plastic containers are to be used and all metal containers must be properly bonded.

6.14 Equipment Spacing and Clearance Requirements

Sinopec Canada expects that facilities will be designed and maintained in compliance with the jurisdictional surface equipment spacing requirements. The regulatory requirements for your jurisdiction must be reviewed. In the absence of specific guidance, consult the diagram below (which presents the Alberta and British Columbia Requirements)

Appendix 7 Spacing Diagram



6.15 Hot Work

Hot work is any work in which a flame is used or sparks or other sources of ignition may be produced when:

- Cutting, welding, burning, air gouging, riveting, drilling, grinding and chipping.

The above types of work can be conducted in a designated safe area(s) off lease if a minimum of 25 metres away from sources of ignition. If the above must occur within 25 metres a hot work permit must be issued and hot work procedures followed.

- Using electrical equipment not classified for use in a hazardous location.

Non-classified electrical equipment must be used in a designated safe area(s) for non-classified, electrical equipment which coincides with being outside of the CEC-prescribed, hazardous locations, Class

I - Zone 1 or 2, or this equipment must be treated and permitted as hot work in a hot work zone.

- Introducing a combustion engine to a work process.
For temporary movement of a vehicle powered by an internal combustion engine in and around a lease, the vehicle must remain in the designated safe area(s) for vehicles which coincides with being outside of the clearance of 7.5 metres, or the vehicle use must be treated and permitted as hot work in a hot work zone.
- Designated smoking areas must be located a minimum of 25 metres (75 feet) away from sources of hydrocarbons and production, drilling or well servicing operations or equipment.

The primary objective, whenever and wherever possible, is that hot work is done only in a designated “safe” hot work area. It is important to note that the determination of designated safe area(s) must be done in conjunction with other site information including:

- Contour of lease (noting trenches and other low-lying areas where hydrocarbon accumulation may occur).
- The nature of the hydrocarbons (lighter or heavier than air).
- Ambient conditions.
- Potential to create a hazardous atmosphere resulting from hot work in a designated safe area.
- Known sources of hydrocarbons including vents, tanks, etc.

Whenever circumstances arise that require the performance of hot work on or in close proximity to oil and gas equipment, the hot work must be undertaken with careful planning and preparation and only trained personnel shall be utilized.

Adequate documentation must be in place (hazard assessment form, Safe Work Permit or other equivalent) whenever it is necessary to use tools or perform tasks that could cause the ignition or release of explosive or flammable gas mixtures and substances.

6.16 Hydrate Handling

Hydrates are a mixture of hydrocarbons and water that under appropriate conditions of temperature and pressure, form as crystals and take on the appearance of snow. As the hydrates pack together, they form ice chunks and are capable of plugging pipes. This occurrence is referred to as “line freezing” or an “ice plug”.

Hydrates can also form where there is a sharp reduction in pressure such as at orifices, partially open control valves, sudden enlargement on pipelines, and short radius elbows.

The movement of hydrates through a pipeline can quickly accelerate to velocities approaching the speed of sound, which can cause serious damage (pipe movement, stress or its rupture) at any downstream location where a restriction, obstruction, or change of direction exists. **Note: Hydrate procedure must be developed prior to removal attempts.**

6.17 Ladders (extension and stepladders)

Portable ladders (wood, metal, or fiberglass) or stepladders used at work sites must be CSA approved and commercially manufactured.

- Check the ladder for broken rungs, split side rails, loose screws or bolts, worn or broken non-slip feet, frayed or damaged ropes. Tag it “out of service” and have it replaced.
- Before climbing a ladder, clean your boots if they are muddy or slippery. Avoid climbing with wet soles.
- When setting up the ladder, secure the base and “walk” the ladder up into place. The ladder should be set at the proper angle of one horizontal to every four vertical. Secure the ladder against movement. When in position, the ladder should extend 1 metre above the intended landing point.
- Do not work from the top two rungs of a ladder.
- Never overreach while on a ladder
- When climbing a ladder, always use the three-point contact system (ie. Two hands and one foot or two feet and one hand). Always face the ladder when using it. Grip it firmly when moving up or down.
- Use ladders made of non-conductive material (ie. Fiberglass) for electrical work.
- Hoist and lower materials by rope when working on a ladder.
- For heights over 6 metres (20 feet) a ladder must not be used; scaffolding must be in place.
- Tops of stepladders are not to be used as a support for scaffolds.
- Stepladders should be fully opened and the spreader bars or braces locked before using. Do not stand or work from the top two steps of a stepladder. Never use a stepladder as a straight ladder - always open the legs.
- Set up barricades and warning signs when using a stepladder in a doorway or passageway.
- Store ladders in such a manner to permit easy access or inspection.

6.18 Lifting and Material Handling (manually)

Workers must use proper lifting methods to protect themselves from injury and make their job easier. When equipment is available and conditions

make it practical, use mechanical devices (eg. Dollies, forklifts, hoists, and cranes) for lifting and material handling.

- Anything over 50 lbs. mechanical assistance should be considered.
- Never lift an object of any sort until you have some idea as to how heavy it is. Try the load to determine whether you can safely handle it.
- Do not attempt to lift or move objects which are too heavy or bulky for you or which require you to move or get in an awkward position. Obtain assistance.
- Regardless of the weight:
 - Always position your feet securely on the ground or surface.
 - Ensure you have a firm grip on the object.
 - Bend your knees, keep your back straight, and lift with your leg muscles.
 - Move your feet to change direction. Don't twist at the waist.
- When carrying pipe that is longer than 3 metres (10 ft.) at least two workers are needed and each should carry the pipe on the same shoulder.
- Many injuries result from improper stacking of materials. For maximum safety, see that each pile has a firm foundation and is cross tied for stability.
- When piling materials in a building, stay within the permissible floor load. Check this with your supervisor. Keep the size of each pile with safe limits and maintain adequate aisle ways to exits and access to fire equipment, safety showers, control valves and switches.
- Always have a clear view of your path when carrying materials.

6.19 Lighting Flare Stacks/Uncontrolled Ignitions

Ensure the following safety precautions are in place:

- Check area for LEL (Lower Explosive Limit)
- Ensure the stack system design is in serviceable condition. Immediately after firing off the flare, step back from the stack, observe the ignition, and be ready to respond should the cartridge catcher fail.
- Where flare guns are required for operational purposes, a site-specific procedure must be developed.
- Site-specific Emergency Response Plans (ERPs), describe the procedure for ignition of controlled and uncontrolled gas sources. Personnel must be familiar with these plans.

6.20 Lockout / Tagout

When performing maintenance or repair work on electrical, mechanical hydraulic or steam-driven equipment or process equipment, all workers must follow proper Lockout and Tagout Practices.

Lockout is the use of a lock or locks to render machinery or equipment inoperable or to isolate an energy or product source. The purpose of a lockout is to prevent any energy or product isolating device (such as a switch, circuit breaker, or valve) from accidentally or inadvertently being operated while workers are performing maintenance or service on machinery or equipment.

Tagout is the placement of a tag or marker attached or adjacent to a lock identifying the individual who attached the lock and time and date of attachment.

Individual lock(s) may not be removed by anyone except who placed the lock.

Lockout / Tagout procedures include the following:

- The identification of the machine or equipment;
- Specific steps to shut down, isolate, block, and secure machine or equipment;
- Specific steps for the safe placement, removal, and transfer of Lockout / Tagout devices;
- Identification of who is responsible for the Lockout / Tagout devices; and
- Specific steps for testing machines and equipment to determine the effectiveness of lockout devices, tagout devices, and other Lockout / Tagout measures.

***Reference: Lockout / Tagout Code of Practice
Sinopec Canada HSE Manual***

6.21 Machinery Safeguards

Machine and equipment safeguards should not be removed except for maintenance, repair, testing, or adjustment.

- Remove machine guards only after permission is received from your supervisor and the machine or equipment is shut down following proper Lockout and Tag Practices
- Do not restart a machine until you have checked and made sure that all guards have been properly replaced and adjusted according to the manufacturer's instructions.

- Never, under any circumstances, use grinding or buffing tools without a proper manufactured guard. Always use eye and face protection as the grinding wheel or wire bristles can let go at any time.
- All machinery must be shut down for oiling unless the grease or oil cups are located outside the guard or they are not near moving parts.
- Ensure all guards are in place when using portable hand tools.

6.22 Manual Tank Gauging

Tank gauging can present a significant hazard to workers due to the presence of toxic or combustible gases as well as the height of the tank being gauged.

- The handrail should be used when ascending or descending stairs. Special care and caution must be used when the ladders are wet, icy, or snowy.
- Operators must not gauge tanks or remain near tanks during an electrical or thunderstorm.
- Use appropriate personal protective and respiratory protective equipment.
- To prevent an electrostatic discharge when opening hatches, touch the ladder or stairway with your bare hand before reaching to the top of the tank. Use proper tank gauge with bonding cord.
- Operators should stand to the upwind side of the tank hatch.
- **Personnel must not stand or walk on tank roofs.**
- Gauge and thief hatches should be closed at all times.
- Report any unsafe or inoperative thief hatches.

6.23 Pigging

Pigging operations can represent a significant hazard and site-specific operating procedures must be used. The primary hazards and precautions associated with pigging include:

- Exposure to toxic, flammable materials.
- Exposure to pig exiting the receiver under pressure.
- Exposure to high pressure (ie. Bodily injury due to launcher or pig traps opening under pressure)
- Trapped pressure
- Staying clear of the pig launcher/catcher door and opening.
- Ensuring the pig is compatible with the pipeline and the required pigging job.
- Using only proper disposal methods for pigging wax, other solids and fluids.

- Following site-specific procedures.

6.24 Portable and Fixed Grinders

Grinders (portable and fixed) must be used, maintained, and inspected regularly according to the manufacturer's recommendations.

- Workers who are grinding or buffing must wear full face shields and safety eyewear with side shields.
- Prior to starting a grinder, inspect the abrasive wheels and discs for defects (cracks and chips)
- Check the position of the safety guards. Do not use grinders without guards.
- Do not use abrasive wheels and discus for side grinding unless designed for that purpose
- A work or tool rest for a grinding wheel must have a maximum clearance of 1/8 inch from the abrasive wheel, must be positioned at the center line of the abrasive wheel and must not be adjusted while the abrasive wheel is in motion.

6.25 Portable Heaters

Workers must obtain permission from the on-site supervisor to heat buildings with portable heaters that are not approved for the specific services. Hazards associated toxic gases, ventilation and flammability must be assessed prior to use.

6.26 Purging

Purging is the removal of an undesirable medium from vessels, equipment and piping systems. This is accomplished by the replacement of the undesirable medium with a purging medium.

The choice of the purge materials such as nitrogen, steam, water, or fuel gas depends upon the process and the availability of the material.

Steam and water are commonly used for water wet systems but would not be used to purge catalyst systems or systems that operate at low temperature where the presence of water vapour is undesirable.

Primary hazards associated with purging are:

- Fire (burns) or explosion from purged gases.
- Suffocation in oxygen-deficient atmospheres.
- Burns or scalding (when steam purging)
- Iron Sulphide

When purging, as part of commissioning and/or decommissioning lines and vessels, a hazard assessment must be completed, site-specific procedures must be developed and a Safe Work Permit must be issued.

6.27 Relief Valves

Relief valves are safety devices that are designed to provide workers and equipment with protection against overpressure. Relief valves require sensitive calibration and must be transported and installed according to the local engineering design specifications and manufacturers' instructions

- Relief valves shall not be isolated or bypassed unless by design.
- Relief valves must not be tampered with.
- Relief valves that have been activated must be investigated and serviced to maintain design integrity.
- The relief point on relief systems should not impinge on workspaces or walkways.

6.28 Riggings (ropes, chains and cables)

All rigging equipment must be handled and stored properly to ensure it is maintained in good condition to maximize its service life. Workers are responsible for:

- Inspecting rigging equipment prior to use.
- Tagging and reporting defective equipment to their on-site supervisor.
- Using and maintaining the equipment as outlined in the applicable regulations, manufacturers' instructions, and industry recognized practices.

6.29 Shutdown Devices (emergency)

Emergency Shutdown Devices (ESDs) on facilities, buildings or equipment should be function checked at least annually. Any ESDs that fail to operate must be immediately reported to the on-site supervisor and repaired.

6.30 Signage for Worksites, Pipelines and Facilities

Well site, pipeline, and facility identification guidelines have been prepared to ensure consistency and accuracy of all company lease and facility design requirements. If you have further concerns contact Supervisor, Foreman, Calgary head office, HSE, Regulatory or Facility Departments.

6.31 Tools

- Select the proper tool for the task.
- Inspect tools and equipment before use; if a tool is damaged or appears to be defective, do not use it. Tag it and report the deficiency.
- Only use the tool for the purpose intended and be aware of any safe work procedures.
- Workers should never use tools'/' or equipment they are not qualified or properly trained to use. Be aware that some tools or equipment require certification to be able to use.

6.32 Security (Trespass)

- Do not approach suspicious looking individuals; contact local law enforcement and report all suspicious activity at our near Sinopec Daylight property to your Supervisor immediately.
- Report all security incidents to the Sinopec Daylight Supervisor or representative
- Contractors and their workers should avoid or remove themselves from confrontations with angry or disgruntled landowners
- Keep gates, doors, and windows secured when Sinopec Daylight facilities and leases are unattended.
- Pipeline right-of-way and lease identification signs must be installed as per government regulations.

6.33 Valve Operation

- A valve is a device to control flow and may be subject to or can cause mechanical stress from pressure shock loads during its operation.
- Always slowly open or close a valve unless the hazards of a fast motion have been assessed and controlled.
- Do not stand directly in front of, or over, the stems of high-pressure valves when opening or closing them.
- All pressure on plug valves should be relieved before attempting to insert stem packing, except valves which are designed to be packed under pressure. Proper lubrication for plug valves should be used as recommended by the manufacturer.

6.34 Welding and Cutting

Welding within a production area is an activity which requires extreme caution and proper procedures. Welding and other hot work is not considered to be routine operations. Great care and consideration must be taken before welding onto or cutting into any production lines.

A hazard assessment must be conducted, a pre-job safety meeting held, and a Hot Work Permit issued prior to any welding or cutting operation. Adequate controls must be in place to offset the hazards associated with welding or cutting on any work site.

Welding and cutting operations will be conducted by contractors who are competent and specialize in this type of work.

Common welding and cutting hazards and precautions are:

- Explosions.
- Fires and burns from contact with hot metal or sparks.
- Shock from electrical current.
- Flying debris.
- Skin and eye damage from exposure to infrared and ultraviolet radiation.
- Exposure to toxic metal fumes and gases.
- Ensure fire extinguishers are easily accessible to the welder.
- Use mechanical exhaust ventilation in areas containing highly toxic fumes and for heavy production.
- Wear proper PPE such as a welding apron, goggles, gloves with sleeves, a jacket and a face shield.
- Use protective shields in congested areas to protect other workers.
- Mobile welding trucks must be equipped with fire suppression appropriate to the nature of the hazards and the work area.
- Welders and welders' helpers must know how and when, to use such fire extinguishers.
- On gas welding equipment, suitable flashback devices are to be installed on both hoses to prevent reverse gas flows.

7.0 PRODUCTION AND FACILITY OPERATIONS

7.1 Breaking Lines

Breaking open process lines or pressure piping systems can expose workers to hazards such as:

- Fires associated with flammable gases, liquids or vapours.
- Sources of ignition (ie. Sparking or static electricity, open flame, iron sulphide, cathodic current, etc.).
- Toxic vapours or corrosive substances.
- High temperature fluids and gases under pressure

7.2 Cathodic Protection

A cathodic protection system puts an electrical charge in the soil to prevent or reduce corrosion on pipes, tanks or other buried structures. As a result, the cathodic protection must be shut off or disconnected to prevent sparking hazards.

When working on a piping system connected to cathodic protection (eg. Removal of a valve, breaking lines), personnel shall adhere to the following safety requirements:

- Conduct a hazard assessment and issue a Hot Work Permit.
- Turn off and lock out the power supply to the nearest rectifier providing current to the piping.
- Connect the bonding cables and ensure a good connection on bare metal by removing paint (use caution when scraping), tape or insulation. The use of pipe clamps and booster cables is acceptable.
- When the repairs are complete, remove the cable bond, purge the piping, and turn on the power supply to the rectifier.

7.3 Cold Cutting

The following hazards are associated with cold cutting pipe:

- Fire and explosion
- Stressed pipe (recoil)
- Exposure to pipeline contents

General Safety Guidelines

- A hazard assessment must be completed as part of issuing the Safe Work Permit, review the SDS (Safety Data Sheet) of the pipe contents.

- Ensure the pipe is secured against movement and properly supported.
- Pig the line, if required.
- Close all connection valves, isolate (ie. blind and double block), drain and depressurize the pipe.
- If there is any uncertainty as to the contents in the line being cut, hot tap and then drain. Hot tapping is to be conducted as per site specific Hot Tap Procedures.
- Proceed with cutting the pipe. If liquid is discharged, collect it in grounded containers.

7.4 Depressurizing Equipment

Hazards and precautions when depressuring equipment:

- If H₂S is present, it must be kept out of the breathing space.
- The facilities used to capture and hold the liquids, as well as direct the gas to the atmosphere or flare, may be subjected to pressures exceeding design limits.
- Vented gases mix with air and produce explosive mixtures. These mixtures must be kept away from sources of ignition.
- Impact on the public and landowners.
- Regulatory notifications.

7.5 Fuel Gas as Instrument Gas

Before using fuel gas as instrumentation or power gas, ensure the fuel gas is compatible with the equipment and materials. Potential hazards include:

- Asphyxiation.
- Fire and explosion
- Pressure releases
- Premature equipment failure

A hazard assessment must be completed as part of issuing the Safe Work Permit. Review the SDS (Safety Data Sheet) of the pipe contents.

Safety Precautions to be Followed:

- All instrumentation gas, power gas, and all gas from regulators must be vented outside and away from any potential ignition source and labeled. Prevailing wind direction must be considered.
- Ensure all liquids present in the system can be safely trapped and removed.
- Vent lines should be sized and designed to eliminate back pressure on instrumentation or line freezing.

- Where sour fuel gas is used, the potential exposure concentrations must be addressed.
- Fuel gas must not be used as a substitute for air in portable power tools (eg. Impact drivers, sprayers, pumps).
- Fuel gas must not be used as a low pressure back up for an instrument air system.
- Establish and maintain a strict preventative maintenance schedule to look for and correct all types of leaks (ie. instrument-controlled gasket door leaks)

7.6 Gas and Liquid Sampling

All workers who are required to sample gas or liquids must demonstrate their competence to their supervisor.

Hazards associated with gas and liquid sampling include:

- Burns from hot fluids, gases chemicals and frost
- Chemical exposure from inhaling toxic substances
- Asphyxiation
- Dermatitis or skin irritation
- Fire and explosion from using improper sampling containers
- Plugged sample lines and faulty valves
- Static electricity

A work-specific procedure must be developed to eliminate or control the potential hazards associated with gas and liquid sampling.

Additional PPE may include:

- Goggles and face shields
- Coveralls
- Rubber gloves when working with caustic/acid samples
- Personal monitor
- Self-Contained Breathing Apparatus (SCBA)

7.7 Gas Detection and Monitoring

All workers that use gas detection and monitoring equipment must be competent in its operation.

- Ensure personal multi-head detectors, capable of measuring explosive gases (lower explosive limit), oxygen (O₂), hydrogen sulphide (H₂S) and carbon monoxide (CO) are worn on the outside of a worker's clothing.
- Ensure detectors are calibrated and tested as per the manufacturer's specifications.

- Use tube-type detectors only for quantification of gas concentrations, not for ongoing monitoring.
- All personal and fixed H₂S detection equipment shall be low level, alarmed at 10 ppm H₂S.
- All fixed combustible LEL gas detectors are to be calibrated to a minimum alarm at the following settings:
 - Alarm: 20% of the LEL for methane.
 - Shutdown: 40% of the LEL for methane.

7.8 Hot Oiling

Hot Oiling is a treatment where hot fluids are circulated through existing process piping and equipment for the purposes of well stimulation, paraffin removal, or piping and equipment maintenance and cleaning. The following hazards are associated with hot oiling operations:

- Leaks of hot fluids at high pressure (potential auto ignition).
- Vapours venting from unlatched hatches.
- Toxic vapours (H₂S).
- Off gassing from chemical reaction (determine appropriate respiratory protective equipment).
- Potential ignition sources (heater, truck engine, static electricity).
- Release of flammable or toxic vapours as a result of preheating oil in the feed tank of the hot oil unit circulating oil through the heater back to the tank.
- Snaking hoses - tripping hazards.
- Exceeding the maximum allowable working pressure or temperature of surface and down hole equipment (ie. tubing drain, plastic rod scrapes and fiberglass rods).

Prior to Hot Oiling

- A hazard assessment must be completed as part of issuing the Hot Work Permit.
- Review SDS (Safety Data Sheet) for any chemicals or fluids to be used in the work.
- Additional PPE requirements include face shields, fire-resistant clothing, appropriate hand protection, personal monitor, and Self Contained Breathing Apparatus (SCBA).
- Inspect the work area for hazards such as H₂S, gas leaks, spills and overhead power lines.
- Ensure the equipment placement and spacing meets regulatory requirements.
- Ensure signs are conspicuously placed to warn workers approaching the work site of a potentially hazardous condition (ie. H₂S).

7.9 Production, Facility and Process Equipment

Production, facility and process equipment may consist of moving parts that can cause death or serious injury to workers if safe practices are not observed when erecting, moving, operating or maintaining the equipment. Workers in or around the equipment must stay clear of stationary or moving components, cranks and counterweights. Times of particular danger are during installation, equipment maintenance, servicing or inspection operations. Potential hazards include:

- Pinch points.
- Fire.
- Explosion.
- Ignition sources (ie. sparks and static electricity).
- Pressure.
- Toxic or contaminated atmospheres.
- Slips, trips, and falls.

7.10 Tank Cleaning

Whenever cleaning storage tanks, refer to Confined Space Entry Code of Practice for detailed instructions and conditions on entering a storage tank. Ensure a written site-specific practice is on-site and discussed during pre-job meeting.

- Prior to taking the tank out of services, a hazard assessment must be completed as part of issuing the Safe Work Permit. Review the physical and chemical properties (ie. toxicity, flashpoint, pyrophoric deposits, etc.).
- Wear and use the required PPE (ie. SCBA) and conduct continuous atmospheric monitoring. Follow the conditions recorded on the Safe Work Permit.
- Tanks must not be cleaned during an electrical storm.
- Tanks and tank lines must be properly isolated.
- The contents of the tank (ie. hazardous vapours and materials) must be removed in a safe and environmentally friendly manner.
- Keep all sources of ignition at a safe distance. Any non-intrinsically safe equipment must be used under a Hot Work Permit.
- When tanks are being moistened down or cleaned by flushing with water or steam, the heater or steam hose nozzle must be grounded. Wire-wrapped hose may be grounded through the external wire.

8.0 PIPELINE OPERATIONS

8.1 Detection and Reporting of Leaks and Breaks

The signs of a leak or break in a pipeline include:

- Pooling of hydrocarbons or water on the right-of-way.
- Unusual ground temperature change (ice or snow melt).
- Wilting or dead vegetation along the right-of-way.
- Unexplained loss of pressure.
- Soil erosion or settlement on the right-of-way.
- Odour of hydrocarbons (hydrogen sulphide).

When the presence of a leak is suspected, workers must:

- In a non-emergency situation, notify their supervisor to initiate the repair procedures.
- In an emergency situation, initiate the company's emergency response procedures and take immediate steps to isolate the leak.

8.2 Reporting Damage to the Pipe or its Coating

All pipelines have a protective coating to help control external corrosion of the pipe. The condition of the coating will be inspected each and every time an excavation occurs on a pipeline.

- All damage to above ground pipe (ie. insulation, support brackets, valves, flanges, etc.) must be reported to the Supervisor/Field Foreman.
- In the case of a ground disturbance, if contact is made with an underground pipe that results in a puncture or crack, scratch, gouge, flattening or dent of the surface, or damage to the protective coating, terminate the ground disturbance work immediately. Notify the Supervisor/Field Foreman and regulatory authorities.

8.3 Warning Signs and Markers

If pipeline warning markers and signs are removed, defaced, worn out or become illegible, it is the responsibility of field personnel to report deficiencies to their Supervisor/Field Foreman. This practice also applies to other companies operating pipelines on Sinopec Canada property.

9.0 OILFIELD TRUCKING

All field employees and trucking contractors must have valid certificates in First Aid/CPR, H2S Alive, WHMIS and TDG and must be experienced and competent in the handling and transporting of hazardous products.

- No truck is permitted to transport product without automatic positive air shut-off
- Drivers shall not exceed posted speed limits and shall drive according to the weather and road conditions
- No unauthorized persons are permitted in the trucks
- Trucks must be driven to the loading area slowly, making sure the path is clear of loading hoses or cables, etc.
- No loading/unloading is permitted during an electrical storm
- If a truck fails to start, it must be towed at least 30 metres before being worked on (pushing trucks or battery boosting is prohibited in the loading area)
- When loading or unloading:
 - Wear and use the PPE required for the facility
 - Turn off cellular phones, CBs or two-way radios
 - Ensure drivers stay with their truck and remain outside of truck to monitor while loading/unloading
 - Ensure maintenance work is not performed while onsite
 - Smoking is not permitted
 - Review SDS (Safety Data Sheet) and have a copy accessible
 - Set parking brake and chock wheels
 - Ground and bond vehicle and equipment
 - Venting of Sour Gas is not permitted
 - Ensure JSA & Hazard Assessment for task are completed and attached to Safety Work Permit
- Follow site specific loading procedure

10.0 OCCUPATIONAL HEALTH

10.1 First Aid and CPR

Standard First Aid and CPR certification is standard for all employees and contingent workers assigned to field operations.

- All workers must familiarize themselves with the location of on-site first aid equipment, eye wash stations and emergency telephone numbers.
- Report all injuries or illnesses requiring first aid, no matter how minor, to your supervisor.
- First aid kit supplies must be maintained up to date.

10.2 Hearing Conservation and Noise Abatement

All workers must wear the following CSA Class A hearing protection:

- For noise levels exceeding 85 dBA - earplugs or earmuffs.
- For noise levels exceeding 100 dBA - earplugs and earmuffs.

Signs will be posted at all entrances (buildings, units, etc.) where the noise level exceeds 85 dBA, stating “Hearing Protection Required”.

Audiometric testing, noise monitoring and employee training will be conducted in accordance with Sinopec Canada’s Hearing Conservation Program.

**Reference: *Hearing Conservation Code of Practice*
*Sinopec Canada HSE Manual***

10.3 Toxic Chemicals

To prevent the long-term effects of occupational exposure to chemicals or groups of chemicals, workers should be briefed and instructed on the hazards, SDS (Safety Data Sheet), personal protective equipment (PPE) and the emergency response and rescue procedures for handling toxic chemicals which are present at the work site. Workers with sensitivities may require additional PPE. Given the constant addition of new information on toxic chemicals, it is prudent for workers to limit their exposure as much as practically possible.

10.4 Hazardous Materials

General safety precautions to eliminate or reduce the risk of being exposed to these hazardous materials include:

- Conduct a hazard assessment and review the SDS to determine additional PPE requirements, which may include:
 - a) Air purifying, SCBA or SABA respirators.
 - b) Face shields and goggles
 - c) Gauntlet-style gloves (ie. neoprene, PVC, or rubber)
 - d) Aprons, chemical suits and specialized footwear.
 - e) Disposable clothing or gloves.
- Adequate ventilation of the work area must be maintained.
- Ensure eye wash stations and deluge showers are available.
- Ensure fire protection equipment is available and ready for immediate use.
- Practice good personal hygiene.

10.5 Benzene

Field personnel and contractors may be exposed to benzene while handling for transferring products or through fugitive emissions. Fugitive benzene emissions are a particular concern around dehydrators. When benzene enters the bloodstream through the lungs or skin, it collects in the fatty areas of the body.

Short term health effects include light-headedness, headaches, unsteady gait, drowsiness and nausea. Benzene may also cause eye and skin irritation.

Long term effects include an increased risk of leukemia and other blood disorders such as a decreased blood-clotting ability.

Benzene is highly flammable and forms explosive mixtures in air at very low concentrations.

Should your clothing come into contact with benzene, you must immediately:

- Rinse or douse yourself with water **before** removing clothing to avoid ignition due to static electricity.
- Wash affected areas of the body thoroughly with soap and water.
- Seek medical attention if you suffer from any of the short term health effects.
- Report the spill to your Supervisor/Field Foreman.

10.6 Hydrocarbon Gases

Most of the hydrocarbon gases encountered are considered toxic, although the allowable exposures are higher than H₂S. The gases can affect the respiratory organs if exposure is of long duration. Hydrocarbon gas can, of

course, exclude air and cause suffocation. The best means of combating this hazard is providing proper ventilation, keeping in mind that these gases are highly flammable.

10.7 Hydrogen Sulphide (H₂S)

All employees and contingent workers must hold a current “H₂S Alive Certificate” (or equivalent) when working in a sour gas area or facility and must follow the **Sour Service Code of Practice” & “Respiratory Protective Equipment Code of Practice”**.

When completing any operation and the release of gas is expected to expose the worker to H₂S levels that exceed the occupational exposure limits, a breathing apparatus is required. A back up person is needed in these situations.

Workers are responsible for:

- Wearing and using the required personal protective and respiratory equipment identified during the hazard assessment and as specified on the Safe Work Permit.
- Testing their personal monitor daily and setting it to alarm for H₂S at 10 ppm. Personal monitors must be worn on the outside of any clothing.
- Reporting any leaks or drips at sour facilities to their Supervisor/Field Foreman.

In the event of an H₂S release, follow these seven steps:

1. **EVACUATE** - Get to a safe area immediately
 - Move upwind if release is downwind of you
 - Move crosswind if release is upwind of you
 - Move to higher ground if possible
2. **ALARM** - Call for help (“Man Down”), sound bell, horn, whistle or call by radio.
3. **ASSESS** - Do a head count. Consider other hazards.
4. **PROTECT** - Put on breathing apparatus before attempting rescue.
5. **RESCUE** - Remove victim to a safe area.
6. **REVIVE** - Apply artificial respiration if necessary.
7. **MEDICAL AID** - Arrange transport of victim to medical aid. Provide information to EMS.

H2S Toxicity Levels and Occupational Exposure Limits

H2S Exposure (ppm)	Health Effects and Exposure Limits
Less than 1 ppm	<ul style="list-style-type: none"> You can smell it.
10 ppm or less	<ul style="list-style-type: none"> No known short term effects from 8 hour exposures

10 ppm	<ul style="list-style-type: none"> 8 hour maximum Occupational Exposure Limit (OEL). Personal monitors must be set to alarm at 10 ppm
15 ppm	<ul style="list-style-type: none"> 15 minutes or Occupational Exposure Ceiling Limit.

100 ppm	<p>Immediately Dangerous to Life and Health (IDLH)</p> <ul style="list-style-type: none"> Eye, nose, throat, and lung irritation Coughing, eye irritation, loss of sense of smell after 3 to 15 minutes. May burn throat, cause headache and nausea
500 ppm to 700 ppm	<ul style="list-style-type: none"> Loss of reasoning and balance. Become unconscious leading to cessation of breathing. Prompt resuscitation is required.
1000 ppm	<ul style="list-style-type: none"> Unconscious at once. Death or permanent brain damage will result unless rescued immediately.

10.8 Iron Sulphide

Iron sulphide is produced by the corrosive action of hydrogen sulphide on the iron and steel of process equipment and tanks. It is a black or dark brown material bound in a grainy, scaly, lumpy or more less powder from mixed with coke, oil, sand, and other process materials.

- Iron sulphide, when it is dry, will ignite spontaneously in air and will release toxic sulphur dioxide gas.
- When cleaning vessels or tanks, always keep the walls and roof wet with water or steam to reduce the risk of fire.
- SCBA must be kept nearby, ready for immediate use during cleaning operations should the iron sulphide ignite.
- Once iron sulphide has been removed from equipment, it must be wetted thoroughly and placed in metal containers with tight-fitting lids. They should then be labeled and disposed of properly.

10.9 Liquid Petroleum Gases (propane and butane liquids)

- Use caution when working with liquid petroleum gases (LPGs) as they are very susceptible to fire and explosion from static electricity, sparks or open flame.
- Wear gloves and face shields to avoid skin contact as LPGs evaporate rapidly causing burning or freezing to exposed skin.
- Ground lines must always be connected during the unloading or loading of vessels or trucks.

10.10 Methanol

Methanol is used primarily for hydrate control and management. Large volumes can be used in normal winter operations and during summer operations where hydrates may occur. Methanol is easily absorbed through the skin which can be a major source of entry into the body.

Short term health effects include skin, eye, nose, throat and lung irritation. Repeated contact may cause skin de-fatting, redness and irritation.

- Repeated overexposure to methanol may cause vision disturbances such as blurred vision, wavy lines or even blindness in extreme cases.
- The Occupational Exposure Limit (OEL) for methanol is 200 ppm for 8 hours.

Long term exposure to methanol has been linked to eye, skin, respiratory, central nervous system and gastrointestinal tract damage.

Recommended PPE

- Neoprene clothing (aprons or rain suits) is recommended for all methanol use, especially when body contact with methanol is possible.
- SCBA or SABA are the only approved respirators for exposure to methanol vapours for the following two reasons:
 1. Organic cartridges allow methanol to migrate through the cartridge very quickly (within minutes).
 2. Pure methanol does not have an odour so the user cannot detect breakthrough.

10.11 Naturally Occurring Radioactive Materials (NORM)

In most instances, the radiation hazard from NORM is limited to inhalation and skin contact with NORM-contaminated sludge, scales and films on the inside/outside surfaces of process equipment and contaminated soils.

Sinopec Canada will inform workers of the NORM hazard during the work site orientation and when personnel are required to handle NORM-contaminated equipment/materials or conduct NORM detection surveys.

Long term exposure to air contaminated with NORM can cause damage to lungs, which can increase the risk of lung cancer and leukemia.

General Safety Precautions

- Avoid skin contact with NORM-contaminated scale at all times. If scale removal is necessary, wear appropriate PPE.
- Do not eat, drink, smoke or chew gum or tobacco when NORM are present in the soil or in the interior of open equipment that is being cleaned or receiving maintenance.
- If exposed to NORM or after any potential contact is made, follow good personal hygiene practices.
- Use proper respiratory protection to minimize exposure to dust and mist when performing cutting, grinding, welding or de-scaling on NORM-contaminated equipment. Additionally, handle it in a “wet state” to minimize airborne concentration.

***Reference: NORM Management Code of Practice
Sinopec Canada HSE Manual***

11.0 CONTRACTOR MANAGEMENT

Field employees need to know that Sinopec Canada has numerous processes to ensure that working relationships with contractors are in alignment with Sinopec Canada Health, Safety and Environment Management System.

All contractors must comply with Sinopec Canada’s requirements for liability insurance and WCB coverage, Certificate of Recognition (COR/SECOR), appropriate training, and ensure all employees, or sub-contractors are competent to undertake such work. Field employees are obligated, as Sinopec Canada representatives, to assess a contractor’s safety performance in the course of their business and report any risks or opportunities for improvement.

Any Service Providers working on a Sinopec Canada worksite must be properly approved and orientated. Only Service Providers on the Safety Approved Vendors List in Complyworks can work on Sinopec Canada Sites.

12.0 DRILLING / COMPLETIONS SITES

Any employee, contractor or visitor entering a Sinopec Canada Drilling or Completions Site must first stop at the Safety trailer located at the entrance to the site.

Contractors or visitors will be asked to show their H2S, First Aid, WHMIS and TDG Certification. Contractors will require a safety orientation if they have not had it previously.

All contractors will also have to verify the certification of their Personal Monitor. All contractors may be asked to show their daily bump test logs.

13.0 EMERGENCY PREPAREDNESS AND RESPONSE

The following are Emergency Preparedness and Response requirements:

1. Emergency Response Priorities
 - Highest priority is life safety, workers, responders and the public.
 - Size up the situation
 - Determine if life is at immediate risk
 - Ensure that personnel safety factors are taken into account.
 - Determine if there are any environmental issues that need to be addressed.
 - Assume command and establish the Incident Command Post.
 - GET BIG FAST - over-respond until the incident is understood.
 - Establish immediate incident objectives, strategies and tactics.
 - Follow Response Process diagram
 - Determine resources (manpower and equipment) required to accomplish the incident objectives.
 - Develop the initial Incident Command System (ICS) organizational structure that maintains span of control.
 - Obtain advice and support from the company Emergency Operations Centre Team.
 - As appropriate, seek consensus with those impacted or having jurisdiction by sharing decision making.
 - Demobilize ICS functions when not needed. Keep ICS team proportional to incident needs.
2. Response Strategy
 - Emergency Preparedness
 - Identify who you would contact in the event of an emergency (potential Incident Commander).
 - Identify egress routes and muster locations.

- Ensure there is a head count obtained for all site personnel.
- Identify where relevant safety equipment is located (personal protective equipment, fire extinguishers, first aid kits, etc.).
- Understand how to initiate site evacuation in the event of an alarm or incident
- Initial Response
 - Contact your immediate supervisor.
 - Call Sinopec Canada's 24 hour Emergency Number. 1-866-616-6300
 - As required, call fire, police or ambulance (911).
 - Protect yourself and other responders.
 - Protect the public.
 - As required, call for back up. For any H2S incident, responders will be dispatched in pairs to investigate.
 - As required, call for external support services. Attempt to use a Sinopec Canada preferred vendor.
 - Ensure all personnel dispatched to the incident site are trained, accredited and appropriately equipped.
 - Document your response actions.
 - Initiate your emergency response plan and establish an Incident Command System (ICS) response team structure. Refer to Sinopec Canada's Incident Command System (ICS) - Quick Reference Guide.
- Continuous Response
 - Ensure internal/external reporting requirements are fulfilled.
 - As required, refer to the "Media Statement for Sinopec Canada Responder".
 - Initiate the appropriate Incident Specific Response Action.

3. Emergency Response Requirements

- Emergency preparedness and response is part of the planning process for all work in your area of responsibility.
- Emergency Response Plans are developed and maintained for all field operations to support effective and appropriate emergency response, at a level of detail appropriate to manage the risk to employees, the public, property and the environment.
- Emergency Response Plans facilitate factual, timely and appropriate internal and external communication.
- Sites have Emergency Response Plans and emergency response equipment that are appropriate to the hazards identified at the site.
- Plans are accessible and understood by all potential users.

- Plans are kept current.
- Emergency Response Plans are bridged to contractor Emergency Response Plans where appropriate.
- Key Incident Command roles and responsibilities are identified within the plan.
- Personnel and contingent workers are trained
- All sites must have an evacuation plan.

24 hour answering service 1-866-616-6300

14.0 SPILL MANAGEMENT

14.1 Storage Requirements

It is important to ensure all stored materials including liquids and solids are stored in appropriate containers or tanks and in a manner that prevents exposure to the elements.

- All containment storage facilities and dykes must be designed to meet regulatory requirements (eg. AER Directive 55)
- Aboveground tanks less than 5 m³ volume do not require secondary containment due to the limited potential for environmental damage. These include: glycols, amines, demulsifiers, corrosion inhibitors, solvents, and fuel tanks.
- Methanol tanks and tanks that are less than 1 m³ do not normally require any secondary containment unless they are within 100 m of a watercourse. The use of underground storage tanks should be avoided.
- All underground storage tanks must be double walled.

15.0 TRAINING SCHEDULE

PRODUCTION & MAINTENANCE SAFETY TRAINING REQUIREMENTS

Certification Required	Training Time (Hours)	Renewal Frequency (Years)	Field Employee / Contract Operator	Calgary Staff Involved in Field Operations
Standard First Aid with CPR and AED	16	3	Mandatory	Mandatory - Emergency First Aid
H2S Alive	8	3	Mandatory	Mandatory
WHMIS	Online	3	Mandatory	Mandatory
TDG	Online	3	Mandatory	Mandatory
Confined Space Awareness (Confined Space Entry and Rescue if Supervising - 8 hr)	4 Classroom	3	Mandatory	Optional
Ground Disturbance Awareness (Level 2 if supervising - 6.5 hr)	4 Classroom	3	*Mandatory	Optional
Detection and Control of Flammable Substances	8	3	*Mandatory	Optional
Fall Protection - General	4	3	*Mandatory	Optional
Fire Extinguisher Training	4	3	*Mandatory	Optional
Corporate HSE Orientation	Varies	As required	Mandatory	Mandatory
Spill Response (WCSS)	8	As required	As required	Optional
Emergency Response Training	4	Yearly	Mandatory	Mandatory
NORM Awareness	8	As required	Required, if potential for exposure	Optional
Driver Training	6	3	As required	Optional
ATV Training	4	3	Required if operating ATV	Optional
Bear Awareness	1	3	Required, if potential for exposure	Optional
PEIM (Pressure Equipment Integrity Management) Training	Varies	3	*Mandatory	Optional
POM (Pipeline Operating Manual) Training	Varies	3	*Mandatory	Optional

***Mandatory within 6 months of hire**

DRILLING SUPERVISOR TRAINING REQUIREMENTS

Certification Required	Training Time (Hours)	Renewal Frequency (Years)	Field Employee / Contract Operator	Calgary Staff Involved in Field Operations
Safety Management & Regulatory Awareness for Wellsite Supervisors	24	5	Mandatory	Mandatory
Second Line Supervisor's Well Control (First Line, pre-requisite)	40	2	Mandatory	Mandatory
Standard First Aid	16	3	Mandatory	Mandatory - Emergency First Aid
H2S Alive	8	3	Mandatory	Mandatory
WHMIS	Online	3	Mandatory	Mandatory
TDG	Online	3	Mandatory	Mandatory
Confined Space Pre-Entry	8 Classroom Only	3	Recommend	Optional
Ground Disturbance	6.5	3	Mandatory	Mandatory - Awareness (2 hour)
Detection and Control of Flammable Substances	8	3	Recommend	Recommend
Rig Work Fall Protection	16	2	Optional	Optional
Rig Work Fall Rescue	8	As required	Optional	Optional
General Safety Orientation Standard (Enform)	Online	As required	Optional	Optional
Corporate HSE Orientation	Online	As required	Mandatory	Mandatory
Emergency Response	4	Yearly	Mandatory	Mandatory
Spill Response	8	As required	Recommend	Optional

COMPLETIONS SUPERVISOR TRAINING REQUIREMENTS

Certification Required	Training Time (Hours)	Renewal Frequency (Years)	Field Employee / Contract Operator	Calgary Staff Involved in Field Operations
Safety Management & Regulatory Awareness for Wellsite Supervisors	24	5	Mandatory	Mandatory
Well Service BOP	32	5	Mandatory	Mandatory
Standard First Aid	16	3	Mandatory	Mandatory - Emergency First Aid
H2S Alive	8	3	Mandatory	Mandatory
WHMIS	Online	3	Mandatory	Mandatory
TDG	Online	3	Mandatory	Mandatory
Confined Space Pre-Entry	8 Classroom Only	3	Recommend	Optional
Ground Disturbance	6.5 Classroom Only	3	Mandatory	Mandatory - Awareness (2 hour)
Detection and Control of Flammable Substances	8	3	Mandatory	Mandatory
Rig Work Fall Protection	16	2	Optional	Optional
Rig Work Fall Rescue	8	As required	Optional	Optional
General Safety Orientation Standard (Enform)	Online	As required	Optional	Optional
Corporate HSE Orientation	Online	As required	Mandatory	Mandatory
Emergency Response	4	Yearly	Mandatory	Mandatory
Spill Response	8	As required	Recommend	Optional

CONSTRUCTION/FACILITIES SUPERVISOR TRAINING REQUIREMENTS

Certification Required	Training Time (Hours)	Renewal Frequency (Years)	Field Employee / Contract Operator	Calgary Staff Involved in Field Operations
Supervisor Safety & Leadership Training and/or Leadership for Safety Excellence	Varies	As required	Required if directing activities	Required if directing activities
Standard First Aid	16	3	Mandatory	Mandatory - Emergency First Aid
H2S Alive	8	3	Mandatory	Mandatory
WHMIS	Online	3	Mandatory	Mandatory
TDG	Online	3	Mandatory	Mandatory
Ground Disturbance	6.5 Classroom Only	3	Mandatory	Mandatory - Awareness (2 hour)
Detection and Control of Flammable Substances	8	3	Recommend	Recommend
Corporate HSE Orientation	Online	As required	Mandatory	Mandatory
Emergency Response	4	Yearly	Mandatory	Mandatory
Spill Response	8	As required	Recommend	Optional
ATV Training	4	As required	Required if operating ATV	Optional